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by Dr. sci. med. Zana Pozderac



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The differences in cerebral oxygenation among patients undergoing thyroidectomy in different positions and comparison of their effects on nausea-vomiting

Haci Yusuf Gunes, Ugur Goktas, Ismail Kati, Hasan Husnu Yuce, Serap Bartin

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Abstract

Background: Hyperextension of the patient's neck associated with distortion and vasospasm of the vertebral and internal carotid arteries intra-operatively. In this study we aimed to investigation of whether there is effects of supine, slight neck hyperextension and semi-seated and neck hyperextension positions of patients on postoperative nausea and vomiting (PONV) via regional cerebral oxygen saturation (rSO_2).

Methods: ASA I-II group of 40 adult patients for whom elective thyroid operations under general anesthesia (GA) were planned, were divided into 2 randomized groups. The patients in the Group 1 were positioned in the hyperextension of the neck at 45° semi-seated position and in the Group 2 patients were positioned in the supine position.

Results: The heart rate (HR), and mean arterial pressure (MAP) values were found to be statistically significantly higher in the first group than the second group in a few values ($p < 0.05$). There were no significant differences between the groups when they were compared for left and right cerebral oxygen saturation ($p > 0.05$). No correlation was determined between the cerebral arterial desaturation and rates of PONV.

Conclusions: It was concluded that cardiovascular changes due to hyperextension of the neck in a semi-seated position during surgery under general anesthesia, despite a cerebral desaturation in rSO_2 that remained within the cerebral auto-regulation range and there is no correlation of PONV with either neck hyperextension in the semi-seated position or desaturation conditions with less than a 20% decrease in rSO_2 .

Key words: cerebral oxygen saturation, hyperextension, PONV, supine, thyroidectomy.

Introduction

In a conscious, healthy individual, after a change in position, blood pressure and tissue perfusion are regulated quickly. Under anesthesia, autonomic regulation is defective. The most important topic during the procedure of anesthesia is to provide sufficient perfusion pressure and suitable surgical conditions (1).

Cerebral oximetry provides direct, non-invasive and continuous information for the follow-up of changes in regional cerebral oxygen saturation (rSO_2), and shows the equilibrium between the oxygen supply and oxygen expenditure in the cerebral venous micro-vascular tissue (2-4). The main changes in rSO_2 depend on the mean arterial pressure, hemoglobin, peripheral oxygen saturation (SpO_2), partial carbon dioxide pressure and heat changes. Neck position can cause rapid and dramatic changes in cerebral oxygen status. Hyperextension of the patient's neck associated with distortion and vasospasm of the vertebral and internal carotid arteries intra-operatively. The auto-regulation range for brain blood flow is 60-140 mmHg. In cases when the values of the pressure are above and below this range, the brain blood flow (BBF) depends on the pressure, and changes in direct proportion with the brain perfusion pressure (1).

Nausea-vomiting is a symptom seen at a frequency of 25-30% following any type of surgery in general (5). There are no studies present in the literature determining the effects of changes in rSO_2 on postoperative nausea-vomiting.

It is not clear that whether the thyroid surgery causes nausea and vomiting via cerebral desaturation or only increased vagal stimulation. In this study we aimed to investigation of whether there is effects of supine, slight neck hyperextension

and semi-seated and neck hyperextension positions of patients on postoperative nausea and vomiting (PONV) via cerebral oxygenation.

Materials and methods

After having obtained an approval from the local ethical committee and the patients' informed consents, a total of 40 patients, 7 men and 33 women, that were going to undergo elective thyroid surgery, who were classified as American Society of Anesthesiologist (ASA) I-II, with ages between 18 and 65 years were enrolled in the study. According to a randomized sequence, the patients were allocated into two groups.

All the patients were monitored with electrocardiography (ECG), SpO₂, non-invasive mean arterial pressure (MAP), end tidal carbon dioxide (etCO₂), heart rate (HR) and rSO₂. Two soma sensors were attached to the forehead regions that were adhered to the right and left frontal lobes (INVOS 4100, Somanetics Corporation, Troy, MI, USA). The first values that were recorded for the right and left hemispheres one by one were accepted as the preoperative baseline values. The 20% declines in baseline values were regarded as the critical border for intervention. For patients in whom such a decrease was recorded, increasing the oxygen concentration, fluid replacement and ephedrine application, if necessary, to normalize the haemodynamic changes, correction of the neck position and cessation of the surgical procedure were planned. Induction was provided with 5–6 mg/kg thiopental, 2 µg/kg fentanyl and 0, 1 mg/kg vecuronium, and the patients were intubated. For maintenance of anesthesia, 40% O₂ + 60% N₂O, desflurane (4–6%) and 50 µg fentanyl + 2 mg vecuronium once every 45 minutes were administered. After induction and intubation, the patients in the first group were positioned in the hyperextension of the neck at 45° semi-seated position and the second group patients were positioned in the supine position. Before induction, after intubation and during the operation, ECG, SpO₂, MAP, HR and etCO₂ were recorded. rSO₂ values were recorded continuously. At the end of surgery, after decurization with atropine and neostigmine, extubation was performed and nausea and vomiting were recorded at the first and second postoperative hours if present.

Statistical Analysis

Descriptive statistics dealing with the variables were defined as mean and standard deviation. The Two-Way ANOVA with repeated measurements on one factor level was utilized in the determination of differences between the variables among the groups and measurement times. The Chi Square test was used in the determination of differences for the presence of nausea-vomiting. The McNemar test was performed in each group to determine if the presence of differences between the first and the second hours was statistically significant or not.

Results

There was no significant difference between the groups with regard to the demographical data (Table 1).

Table 1. Demographic values (Mean±SD)

	Group 1 (n = 20)	Group 2 (n = 20)
Age (year)	43.85 ± 9.44	39.75 ± 8.38
Gender M/F	5/15	2/18
ASA I/II	16/4	16/4

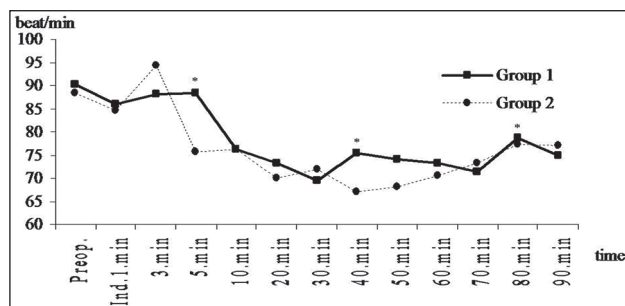
M: Male, F: Female, ASA: American Society of Anesthesiologist

It was determined that 40 cases were enough to achieve an 80% power to determine a minimal change of 20% in rSO₂ values.

There was a statistically significant increase in the HR values in the first group (5., 40., 80. minutes during operation) compared with the second group (p<0.05) (Figure 1).

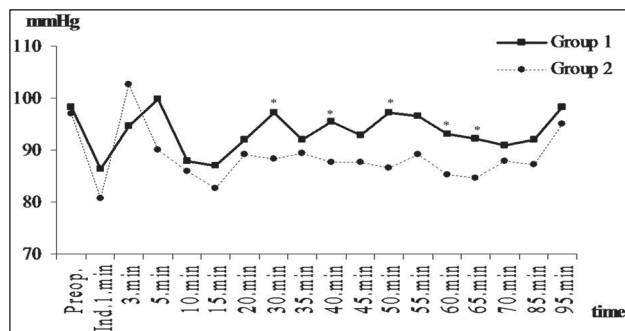
The MAP values were found to be statistically significantly higher in the first group (25., 40., 50., 60., 65. minutes during operation) than the second group. In the intra-group evaluation of MAP values, in both groups, it was determined that there was a significant decrease compared to preoperative values (p<0.05) (Figure 2).

There was no significant difference for SpO₂ among groups. After induction, there was an increase in SpO₂ values in both groups (p<0.05). In both the intra-group and the inter-group comparisons, there were no changes with regard to the etCO₂ values (p>0.05).



* $p < 0.05$

Figure 1. Heart Rate values



* $p < 0.05$

Figure 2. Mean Arterial Pressure values

There were no significant differences between the groups when they were compared for left cerebral oxygen saturation (rSO_2L) ($p > 0.05$). In the intra-group comparison, compared with the preoperative rSO_2L value in the first group, there was a significant increase at the first minute after induction, and at the fifth and tenth minutes after intubation, while there was a significant decrease at the ninety-fifth minute after intubation ($p < 0.05$). When compared with the preoperative rSO_2L value, in the second group, there was a significant increase at the first minute after intubation and at the fifth minute and just after intubation, while there was a significant decrease at the thirty-fifth and fortieth minutes after intubation ($p < 0.05$) (Figure 3).

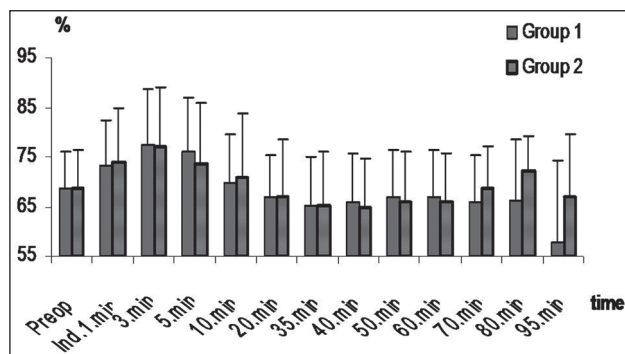


Figure 3. Left Regional Cerebral Oxygen Saturation (rSO_2L) values

In the comparison of groups for right cerebral artery oxygen saturation (rSO_2R), there was no significant difference between the groups ($p > 0.05$). In the intra-group evaluations, compared with preoperative rSO_2R values, there was an increase in the rSO_2R values measured at all other times in both groups ($p < 0.05$) (Figure 4).

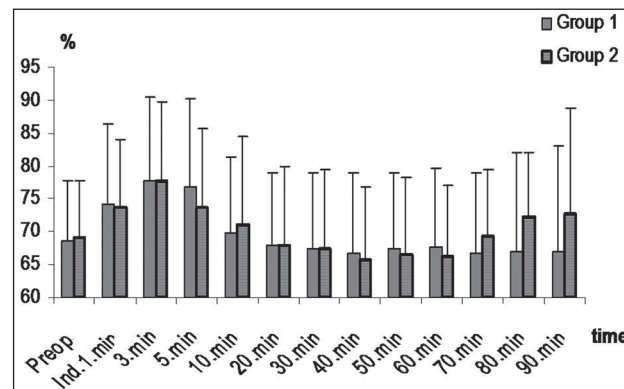


Figure 4. Right Regional Cerebral Oxygen Saturation (rSO_2R) values

Furthermore, in 4 cases in the first group and in 3 cases in the second group, we determined short-lasting 20% decreases in the right and left rSO_2 compared with baseline values. However, in all other cases, the decreases were lower than 10%. There was no correlation of these decrements with age.

There was an insignificant positive correlation between the decrease in MAP and the rSO_2 in 8 cases in the first group and in 15 cases in the second group. Furthermore, in 7 cases in the first group, although there was a decline in MAP (15-20%), there was no change in the rSO_2 . On the other hand, in the second group, a decrease in rSO_2 was observed in 3 cases, although the mean arterial pressure was increased in these cases. In other cases, decreases in MAP and decreases in rSO_2 acted independently from each other.

In the comparison of groups with regard to the PONV, there was no significant difference between the groups ($p > 0.05$) (Table 2). No correlation was determined between the cerebral arterial desaturation and rates of nausea-vomiting.

Table 2. Incidence of PONV

	Group 1 (n = 20)	Group 2 (n = 20)
1.Hour	14 (70%)	13 (65%)
2.Hour	11 (55%)	7 (35%)

PONV : Postoperative Nausea-Vomiting

Discussion

In this study, in one group of 20 patients with goiter, supine and slight neck hyperextension position technique were compared the findings in this group to another group of 20 patients with goiter who received the semi-seated and neck hyperextension position technique. In Group 1, the heart rate and also the mean arterial pressure values were higher than Group 2. Although no statistically superiority in left and right cerebral oxygen saturation values in Group 1 but we observed more stable condition of cerebral oxygenation. However we also observed more PONV events in Group 1.

The first aim of anesthetists who try to benefit from technological developments as much as possible is to provide the patients' safety and help perform an easy surgery without any problems.

All procedures under general anesthesia, especially those performed on elderly patients, may cause insufficient brain perfusion (6-8). However, the brain is rarely monitored in routine practice (9,10). If brain oxygenation is monitored during anesthesia, the insufficient perfusion condition can be prevented (11). We performed continuous rSO_2 monitorization in our study.

The most important etiological factors in decreases in rSO_2 include hemodilution, use of blood transfusions that have low oxygen carrying capacity, hypoxia, hypotension, hypercapnia due to bleeding, increase in cerebral metabolic oxygen expenditure due to insufficient depth of anesthesia, deficiencies in brain blood flow due to defects in neck position or in positioning of the central venous catheter. In our study, apart from the fall in blood pressure of not more than 20% of the preoperative values and hyperextension position of neck, which was the basis of the study, none of the above causes that could be an etiological factor in cerebral oxygen desaturation were present.

Decreases in rSO_2 are defined as decreases from the basal values (9).

Moehle et al. (12) defined cerebral oxygen desaturation as a 20% decrease for 3 minutes in rSO_2 compared with the beginning value. In many studies, it has been reported that 25% decreases in rSO_2 from the beginning value causes cerebral hypoxemia and that it should be corrected. Among patients with low basal values at the beginning,

the clinical meaning of changes in rSO_2 is not clear (13).

Iglesias et al. (11) reported that conservative interventions for rSO_2 and keeping rSO_2 above or equal to 75% of the preoperative values decreases the duration of hospitalization after cardiac surgery.

Casati et al. (14) reported that among patients older than 65 years of age that had undergone a major abdominal surgery, 26% of the patients had more than 20% cerebral desaturation intraoperatively, and in this group of patients, the incidence of early postoperative defects in brain functions and durations of hospitalization were higher. Green (15) also reported that approximately 24% of patients who were older than 45 years of age and that had major abdominal surgery, the rSO_2 was decreased more than 20% and in more than half of these cases, this decrease was due to major bleeding or prolonged surgery period. In our study, we determined that 4 cases in the first group and 3 cases in the second group had 20% decreases in rSO_2 from the baseline for a short time. However, all other decreases were lower than 10%. There was no correlation of these decrements with age.

Hoppenstein et al. (16) determined that in the comparison of patients operated with spinal or general anesthesia, there was no correlation between the rSO_2 and blood pressure, heart rate or peripheral oxygen saturation. They reported that regional cerebral oxygen saturation is probably specific for patients and may be independent from the technique of anesthesia.

In the seated position, a 20% decrease in stroke volume and cardiac output is attempted to be compensated with increases in vascular resistance (50-80%) in the awake position, but this autonomic response is constrained under anesthesia (17). According to the data of Pohl et al (17) who has described a case that reports as much as 28-42% decreases in blood pressure, it was stated that under general anesthesia applied in the seated position, non-invasive blood pressure measurements from the arm was insufficient in determination of brain blood flow, compared with the supine position.

Similarly, McPerson (18) described that changes in rSO_2 may be due to the specific body position and the state of cerebral perfusion.

Fuchs et al. (19) determined significant and sudden decreases in patient groups that were po-

sitioned in the seated position under general anesthesia. However, in awake patients, the mean arterial pressure decreased in all positions; while it was decreased in general anesthesia applied to those in the prone and lateral positions, and no decreases in the seated position was determined. They concluded that changes in the rSO_2 did not accompany changes in MAP completely, and because of this, a direct relationship between MAP and rSO_2 could not be determined. Contrarily, Paquet et al. (20) and Kurukahvecioğlu et al. (21) reported that with normalization of the heart filling pressures or increase in MAP, cerebral oxygenation could be affected positively, while Lee et al. (22) reported that rSO_2 decreased in parallel with the decrease in MAP and none of the patients had any neurological complications. In our study, it was observed that compared with preoperative values in the supine position, MAP values decreased more than that of those in the seated position; however, these decreases were not more than 20% of the preoperative values. While the rSO_2 values were decreased in parallel to the decreases in MAP in 57, 5 % of cases, in some of the other cases, although the MAP values decreased, the rSO_2 values did not change, or the rSO_2 decreases were independent from the MAP. The reason for this was concluded as: cardiovascular changes due to surgical positions of the patients, cerebral auto-regulation borders, and consistent with the literature, although changes in rSO_2 may be specific for patients, they may be parallel with the haemodynamic changes.

The rates of nausea and vomiting after head-neck surgeries, especially thyroidectomy, have been reported to be as high as 60-76% (15,23). The causes responsible for these high PONV incidences after thyroidectomy include development of significant edema and inflammation in the neck region. Casati et al. (14) did not determine any differences in PONV incidences between patients with or without development of cerebral oxygen desaturation. In our study, although there were no significant differences between the groups with regard to PONV, in Group 1 and Group 2, this rate was determined as 70% and 65% at the first hour and 55% and 35% at the second hour respectively. There was no correlation between the cerebral oxygen desaturation and nausea-vomiting rates.

There were several limitations in our study. The most important limitation of our study is that the patients who have the young age and no co-existing diseases. A larger group of patients needs to be evaluated to confirm the observations in this study. The serious cerebral desaturations were not seen in our study for this reason it was not evaluated whether PONV affect or not. A larger group of patients needs to be studied to determine the impact of individual cerebral desaturation (elderly patients, cerebrovascular events, nausea-vomiting sensitivity, etc.) and patients' neck position on outcomes PONV. Further randomized controlled studies are needed to study its effectiveness in such operations.

Conclusion

It was concluded that although changes in the rSO_2 are likely patient specific, they are parallel with haemodynamic changes. Cardiovascular changes due to hyperextension of the neck in a semi-seated position during surgery under general anesthesia, despite a cerebral desaturation in rSO_2 that remained within the cerebral auto-regulation range and there is no correlation of PONV with either neck hyperextension in the semi-seated position or desaturation conditions with less than a 20% decrease in rSO_2 . There is therefore a need for more prospective studies in who have risk groups with large sample size.

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Evaluation the relationship between serum uric acid and post myocardial infarction mortality

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Abstract

Introduction: Coronary artery disease is the leading cause of death. Many risk factors have been recognized for this disease including smoking, diabetes mellitus, hypertension and etc. Although the role of uric acid in cardiovascular diseases has previously been confirmed, it still isn't recognized as a prognostic factor for post myocardial infarction patients.

Materials and Methods: In this study, 393 patients with myocardial infarction who referred to Fateme Zahra hospital in 2010 were enrolled. After confirming the diagnosis of myocardial infarction, serum level of uric acid was measured in the first 48 hours by enzymatic methods and Toos calorimetry. After considering the variables, the patients were categorized according to their serum uric acid levels and were observed for one week in the hospital and followed up for three months after discharge.

Results: The relationship between the first week mortality and serum levels of uric acid wasn't significant ($P=0.104$). This finding wasn't different among males and females ($P=0.22$, $X^2=1.49$). However, the serum uric acid level was significantly related to post myocardial infarction mortality during the three months of follow up ($P<0.0001$). This finding also wasn't different among men and women ($P=0.39$, $X^2=0.71$).

Conclusion: Elevated levels of uric acid cannot be an early prognostic factor in the first days after MI. However, measuring it after discharge and during the follow up period and can be a long term prognostic factor.

Key words: Uric acid, myocardial infarction, mortality, prognosis.

Introduction

Coronary artery disease (CAD) is the leading cause of death in most modern societies. In addition,

this disease leads to long term morbidity, disability and losing the ability to work and produce and takes over most of the health care costs (1).

It is estimated that out of 17,600,000 Americans diagnosed with ischemic heart diseases, 10,200,000 patients suffer from angina pectoris and 8,500,000 suffer from myocardial infarction (MI) (2). According to Framingham, the risk of CAD is 49% for men over 40 years and 32% for women of the same age (3). Many factors are thought to put people at risk for coronary artery disease including hypertension, hyperlipidemia, family history of heart diseases, smoking and etc. High blood uric acid is a confirmed risk factor for cardiovascular incidents. Uric acid is a result of purine metabolism. Its blood concentrations can increase by reduced excretion or increased absorption or both and causes many known problems such as gout and uric acid nephropathy (4 – 6).

Although purines are produced and destructed in all tissues, urate is only produced in tissues that have xanthine oxidase such as liver and small intestine. Two thirds to three fourth of urate is excreted by the kidneys and the rest is eliminated by the intestine.

More than 90% of patients with hyperuricemia have defects in their renal excretion mechanism. Most of the factors that cause hyperuricemia increase uric acid reuptake (7 – 8). In molecular levels, acid uric has significant effects and is one of the most important anti oxidants of plasma. However, it can cause oxidative stress in higher concentrations. In vitro tests show that uric acid can cause endothelial dysfunction, smooth muscle proliferation, platelet aggregation and mild inflammation. It can also cause tubulointerstitial inflammation, functional changes and hypersensitivity to salt in glomeruli and renal arteries. It has been shown that high concentrations of uric acid are etiological factors of hyperuricemic hypertension and salt sensitive hypertension (9).

Despite its anti oxidant role, high serum concentrations of uric acid can lead to cardiovascular diseases and it isn't clear if this increase is the result of a causative response or supportive response (10). Also, it isn't clear if elevated levels of uric acid along with oxidative stress (i.e. stroke or atherosclerosis) is a supportive or primary response (11).

A study conducted by Meisinger et al which was published in *Arteriosclerosis* journal showed that elevated levels of uric acid is independently related to cardiovascular mortality (12).

Also, another prospective study conducted in Taiwan showed that hyperuricemia plays an independent role as a risk factor for cardiovascular and ischemic stroke mortality in high risk and low risk patients (13).

Rotterdam showed in his study that patients with elevated levels of serum uric acid have a bigger risk of myocardial infarction and stroke and the concomitance of other risk factors has little effects on this relationship (14). Several studies link these effects to mono sodium urate crystals' effects on platelet aggregation which increases the risk of thrombosis (15).

Although hyperuricemia is concomitant with many conditions that shortens lifetime and despite many studies that show a relationship between hyperuricemia and cardiovascular (CVD) related mortality (16), there are some studies that show no relations between CVD and serum levels of uric acid (17). There is still debate about the effects of serum uric acid on cardiovascular events. In addition to these, limited prospective studies have been conducted in order to evaluate the effects of hyperuricemia on myocardial infarction mortality and morbidity. Therefore we conducted a study with to determine the role of serum uric acid on the prognosis of patients with acute myocardial infarction.

Methods and Materials

This prospective, cross sectional study was conducted in a three month to evaluate the relationship between hyperuricemia and post MI mortality risk among patients referred to Fatemate Zahra hospital of Sari in 2010. Among those who were hospitalized due to myocardial infarction, 393 patients were selected by simple random sampling. Patients who were diagnosed with myocardial infarction (accor-

ding to clinical symptoms, electrocardiographic changes and cardiac enzymes), aged above 18 years and were willing to participate in the study were enrolled. On the other hand, patients who used drugs that affect the level of blood uric acid (i.e. alopurinol, probensid and etc.), had chronic kidney disease, hematologic malignancies or hypothyroid disorders were excluded from the study. The serum uric acid level of the participants was evaluated in the first 48 hours after MI by enzymatic methods, TOOS calorimetry using Pars Azmoon kits and an ERBAXL 640 auto analyzer device (made in India). No fasting was required for serum uric acid measurement. A uric acid serum level below 6.8 milligram per deciliter was considered as normal. Age, gender, uric acid blood level, mortality during hospitalization and until three months after discharge, was assessed in each participant. Also, information regarding coronary heart disease risk factors such as hypertension, family history of cardiovascular diseases, diabetes mellitus and smoking were collected. Blood pressure of the participants was recorded twice (6 hours apart) in a sedentary position and from the right hand. Participants who used anti hypertensive drugs, or had a systemic blood pressure above 140 mmHg or diastolic blood pressure of 100 mmHg or more were considered as hypertensive. In this study, the family history was considered as positive when a female family member was below 65 years and a male family member was below 55 years at the time of myocardial infarction, angioplasty of coronary artery bypass. Diabetes mellitus was considered in patients with random blood sugar above 200 mg per dl or in patients who use blood sugar lowering agents. The patients underwent echocardiography during hospitalization and its information was recorded in the questionnaire. All the uric acid assessments were blinded. After collecting primary information, the patients were followed up for a week during hospitalization and for three months after discharge. Analysis was performed by SPSS 18 software. The relationships between uric acid level and post MI mortality risk and its risk factors were evaluated by regression logistic analysis test. Mortality risk rates (odds ratio) was evaluated in patients involved with high levels of serum uric acid and with a 0.95 confidence interval. Also, a p value below 0.05 was considered as significant.

Results

In this study, 393 patients with myocardial infarction who referred to Fateme Zahra hospital of Sari in 2010 were evaluated. Among the participants, 217 (55.2%) were male and 176 (44.78%) were female. The mean age of the participants was 64.03 ± 12.94 years. The youngest participant was 23 and the oldest was 91 years old.

The uric acid level of the patients was between 2 and 16 mg per dl and the mean level was 6.37 ± 2.09 mg/dl. The mean uric acid level was 6.37 ± 1.83 mg/dl in men and 6.36 ± 2.33 mg/dl in women.

Among the participants, 264 patients had normal levels of uric acid (≤ 6.8 mg/dl) and 129 patients had abnormal levels. In the first week after MI, one patient with normal level of uric acid (0.3%) and three patients (2.3%) with high levels of uric acid died.

Regression logistic analysis showed that mortality during the first week of hospitalization wasn't significantly related to the level of uric acid in patients with normal serum levels ($P=0.552$) and patients with abnormal serum levels ($P=0.326$). Also, Fisher's exact test showed that the differences between the mortality rates of the normal and abnormal groups wasn't significant ($P=0.014$, OR =0.15, 0.01, 1.54).

During the three months follow up period, 14 patients with normal uric acid levels and 23 patients with abnormal uric acid levels died. Chi square test showed that the difference between the mortality rate of both groups was significant ($P<0.0001$, $X^2=15.94$, OR =0.25 0.12, 0.52). In this study, 217 participants were male and 176 were female. Table 2 shows the frequency of males and females in the two groups with normal and abnormal levels of uric acid.

One man and three women died during the hospitalization period. The difference between the

mortality rate of males and females wasn't significant ($P=0.22$, $X^2=1.49$).

After the first week and during the three months of follow up, 18 males and 19 females died. Evaluations showed that this difference in the mortality rate of the males and females wasn't significant ($P=0.39$, $X^2=0.71$).

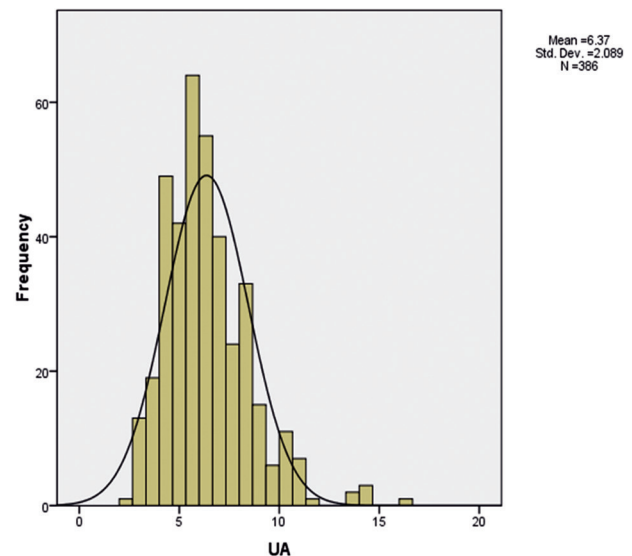


Figure 1. Uric acid level of patients diagnosed with myocardial infarction who referred to Fateme Zahra hospital in 2010.

Discussion

Although many factors are involved in the incidence of cardiovascular diseases, they can't predict all cardiovascular incidents (19 - 20). An analysis on more than 120000 patients with cardiovascular diseases showed that 20% of the patients had no known factors such as hyperlipidemia, hypertension, diabetes or smoking and more than 50 had only one risk factor (19). Another analysis showed that 85 to 95 percent of the patients have at least one risk factor and the rest have no known risk factors (20). These findings led to more clinical research in order to

Table 1. Frequency of males and females with normal or abnormal levels of uric acid

	Patients with normal levels of uric acid	Patients with abnormal levels of uric acid	Total
Male	149 56.4%	68 52.7%	217
Female	115 43.6%	61 47.3%	176
Total	264 100%	129 100%	393

Table 2. Mortality rate of patients with normal or abnormal levels of uric acid during hospitalization and three months after discharge

	Patients with abnormal levels of uric acid	Patients with normal levels of uric acid
Patients died during the first week	3	1
Patients died during the three months follow up	23	14
Patients who stayed alive	103	249
Total	129	264

Table 3. Mortality rate of patients during hospitalization according to gender

	Died	Alive	Total
Male	1	216	217
Female	3	173	176
Total	389	4	393

Table 4. Mortality rate of patients during the three months of follow up

	Died	Alive	Total
Male	18	198	216
Female	19	154	173
Total	37	352	389

Table 5. The relationship between post MI mortality rate and the male gender during the study, according to uric acid level

	P value	OR	95% C.I. for EXP (B)	
			Upper	Lower
Mortality of males during hospitalization	0.820	1.383	22	0.085
Mortality of males during the follow up period	0.019	3.595	10.484	1.233

Table 6. The relationship between post MI mortality rate and the female gender during the study, according to uric acid level

	P value	OR	95% C.I. for EXP (B)	
			Upper	Lower
Mortality of females during hospitalization	0.363	3.077	34.685	0.273
Mortality of females during the follow up period	0.077	2.147	5.011	0.920

Table 7. Frequency of participants who died during the study, according to uric acid levels

	Abnormal uric acid	Normal uric acid
Number of participants who died during hospitalization	3 (2.3%)	1 (0.3%)
Number of participants who died during the follow up period	23 (18.2%)	14 (5.3%)
Number of participants who stayed alive during the study	103	249
Total	129	264

recognize new risk factors such as white cell count, plasma concentrations of fibrinogen, homocysteine and uric acid (21). However, the results of studies that evaluate the role of uric acid in cardiovascular diseases are different and inconsistent. Framingham studied this issue but failed to show any relations between uric acid levels and cardiovascular diseases (17) while Chicago Heart Association Detection Project and NHANES study showed a positive relationship between serum levels of uric acid and cardiovascular diseases. However they showed that this relationship was only seen in females and wasn't seen in males (22 – 23). There are several other studies in this issue that show relations between uric acid and cardiovascular disease. However, the role of uric acid as a prognostic factor, wasn't prominent (24 -25). Limited studies have been conducted to evaluate the level of uric acid in patients with myocardial infarction and the results of these studies were inconsistent (26 – 28). Homayunfar et al conducted a study in Hamedan University of Medical Sciences in 2007 and showed that uric acid had no independent role in post acute MI events (26). On the other hand, Kojima conducted a study in Japan and showed that uric acid along with killip class is a valuable factor in predicting post acute MI events (27). Another study conducted on patients with STE-MI showed that uric acid can independently predict the mortality during hospitalization (28). Car and Trkulja showed that during the hospitalization, the post MI mortality rate, could be predicted by serum levels of uric acid (16).

Kojima et al also showed a close relationship between short term mortality after MI and serum uric acid (27).

These results were inconsistent with our results that showed no relations between uric acid serum levels and mortality during hospitalization and the first week. Homayunfar et al also showed in their study that uric acid isn't a prognostic factor for early death in post MI patients (26).

Aboa Eboele showed in his study that there is a clear relationship between uric acid levels and CAD related mortality (29). The NHANES 1 study also recognized uric acid as an independent factor in the prognosis of cardiovascular related death (30). This study also showed that during the three months of follow up, a relationship exists between serum levels of uric acid and mortality rate of

patients. According to this, high levels of uric acid can show a prognosis in these patients. Also, high serum levels of uric acid can show the activity of xanthine oxidase which is an important source of free radicals that can intervene in the energy sources of myocardium and ventricle dysfunction (31 -34). Also, it is clear that ventricle dysfunction is a prognostic factor in post STEMI death (35).

Myung Hwan showed that uric acid was involved in the post MI mortality of patients with high levels of NT- Pro BNP and couldn't predict the mortality in patients with normal NT- Pro BNP levels. In this study, out of 482 patients with normal NT- Pro BNP, 22 (4.6 percent) developed major cardiac events. On the other hand, 87 patients (33%) with elevated levels of NT- Pro BNP developed major cardiac events. He concluded that a larger sample size was needed to show the relationship between uric acid levels and mortality in patients with normal NT- Pro BNP (36).

Liese et al also showed a significant relationship between uric acid levels and MI related mortality in their study which was a part of MONICA cohort conducted among men in 1999 (monitoring trends and determinants of cardiovascular diseases) (37).

A study conducted by Bitar Omidvar et al on 184 patients in Jondi Shapour university of Ahvaz showed that the mortality rate of men with elevated levels of uric acid was higher than men with normal levels of uric acid. On the other hand, there was no significant relationship between serum uric acid levels and mortality in women. These results were consistent during hospitalization and one month of follow up. They concluded that elevated level of uric acid is only a prognostic factor in men (38). Kojima and Wheeler also showed in their study that uric acid level is significantly higher among men (27 and 39). However, Aboa Eboele showed in his study that this relationship was more prominent in females (29). Also, Nadkar failed to demonstrate a significant relation between post MI mortality and gender and concluded that in contrary to previous studies, gender has no effects on the relationship between post MI mortality and uric acid (18). Also, in our study, the gender of the patients had no effects on the relationship between uric acid levels and post MI mortality.

In this study, post MI mortality rate of the patients was evaluated in short term and the follow

up period wasn't sufficient for long term. However, sufficient sample size and proper analysis tests show that elevated level of uric acid isn't a prognostic factor for mortality during the first days of hospitalization, but its level during follow up can determine the prognosis of patients after discharge.

However, due to time shortage and the limitations of cross sectional studies, many factors that determine the mortality and morbidity after MI were not evaluated. However, this was due to the aim of our study, which was evaluation of uric acid level and its role in the prognosis of post MI mortality. This study can't determine that high levels of uric acid is an underlying factor for cardiovascular mortality or is only a marker. Conducting multicenter prospective studies with bigger sample size and longer following up period is recommended in order to prove this issue. Also, other confounding factors should be analyzed.

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Climatic effects on hospital admissions

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Abstract

Many studies were conducted on the effects of climate change in diseases. In this study, we aimed to investigate the relationships between sex, age, climatic variables, and most common 20 reasons of hospital admissions.

The study was conducted in a tertiary care hospital in Erzurum, a city at 1900m's altitude. The main study question was to compare mean temperature, humidity, and atmospheric pressure values for the most common 20 ICD10 diagnoses. Data for 148262 most common 20 reasons of application in the year 2009 was obtained from the main hospital registry and analyzed using the SPSS software. Climatic data for the same year was obtained from the Turkish State Meteorological Service.

Mean age (\pm SD) was 46.21 ± 17.6 years. The oldest person in the registry was 110 years old. Yearly averages (\pm SD) of temperature, dew point, humidity, atmospheric pressure, sunlight hours, and wind were 5.50 ± 9.56 ($-28; 22$) °C, -0.48 ± 7.30 ($-31, 12$) °C, 69.27 ± 15.0 (31, 98) %, 1017.28 ± 4.81 (1000, 1033) hPa, 9.07 ± 2.12 (0; 10) hours, and 9.71 ± 5.47 (2; 27) km/h respectively.

ICD10 codes such as L30 and M25.5 were given more during the warmer days whereas M51.0, M51.1, and D64 were seen during colder days ($p < 0.001$). Diagnoses with lowest dew point were M51.0 and R07.3 whereas L30 and M25.5 were encountered during higher dew point days ($p < 0.001$).

Erzurum shows some differences in the relationships of disease frequencies and climatic variables from the classical literature. Most strikingly, humidity and temperature may have inverse relationships in high altitudes with low water sources. Health professionals should take this into account when advising patients with diseases related with seasonal and climatic variations.

Key words: climate, atmospheric pressure, dew point, ICD coding.

1. Introduction

Many studies were conducted on the effects of climate change in diseases. Most of these are concentrating on the impact of global warming. However, it is also well known that some diseases have seasonal variations. Some vector borne pathogens for example appear especially during summer [1]. Also the effect of altitude is well known for especially cardiac and respiratory diseases [2].

Being located at an altitude of 1900m, Erzurum is one of the rare cities making it possible to study the relationship between climatic effects and disease presence at high altitude. It was shown previously that contrary to classical knowledge, daily number of admissions due to "Pain in joint" has a negative correlation with humidity and a positive correlation with atmospheric pressure in Erzurum [3]. When compared with therapeutic medicine, prevention is even a greater task for health professionals. Possible new findings on the relationship between climate and health may guide in the development of new preventive and therapeutic strategies. Hence, we decided to review the hospital admissions in one year to a tertiary hospital in Erzurum and look for relationships between sex, age, and climatic variables. The main study question was to compare mean temperature, humidity, and atmospheric pressure values for the most common 20 diagnoses. Secondary outcomes were comparisons of the same diagnoses with sex and age.

2 Methodological Issues

2.1 Study Design

This is an observational cross-sectional study design.

2.2 Setting

The study was conducted in Erzurum, a city with 700 thousand inhabitants located at an altitude of around 1900 m in northeastern part of Turkey. Ataturk University Hospital is the only tertiary hospital in the region.

2.3 Sample size

The sample size was based on the main outcome variable humidity. Mean values (\pm SD) for humidity for Erzurum were reported before as $69.27 \pm 15.0\%$. Taking Alpha as 0.05 and Sigma as 15, a sample size of 10 thousand people is needed to detect a difference of 1 between two groups with a power of 99.7%.

2.4 Case selection

Between January 1, and December 31, 2009, 913108 applications were done to Ataturk University Hospital (including applications to the emergency unit). Data was obtained from the main hospital registry. Patients below 18 years of age and control visits were excluded. As a result, data for 380749 cases (41.7%) was included in the analysis.

2.5 Application

The database included 4698 different ICD-10 codes. We selected the most commonly occurring 30 ICD codes, which accounted for 38.9% ($n=148262$) of the total admissions. A case flow is given in Figure 1.

Daily mean climatologic values of temperature, dew point, humidity, and atmospheric pressure were obtained from the Turkish State Meteorological Service and added to the database. Analyses were done to check the relationship between daily number of diagnoses and the studied meteorological values. Dew point is calculated using temperature and humidity values and is defined as “the temperature at which the water vapor in the air becomes saturated and condensation begins” [4].

temperature and humidity values and is defined as “the temperature at which the water vapor in the air becomes saturated and condensation begins” [4].

2.6 Statistical analysis

Statistical analysis was done using the SPSS software. Most of the studied variables were skewed to the left. Hence we applied the independent samples t test, one-way analysis of variance (ANOVA), and their nonparametric alternatives depending on the data distribution. Categorical data was analyzed using the Chi Square test. Statistical significance level p was set as <0.05 .

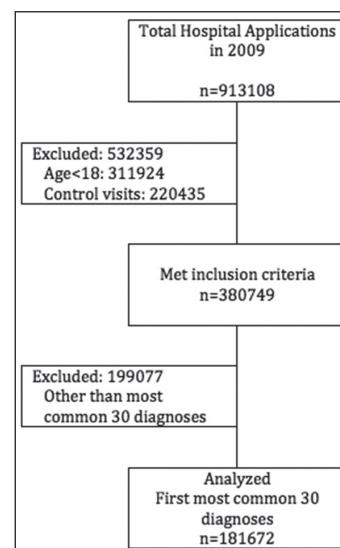


Figure 1. Patient flow

3. Results

Of the patients 41.5 were males ($n=158028$), 58.5 females (222709); sex of 12 patients was not available. Females utilized the health services 1.4 times more than males. Mean age (\pm SD) was 46.21 ± 17.6 years. The oldest person in the registry was 110 years old.

Yearly averages (\pm SD) of temperature, dew point, humidity, atmospheric pressure, sunlight hours, and wind were 5.50 ± 9.56 ($-28; 22$) $^{\circ}\text{C}$, -0.48 ± 7.30 ($-31, 12$) $^{\circ}\text{C}$, 69.27 ± 15.0 (31, 98) %, 1017.28 ± 4.81 (1000, 1033) hPa, 9.07 ± 2.12 (0; 10) hours, and 9.71 ± 5.47 (2; 27) km/h respectively. Daily sunny hours was not included in the further analyses because it was almost constant throughout the year.

Most of the patients were admitted during summer and autumn (61.6; $n=192559$; Figure 2).

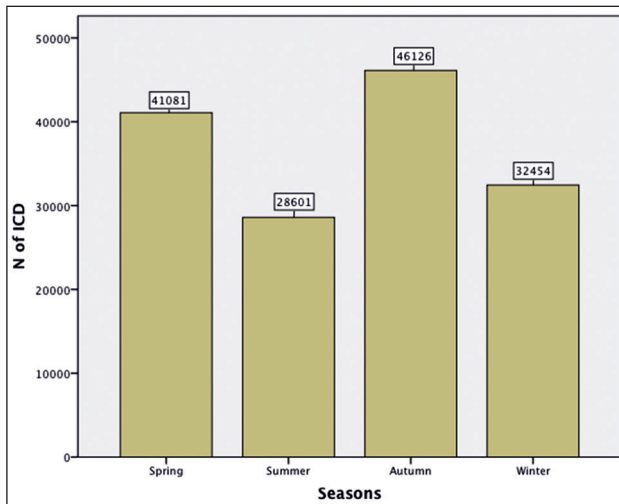


Figure 2. Seasonal variations in the admission of most common 20 diagnoses

Diseases with prominent seasonal variations were M25.5, D50, R10.1, L30, N39, C50, and

M06 during summer; D64 and E03 during winter (Table 1).

Diagnoses such as L30 and M25.5 were made more during the warmer days whereas M51.0, M51.1, and D64 were seen during colder days. Diagnoses with lowest dew point were M51.0 and R07.3 whereas L30 and M25.5 were encountered during higher dew point days. Although the difference between mean humidity values was statistically significant (91.315; <0.001), the margins of lowest and highest mean humidity values were relatively narrow (64.04-70.23). Also atmospheric pressure (32.543; <0.001), wind (23.773; <0.001), and sunlight (43.507; <0.001) had small variations ranging from 1017-1018 hPa, 9-12 km/h, and 8-9 hours respectively (Table 2).

Sex distribution was significantly different between the diagnoses. The most common 20 diag-

Table 1. Distribution of most common 20 ICD-10 diagnoses according to seasons

	Winter		Spring		Summer		Autumn		Total	
	n	%	n	%	n	%	n	%	n	%
R07.3	5591	24.2	4774	20.6	6635	28.7	6122	26.5	23122	100.0
R51	3465	23.1	3263	21.8	4293	28.7	3956	26.4	14977	100.0
M25.5	1195	10.1	1919	16.2	4703	39.8	4012	33.9	11829	100.0
R10	1660	16.7	2610	26.3	3020	30.4	2633	26.5	9923	100.0
N39	1136	14.4	1107	14.0	2644	33.4	3025	38.2	7912	100.0
D50	1201	16.4	929	12.7	2604	35.6	2588	35.3	7322	100.0
R10.1	1231	17.9	1180	17.1	2426	35.2	2055	29.8	6892	100.0
E11	1112	16.2	1874	20.3	1986	29.0	1887	27.5	6859	100.0
M51.0	1680	25.9	989	15.2	2080	32.0	1747	26.9	6496	100.0
R06	1014	16.4	1463	23.7	1891	30.7	1797	29.1	6165	100.0
L30	550	9.2	626	10.1	2773	46.4	2030	34.0	5979	100.0
F41.1	878	15.3	1438	25.1	1807	31.5	1610	28.1	5733	100.0
I10	1158	21.2	1436	26.3	1551	28.4	1312	24.0	5457	100.0
M51.1	1532	29.2	1221	23.3	1678	32.0	808	15.4	5239	100.0
D64	493	9.7	941	18.4	825	16.2	2846	55.7	5105	100.0
Z34	918	20.8	912	20.6	1338	30.3	1250	28.3	4418	100.0
M06	777	20.0	963	24.7	1351	34.7	800	20.6	3891	100.0
N20.0	793	21.2	686	18.3	1233	33.0	1030	27.5	3742	100.0
E03	394	10.9	398	11.0	993	27.5	1828	50.6	3613	100.0
C50	700	19.5	741	20.7	1186	33.1	961	26.8	3588	100.0
Total	27478	18.5	29470	19.9	47017	31.7	44297	29.9	148262	100.0

Chi-Square = 9718; $p < 0.001$

C50: Malignant neoplasm of breast; **D50:** Iron deficiency anemia; **D64:** Other anemias; **E03:** Other hypothyroidism; **E11:** Type 2 diabetes mellitus; **F41.1:** Generalized anxiety disorder; **I10:** Essential (primary) hypertension; **L30:** Other and unspecified dermatitis; **M06:** Other rheumatoid arthritis; **M25.5:** Pain in joint; **M51:** Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with myelopathy; **M51.1:** Thoracic, thoracolumbar and lumbosacral intervertebral disc disorders with radiculopathy; **N20.0:** Calculus of kidney; **N39:** Other disorders of urinary system; **R06:** Abnormalities of breathing; **R07.3:** Other chest pain; **R10:** Abdominal and pelvic pain; **R10.1:** Pain localized to upper abdomen; **R51:** Headache; **Z34:** Encounter for supervision of normal pregnancy;

Table 2. Comparison of mean climate values between the most common 20 ICD-10 diagnoses

		N	Mean	SD	95 % Confidence Interval for Mean		F; p
					Lower	Upper	
Temperature	R07.3	23122	5.54	10.312	5.41	5.68	158.143; <0.001
	R51	14977	5.53	10.351	5.36	5.7	
	M25.5	11829	9.6	8.62	9.44	9.75	
	R10	9923	7.19	9.191	7.01	7.37	
	N39	7912	7.76	9.283	7.55	7.96	
	D50	7322	7.89	9.719	7.67	8.11	
	R10.1	6892	7.23	9.637	7	7.45	
	E11	6859	6.93	9.305	6.71	7.15	
	M51.0	6496	5.59	11.291	5.32	5.86	
	R06	6165	6.62	9.498	6.39	6.86	
	L30	5979	10.18	8.474	9.97	10.4	
	F41.1	5733	7.14	9.461	6.9	7.39	
	I10	5457	6.06	9.979	5.79	6.32	
	M51.1	5239	4.97	10.471	4.69	5.25	
	D64	5105	5.86	7.705	5.65	6.07	
	Z34	4418	6.02	10.539	5.71	6.33	
	M06	3891	6.67	9.813	6.36	6.97	
	N20.0	3742	6.39	10.364	6.06	6.72	
	E03	3613	7.99	8.244	7.72	8.26	
	C50	3588	6.6	10.255	6.26	6.94	
	Total	148262	6.81	9.824	6.76	6.86	
Dew point	R07.3	23122	-0.45	7.676	-0.55	-0.35	135.334; <0.001
	R51	14977	-0.5	7.795	-0.62	-0.37	
	M25.5	11829	2.19	6.373	2.08	2.31	
	R10	9923	0.63	6.742	0.5	0.76	
	N39	7912	1.04	6.859	0.89	1.2	
	D50	7322	1.22	7.131	1.06	1.38	
	R10.1	6892	0.87	7.367	0.7	1.05	
	E11	6859	0.41	6.794	0.25	0.57	
	M51.0	6496	-0.84	8.521	-1.05	-0.64	
	R06	6165	0.3	6.975	0.13	0.48	
	L30	5979	2.77	6.107	2.61	2.92	
	F41.1	5733	0.59	7.032	0.41	0.77	
	I10	5457	-0.14	7.416	-0.34	0.06	
	M51.1	5239	-0.61	7.66	-0.82	-0.4	
	D64	5105	-0.25	5.446	-0.4	-0.1	
	Z34	4418	-0.16	8.022	-0.4	0.07	
	M06	3891	0.53	7.463	0.29	0.76	
	N20.0	3742	0.05	7.76	-0.2	0.3	
	E03	3613	1.18	5.764	0.99	1.37	
	C50	3588	0.25	7.723	0	0.51	
	Total	148262	0.39	7.286	0.36	0.43	

noses were 1.7 times more in females compared with males. Diseases with male predominance were R07.3 and N20.0 while most other diagnoses such as Z34, C50, E03, M06, M51.0, D50, and D64 were more common among females (Chi Square=9056; $p<0.001$) (Table 3).

Table 3. Sex distribution of the most common 20 ICD-10 diagnoses.

	Male		Female		Total	
	n	%	n	%	n	%
R07.3	12457	53.9	10665	46.1	23122	100.0
R51	5760	38.5	9215	61.5	14975	100.0
M25.5	5156	43.6	6672	56.4	11828	100.0
R10	3697	37.3	6226	62.7	9923	100.0
N39	3302	41.7	4610	58.3	7912	100.0
D50	2426	33.1	4895	66.9	7321	100.0
R10.1	2464	35.8	4428	64.2	6892	100.0
E11	2401	35.0	4458	65.0	6859	100.0
M51.0	2062	31.7	4433	68.3	6495	100.0
R06	3083	50.0	3082	50.0	6165	100.0
L30	2464	41.2	3515	58.8	5979	100.0
F41.1	2209	38.5	3524	61.5	5733	100.0
I10	2049	37.5	3408	62.5	5457	100.0
M51.1	1835	35.0	3404	65.0	5239	100.0
D64	1702	33.3	3402	66.7	5104	100.0
Z34	0	0.0	4418	100.0	4418	100.0
M06	1214	31.2	2676	68.8	3890	100.0
N20.0	2275	60.8	1467	39.2	3742	100.0
E03	937	25.9	2676	74.1	3613	100.0
C50	74	2.1	3514	97.9	3588	100.0
Total	57567	38.8	90688	61.2	148255	100.0

Diagnoses such as C50, R07.3, and I10 were encountered more in the older people (mean \pm SD 53.4 \pm 13.552, 55.04 \pm 15.688, and 56.97 \pm 15.278 years respectively) while Z34, L30, and F41.1 were

seen more in the younger population (mean \pm SD 30.56 \pm 5.959, 37.24 \pm 15.797, and 38.49 \pm 15.368 years respectively) ($F=964.33$; $p<0.001$).

We developed a logistic regression model to check for the effects of climate variables and the most common diagnosis (R07.3). A model with age, temperature, humidity, atmospheric pressure, wind, and sex showed that except humidity all the other variables were significant. Sex was significantly protective. Males had around 1.5 times more risk of applying with the diagnosis R07.3 (Table 4).

There were significant negative correlations ($p<0.001$) between temperature and humidity (Pearson $r = -0.736$; Figure 3), atmospheric pressure and wind (Pearson $r = -0.395$), sunny hours and humidity (Pearson $r = -0.346$).

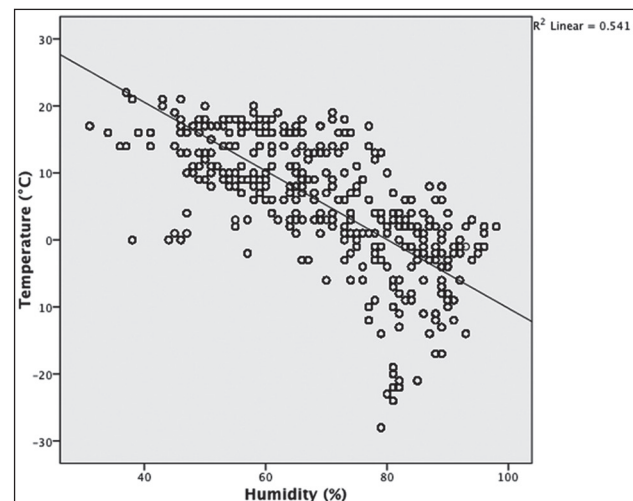


Figure 3. Correlations between temperature and humidity

Table 4. Logistic regression analysis computer output showing predictors of ICD code R07.3.

	B	S.E.	Wald	Sig.	Exp(B)	95% C.I. for EXP(B)	
						Lower	Upper
Age	0.029	0.001	5319.052	0.001	1.029	1.028	1.03
Temperature	-0.005	0.001	22.376	0.001	0.995	0.993	0.997
Humidity	0.001	0.001	0.841	0.359	1.001	0.999	1.002
Atmospheric pressure	-0.006	0.002	14.457	0.001	0.994	0.991	0.997
Wind	-0.003	0.001	6.046	0.014	0.997	0.994	0.999
Female	-0.417	0.014	909.941	0.001	0.659	0.641	0.677
Constant	2.208	1.639	1.815	0.178	9.102		

4. Discussion

This study showed important relationships between climatic variables and hospital diagnoses. The most striking findings were temperature and dew point variations between the most commonly recorded diagnoses. Dermatitis and pain in joint were more common during the warmer days while patients with intervertebral disc problems and anemia applied more during colder days.

As to classical knowledge, rheumatic symptoms worsen in response to climatic factors, especially falling barometric pressure and rising humidity [5]. However, it was shown before that the opposite is valid for Erzurum [3]. Joint pain was related to sunlight and vitamin D in an area with short sunlight hours in Japan [6]. Average sunlight in Erzurum is twice as in this region of Japan. Also contrary to many geographic areas, temperature and humidity have negative correlation in Erzurum. This is probably due to the high altitude and absence of large water sources. Average yearly humidity for Trabzon, a city on the Black Sea coast was reported as 71.5% for 2009 [7].

As to the observation of the authors, strong winter conditions have probably an important contribution to the relatively high applications during summer. The snow season in Erzurum starts usually in November and lasts up to the middle of April. The geographical conditions combined with the long winter seasons usually force people to postpone their elective health problems to the summer season. Also farming during the summer season might be a reactivating factor for painful joint problems. Vitamin D deficiency is an important health problem in Erzurum [8]. Vitamin D has an half life of 15-20 days [9]. Serum vitamin D levels below 12 ng/ml were accused for persistent nonspecific muscle pain [10]. Finishing of the reserves during the winter season might be a contributing factor for the reactivation of pain in summer.

Skin diseases are usually encountered in the spring season in Nepal [11], which is in accordance with the summer season in Erzurum. Although the most common problems expected are fungal infections, our hospital database was lacking a detailed classification in this manner.

The relationship between cold weather and intervertebral disc problems on the other hand are

well known. Salek et al. reported a 60% exacerbation during the winter season [12].

Melatonin hormone was accused for the seasonal variations in breast cancer [13]. Due to its anti-estrogenic effects, high levels of melatonin during the winter season might suppress the proliferation of cancer tissue. With the summer, melatonin will be declining, resulting in an aggravation of the disease.

Cardiovascular reasons account for the highest mortalities in most developed countries. [14] which makes the ICD code "Chest pain" much more important. Fluctuations in temperatures meaning too much cold or warm both may precipitate heart attacks [15]. Research indicates that the number of death from cardiovascular diseases would be increased by 0.226% as the variation in temperature increases by 1%. More importantly, the number of death from cardiovascular diseases would be increased by 1.2% to 4.1% under alternative climate change scenarios [16]. In this sense, our findings are in accordance with the literature. Also the risk of male sex on cardiovascular problems is a well-known entity.

We should also mention some potential limitations of this study. Although the study is grounded on the high altitude of Erzurum, we could not make comparisons with another city at lower altitudes. Being a referral center in the region, the study hospital attracts some patients from the environmental cities. Although they all have relatively high altitudes, climatic variables may differ to some extent. One last limitation is related with the disease coding. Many of the codes are at a general level, lacking the specific diagnoses. ICD coding is applied in Turkey since 1995 [17], coding difficulties and training of the staff are still barriers in many other countries.

As a conclusion, Erzurum shows some differences in the relationships of disease frequencies and climatic variables from the classical literature. Most strikingly, humidity and temperature may have inverse relationships in high altitudes with low water sources. Health professionals should take this into account when advising patients with diseases related with seasonal and climatic variations.

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Association between green tea consumption and coronary artery disease in Iran

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Abstract

Background: Tea is the most common consumed drink in the world after water. Green tea is used mainly in East Asian countries. Previous studies have shown its benefits on cardiovascular diseases.

Purpose: The aim of this study was to assess the association between green tea consumption and CAD in Iran.

Method & materials: In this cross sectional descriptive study 600 patients who were referred to Shahid Rajaie cardiovascular hospital for angiography were included. Patients were divided into patients with and without CAD. All patients were questioned about demographic data, green tea consumption in the recent 12 months and other diet and life style factors. Data were analysed using SPSS 17 software.

Results: Prevalence of CAD was lower in green tea users (21.7%) in comparison to other patients (64.9%). Logistic regression analysis revealed that higher age ($P < 0.001$; CI 1.06-1.1), male sex ($P = 0.004$; CI 1.22 – 3.03), positive family history of CAD ($P = 0.045$; CI 1.01-2.47), hypertension ($P = 0.04$; CI 1.02-2.62), hyperlipidemia ($P = 0.030$; CI 1.05 - 2.67), coffee consumption ($P = 0.036$; CI 1.04-3.17), fat oil ($P = 0.035$; CI 1.04-3.72), and corn usage ($P = 0.035$; CI 1.03-2.82) were associated with increased risk of CAD. Also herbal brew usage ($P = 0.023$; CI 0.31-0.91), green tea consumption ($P < 0.001$; CI 0.03-0.11), and olive usage ($P = 0.042$; CI 0.042-0.98) were associated with decreased risk of CAD.

Conclusion: Green tea consumption, herbal brew usage, and olive usage were three main protective factors against CAD. This is an important finding which necessitates interventions in order to increase the peoples' knowledge of green tea benefits.

Key words: Green tea, Coronary Artery Diseases (CAD), angiography.

Introduction

Tea is produced from *Camellia Sinensis* plant which is cultured in about 30 countries in the world. Tea is the most common consumed drink in the world after water. Annually, 3 billion kilograms of tea is produced in the world. About 76 to 78% of the produced tea is black tea, 20 to 22% is green tea and 2% is Oolong tea. Among them green tea consumption is associated with more benefits (1-5). Black tea is consumed in United States and Europe and green tea is usually consumed in east Asian countries such as China and Japan (3).

According to report of the economic and social branch of national tea research center, Iran, with 105 thousands ton tea consumption, is the sixth main country for tea consumption in the world. Green tea components include protein, amino acids, fiber, minerals, phenolic component, and lipids (3).

Catechins are the main green tea polyphenols which account for about one third of its weight and are effective in prevention of cardiovascular diseases (3,6).

Tea is widely used in the world, and even small benefits have large application for general health. Epidemiologic studies have shown the beneficial effects of green tea on parameters related to vascular dysfunction including lipoprotein oxidation, vascular inflammation, platelet aggregation, and vascular smooth muscle cell proliferation (3,7), and its consumption decreases the rate of coronary artery diseases through lipid lowering, antioxidant, and antihypertensive effects (1,3).

CAD is a major health problem and is a main cause of mortality in developed and industrial countries (7). In recent years, researchers have shown their interest to find the association between green tea consumption and CAD (1). Studies have shown a 11% decrease in CAD with 3 cup of tea a day (4). Despite the high rate of saturated fat in France, the mortality rate of CAD in France in

lower than other industrial countries which may be due to usage of foods containing catechins. Also high rate of smoking in Japan in the presence of very lower rates of CAD may be due to green tea consumption which contains catechins (8).

About 80% of CAD are preventable by changing life style; especially diet. Some countries such as Japan, China, Switzerland, Spain, and France have low rates of CADs which may be due to diet in their countries (7). Still there is no study available reporting the association of CAD and green tea consumption in Iran. The aim of current study was to assess the association between green tea consumption and CADs in Iran.

Materials and methods

In this cross sectional case- control study we included 600 patients who were referred to Shahid Rajaei cardiovascular hospital for angiography. Patient who avoided participating in the study, patients with previous angiography, patients with cardiomyopathy or myocarditis, patients with valve diseases and patients with previous revascularization were excluded. Patients who had significant stricture in one main coronary artery were assigned to the case group and patients who hadn't any significant stricture in their coronary arteries were assigned to the control group.

Coronary angiography was performed with standard technic through brachial or femur arteries. Percentage of coronary artery stricture was determined by a cardiologist who was blind to the green tea consumption by the patients. All assessments were performed according to the American Heart Association (AHA) guidelines. CAD was defined as a stricture more than 50% in Left Main (LM) or other coronary arteries (LAD, LCX, RCA).

Data were collected using a questionnaire and participants who had green tea consumption in previous 12 months were classified as "Green tea user" group. Also they were asked about frequency, type of tea, age of initial tea consumption, amount of tea consumed each time, and duration of tea consumption. Also the participants were asked about consumption of coffee, espresso, and oxtongue in recent 12 months.

All patients were interviewed before performing angiography. The questions were about de-

mographic data, education level, family history of CAD, physical activity, hypertension, hyperlipidemia, diabetes, smoking, diet, type of oil consumed, daily stress and place of residence. A written informed consent was obtained from each patient. "Smoker" was defined as smoking within last 12 month and "no smoker" was defined as smoking less than 100 cigarette in the life. "Physical activity" was defined as aerobic physical activities more than 30 minute (walking, driving bicycle, running, and swimming) at least three times a week. Weight and height was assessed by Seca scale without shoes and hospital dressing. Body Mass Index (BMI) was calculated by weight divided by height square.

Total cholesterol, triglyceride (TG), and fasting blood sugar was extracted from the last laboratory data of patients' record. Cholesterol level above 220, TG level above 150 mg/dl or using lipid lowering drugs was defined as "hyperlipidemia". "Diabetes" was defined as using hyperglycemic agents or fasting blood sugar above 220. Systolic blood pressure above 140 mmHg or diastolic blood pressure above 90 mmHg or receiving treatment for hypertension was defined as "hypertension".

For data analysis mean \pm standard deviation were used for quantitative variables and frequency and percentage were used for qualitative variables. Also chi-square, t-test and regression were used for data analysis using SPSS 17 software.

Results

In this study 300 (50%) patients with and 300 (50%) patients without CAD were included. Among them 238 (39.7%) were female and 362 (60.3%) were male. Also 324 (54%) were illiterate, 155 (25.8%) had diploma, and 121 (20.2%) had university education. Family history of CAD was reported in 219 (36.5%). Also 299 (49.8%) had adequate physical activity. Hypertension, hyperlipidemia, and diabetes were reported in 234 (39%), 232 (38.7%), and 157 (26.6%), respectively. Smoking was reported in 142 (23.7%). Coffee, borage, and herbal brew consumption were reported in 160 (26.7%), 150 (25%), and 119 (19.8%) of the study participants. Type of tea consumption was green tea in 45 (7.5%), black in 398 (66.3%) and mixed in 157 (26.2%). 207 (34.5%) reported green tea usage in previous 12 months. 28 (4.7%)

were vegetarian, and 10 (1.7%), and 562 (93.7%) had carnivore and mixed diet respectively.

Vegetable, dairy, fruit, nuts, red meat, white meat, and egg consumption were reported in 587 (97.8%), 595 (99.2%), 592 (98.7%), 567 (94.5%), 546 (91%), 584 (97.3%), and 534 (89%) of the study participants respectively. Also cereal, fat oil, olive, sunflower, corn, and canola usage were reported in 558 (93%), 83 (13.8%), 227 (37.8%), 375 (62.5%), 152 (25.3%), and 20 (3.3%) respectively. Stressful condition was reported in 81 (13.5%). Also 297 (49.5%) were living in capital city, 245 (40.8%) in other cities, and 98 (9.7%) in villages.

Mean patients' age was 54.49 ± 14.88 . Also mean height, weight and BMI were 166.22 ± 9.19 , 74.88 ± 13.47 , and 27.09 ± 4.43 , respectively. Mean green tea usage was 1.48 ± 1.18 cups a day. Mean age for starting green tea usage was 76 ± 42.93 years. Mean green tea usage in each time was 1.3 ± 0.79 teaspoons. Green tea usage was different according to the sex, education, physical activity, and location (Table 1).

Mean age was lower in green tea users in consumption to others. (51.38 ± 14.93 versus 56.12 ± 14.61). $P < 0.001$

Prevalence of CAD was lower in green tea users (21.7%) in comparison to other patients (64.9%). (OR: 0.150; CI: 0.102-0.222)

As shown in table 2 this lower rate of CAD was present when the patients were classified according to sex (Table 2).

Logistic regression analysis analysis revealed that higher age ($P < 0.001$; CI 1.06-1.1), male sex ($P = 0.004$; CI 1.22 – 3.03), positive family history of CAD ($P = 0.045$; CI 1.01-2.47), hypertension ($P = 0.04$; CI 1.02-2.62), hyperlipidemia ($P = 0.030$; CI 1.05 - 2.67), coffee usage ($P = 0.036$; CI 1.04-3.17), fat oil ($P = 0.035$; CI 1.04-3.72), and corn usage ($P = 0.035$; CI 1.03-2.82) were associated with increased risk of CAD. Also herbal brew usage ($P = 0.023$; CI 0.31-0.91), green tea usage ($P < 0.001$; CI 0.03-0.11), and olive usage ($P = 0.042$; CI 0.042-0.98) were related to decreased risk of CAD.

Table 1. Comparison of the green tea usage according to demographic variables

variable		Green tea usage		P Value
		NO n (%)	YES n (%)	
Sex	Female	146 (61.3%)	92 (38.7%)	0.050
	Male	247 (68.2%)	115 (31.8%)	
Education	Illiterate	236 (72.8%)	88 (27.2%)	< 0.001
	Diploma	102 (65.8%)	53 (34.2%)	
	University education	55 (45.5%)	66 (54.5%)	
CAD family history	No	253 (64.4%)	128 (33.6%)	0.299
	Yes	140 (63.9%)	79 (36.1%)	
Physical activity	No	213 (70.8%)	88 (29.2%)	0.004
	Yes	180 (60.2%)	119 (39.8%)	
Hypertension	No	241 (65.8%)	125 (34.2%)	0.445
	Yes	152 (65%)	82 (35%)	
Hyperlipidemia	No	232 (63%)	136 (37%)	0.066
	Yes	161 (69.4%)	71 (30.6%)	
Location	Capital city	179 (60.3%)	118 (39.7%)	0.027
	Other cities	172 (70.2%)	73 (29.8%)	
	Village	42 (72.4%)	16 (27.6%)	
Diabetes	No	288 (65%)	155 (35%)	0.374
	Yes	105 (60.9%)	52 (33.1%)	
Smoking	No	302 (65.9%)	156 (34.1%)	0.378
	Yes	91 (64.1%)	51 (35.9%)	
Stress	No	57 (70.4%)	24 (29.6%)	0.247
	Yes	132 (61.4%)	83 (38.6%)	
	Occasionally	204 (67.1%)	100 (32.9%)	

Table 2. Association of green tea usage and CAD according to the sex

		Green tea usage		P Value	Confidence Interval
		No n (%)	Yes n (%)		
Females	Without CAD	56 (38.4%)	90 (61.6%)	< 0.001	0.047-0.187
	With CAD	80 (87%)	12 (13%)		
Males	Without CAD	82 (33.2%)	165 (66.8%)	< 0.001	0.123 - 0.324
	With CAD	82 (71.3%)	33 (28.7%)		

Discussion

In this study we have studies on the association of green tea consumption and CAD in Iran. About one third of patients in our study had green tea consumption in previous 12 months. This rate is higher than coffee, borage, and herbal brew consumption in our study population but is lower than black tea consumption rate. The rate of green tea consumption is variable in different countries and seems to be higher in East Asian countries. One study in Japan has reported green and black tea consumption in 80% and in less than 10% of people (9).

Our study showed higher rate of green tea consumption among females, patients with university education, and who live in capital city.

Also patients with higher physical activity and without hyperlipidemia had higher rates of green tea consumption. In Iran black tea is the common tea consumed and often green tea is used for its benefits. These findings are in favor of this fact because younger patients with higher education who live in capital city may be more aware of the benefits of green tea consumption.

In this study we found the lower rate of CAD among the patients who had green tea consumption. The difference is very obvious and the prevalence of CAD is two times higher in patients without green tea consumption.

Several studies have shown the benefits of green tea in CAD (7). Also animal studies confirm its role as a protective factor for Myocardial Infarction (MI) (10).

Sano et al have also reported in their study, the inverse relationship between green tea consumption and CAD (8).

We found the relationship in both male and female subgroups. Sasazuki et al have reported the protective role of green tea in atherosclerosis

which was more obvious in men (11). Lower odds ratios and finding the association for both men and women in our study may be due to the fact that we have compared the patients with or without green tea usage. Sasazuki et al reported the comparison for 2-3 cups and 4 or more cups in comparison to 1 or less cups of green tea in their study population.

A study in China has shown that the beneficial effects of green tea on reducing CAD are dose dependent (1). This study didn't find any inverse association between green tea consumption and CAD in females which isn't compatible with our findings. This difference may be due to the difference in the study population and also other confounding factors.

A recent meta-analysis have confirmed our findings by reporting that consumption of 1 cup a day green tea is associated with a 10% decrease in developing CAD (12).

The beneficial effects of green tea on CAD seem to be because of its compound. About one third of green tea compounds are polyphenols (13). Also, catechins which are found in all 3 types of tea are responsible for most beneficial effects of tea (14,15).

The concentration of catechins in green tea is higher than other types of tea. Polyphenols can have benefits through their antioxidant role (16,17), and modulation of platelet aggregation and prevention of thrombosis (18-20), and lipid lowering effects (21).

As shown in our study green tea usage, herbal brew usage, and olive usage were three main protective factors against CAD. This is an important finding which necessitates interventions in order to increase the peoples' knowledge of green tea benefits.

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Smoking habits of nurses and midwives and their attitudes tobacco control; a primary care based study from four major cities of Turkey

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Abstract

It was aimed to investigate smoking habits, knowledge about and attitudes towards tobacco control among nurses and midwives at primary care settings in Turkey. A cross-sectional survey was applied to nurses/ midwives at primary care settings. 1063 surveys were analyzed in the study. Mean age of nurses/ midwives was 33.7 ± 6.3 . Current, former and never smokers' ratio among nurses/midwives were 30.1 %, 10.6 % and 59.3 %, respectively. Knowledge of nurses/midwives was observed as quite high. Majority of never smokers significantly marked as higher agreement with items related to knowledge level about smoking by than ever smokers. The lowest ratio was observed in agreement with item of "Pharmacotherapy is efficient for smoking cessation" (46.6 %). the highest ratio was observed in agreement with item of "Health professionals should routinely advise patients to avoid smoking around their children" (97.5 %). Significant differences were observed in statement of agreement with items related to attitudes of the nurses/midwives towards smoking and tobacco control between never and ever smokers. Almost all of the nurses/midwives had no any training course on smoking cessation practice (99.6 %). Majority of them were not competent for preparedness in smoking cessation (competent: 17.4 % vs. incompetent or somewhat: 82.6 %). In conclusion, knowledge and skills in smoking cessation practice and attitudes towards smoking and tobacco control in nurses/midwives were observed as low and somewhat high. Therefore,

an appropriate education program should be instituted to increase motivation of them about their role in society and smoking cessation practice.

Key words: Health professional, smoking habits, tobacco control, attitudes, primary care

Introduction

Smoking is the single most modifiable cause of premature death, and causes several diseases. Unfortunately, it stills remains a major public health problem in the world (1). The prevalence of smoking among health professionals including nurses is substantially higher than among adult female populations in Turkey (2,3). A comparable result from UK was reported (4). General Directorate of Family Research Organization and Turkish Statistical Institution (2006) revealed that 33.4 % of Turkish adult population (18 years old - and over) are smokers (5). In 2008, a collaborative study which included WHO, CDC, the Turkish Ministry of Health and Turkish Society of Public Health Specialists (HASUDER) reported that prevalence of current smoking among nurses was 29.5 % (6). Recently, the frequency of smoking among family physicians was reported as 33 % (7).

Health professionals including nurses/ midwives have an important role in helping smokers for smoking cessation. Therefore, nurses as well as physicians are a group of health professionals who should have knowledge about dangers of smoking habits and experience in smoking cessation practices. Their commitment to help smokers to quit smoking is linked to their own attitudes towards smoking (8,

9). However, some differences have been reported in smoking frequencies among nurses and their attitudes towards advising and supporting clients in smoking cessation (10-12). Previous studies indicated that the more the health care professionals smoked, the less they were willing to provide advice smoking or smoking cessation interventions. The attitudes of health professionals towards smoking and tobacco control may influence the credibility of advising clients to quit smoking (13, 14).

Recently, WHO reported that Turkey is one of “high achieving countries in tobacco control” (15). In Turkey, governmental or political strategies have been achieved after modification in tobacco control legislation in 2008 (16, 17). Transition in health system has been achieved in Turkey since 2005, and family medicine practice has gained importance in primary care settings (18, 19). With this transition, a family physician and health professionals were nominated to care for fixed population. In this way, health professionals have more chance to consult with patient for their every problem. Therefore, it was also a good chance for tobacco control. To maintain and obtained more achievement in tobacco control, primary care providers have great importance in this issue.

To best our knowledge, there was no any study on smoking habits, knowledge and attitudes among health professionals in primary care in our country. In this context, we aimed to investigate smoking habits, knowledge about and attitudes towards tobacco control among health professionals including nurses and midwives at primary care settings in Turkey.

Methods and Materials

The study design

The primary care based-study was designed as coress-sectional and carried out in six major cities of Turkey. It was conducted by Department of Family Medicine, Medical Faculty, Duzce University between January and July of 2011. Ethics for the study was approved by Ethic Committee of our institute. Moreover, permission for the study to be carried out in primary care settings was obtained from The Provincial Directorate of Health as well as General Directorate of Basic Health services of

Health Ministry. The study surveys were delivered to all family medicine centers in those cities through The Provincial Directorate of Health. Participation in the study was based on willingness.

The study survey

The study survey was modified from “Global Health Professional Survey” (20) and included health professionals’ (rather than physicians) sociodemographic features, smoking habits, and knowledge and attitudes towards smoking and tobacco control was formed. The study survey was self-administered. The participants were asked to mark as “Agreed”, “Disagreed” and “Unsure” for every item related to knowledge about, skills in and attitude towards smoking habits, smoking ban, and smoking cessation practice. In table 2, 3 and 4, statement of “Agreed” by participants was shown as frequency.

a. Sociodemographic features and smoking habits and definition of smoking status

To determine sociodemographic features and smoking habits of nurses/ midwives in the study, age, duration of working, smoking initiation age, duration of smoking, smoking cessation age, nicotine dependence degree, and amount of cigarette unit per day was recorded. Influencing factors for smoking initiation and methods of smoking were also recorded. Among current smoker of health professionals, degree of preparedness for smoking cessation was asked. Status of smoking was defined according to WHO definition criteria (21). Accordingly, current smoker was defined as those individuals who had smoked at least 6 months during their lifetime and were smoking tobacco products at the time of the survey. The former smoker was defined as those individuals who had smoked at least 6 months during their life time but no longer currently smoke. Never smoker was defined as those individuals who had never smoked or had smoked less than 6 months during their lifetime.

b. Items related to knowledge level about dangers of smoking

The knowledge about the dangers of smoking was evaluated with 5 items: 1. Smoking is harmful to your health; 2. Neonatal death is associated with passive smoking; 3. Passive smoking increases the

risk of lung and heart diseases in non-smokers; 4. Paternal smoking increases the risk of lower respiratory tract illnesses such as pneumonia and asthma in exposed children, and 5; Smoking during pregnancy increases sudden neonatal death syndrome.

c. Items related to attitudes towards smoking and anti-smoking activities

Attitudes of health professionals towards smoking habits and tobacco control were evaluated with fourteen items: 1. Health professionals should serve as role model for their patients and the public; 2. Health professionals should set a good example by not smoking; 3. Health professionals should routinely ask about their patients' smoking habits; 4. Health professionals should routinely advise their smoking patients to quit smoking; 5. Physicians should get a specific training on cessation; 6. Health professionals should speak to community groups about smoking; 7. Smoking in enclosed public area should be prohibited; 8. Health warnings on cigarette packages should be written and big print; 9. Sponsorships supported by tobacco industry should be banned; 10. There should be a complete ban on the advertising of tobacco products and it should be extended; 11. The price of tobacco products should be increased sharply; 12. Health professionals should routinely advise patients to avoid smoking around their children; 13. Pharmacotherapy such as nicotine replacement and bupropion is efficient for smoking cessation; 14. Health professionals who smoke are less likely to advise people to stop smoking; and 15. Patient's chances of quitting smoking are increased if a health professional advises him or her to quit.

d. Items related to skills regarding smoking cessation practice

Experience of health professionals in tobacco control was evaluated with six items: 1. Training in course on smoking cessation; 2. Degree of preparedness in smoking cessation practice; 3. To ask about smoking to every patient; 4. Advising to stop smoking; 5. Arranging follow-up; 6. Referral to smoking cessation program or center.

The study survey collection and data analysis

The study surveys were collected by researchers from family health centers within 2 weeks after delivery. The surveys in which data of socio-demographic features were missed were excluded. Data was entered in PC. Data of all participants, and ever and never smokers were analyzed. Categorical variables were stated as frequency and percentage. Continues variables were stated as mean \pm standard deviation. Chi-square or Fisher's exact test was used for categorical analysis. Student t test was used for continues variable with normal distribution, but Mann-Whitney U test for continues variables without normal distribution. Kolmogorov-Smirnov test was used to determine normal distribution in continues variables. Statistically significant level was set as $p < 0.05$.

Results

Total of 2153 study surveys were delivered to family health centers, but 1237 surveys were collected. The study response rate was 57.5 %. Out of 1237 surveys, 174 ones were excluded due to missed data. Remaining 1063 surveys of nurses/midwives were analyzed in the study.

Evaluation of sociodemographic features and smoking habits among nurses/midwives

Table 1 and 2 summarized sociodemographic features and smoking habits among nurses/midwives in the study. Majority of the participants were female (male: 90, 8.5 %; female: 973, 91.5 %). Mean age (\pm SD) of all participants was 33.7 ± 6.3 (17-58 years-old). Mean duration of working (\pm SD) was 10.8 ± 6.7 (21-years. Frequency of current smokers among nurses/midwives was found to be 30.1 % ($n = 320$). The percentage of former smokers (FS) among all participants was found to be 10.6 %. Ratio of never smokers (NS) and passive smokers was 59.3 %, and 4.1 %, respectively. Totally, frequency of ever smokers (ES) ($n = 433$) was found to be 40.7 %. Average age for smoking initiation was 20.6 ± 4.4 years-old among ever smokers (10-40 years-old). We detected that the mean duration of smoking use among CS was 12.8 ± 6.2 years (1 to 35 years). Mean age (\pm SD) for smoking cessation among the former smokers (FS) was 29.4 ± 6.1 (18-

49 years-old). Average unit (\pm SD) of cigarette use per day was 12.6 ± 7.1 (3-40 units).

Table 1. Sociodemographic features and smoking habits of health professionals

N = 1063	Mean \pm standard deviation
Age (years)	33.7 ± 6.3 (17-48)
Duration of work (years)	10.8 ± 6.7 (1-30)
Age of smoking initiation (years)	20.6 ± 4.4 (10-40)
Duration of smoking (years)	12.8 ± 6.2 (1-35)
Age of smoking cessation (years)	29.4 ± 6.1 (18-49)
Nicotine dependence (FNTD)	3.4 ± 2.5 (0-10)
Cigarette unit per day	12.6 ± 7.1 (3-40)

FNTD: Fagerström Nicotine Dependence Test;

Table 2. Smoking habits of health professionals

Smoking habits	N (%)
Smoking status (n = 1063)	
Current	320 (30.1)
Former	113 (10.6)
Never	630 (59.3)
Factors influencing smoking initiation (n = 433)	
Friendship	334 (77.2)
Household member who smoke	41 (9.4)
Familial problems	32 (7.4)
Personal problems	17 (3.8)
School problems	9 (2.2)
The methods of smoking cessation (n = 113)	
Self-help	106 (93.8)
Pharmacotherapy	5 (5.4)
Alternative therapy	2 (1.8)
Intention of HP to give up smoking (n = 320)	
Intent to quit smoking right now	66 (20.7)
Intent to quit smoking within 6 months	132 (41.4)
Intent to quit smoking within next 6 months	122 (37.9)

Among CSs, degree of nicotine dependence was detected as 3.4 ± 2.5 (0-10). Majority had low nicotine dependence (low level: n = 183, 57.2 %; medium level: n = 91, 28.4 %, and high level: n = 46, 14.4 %) (Not shown in tables). The most effective factor predisposing to smoking initiation was observed friendship factor (friendship factor: 77.2 %, household member whose smoke: 9.4 %, familial problems: 7.4 %, school problems: 2.2 %, and

personal problems: 3.8 %). Among the FS, the majority had quit smoking with self-help (n = 106, 93.8 %); 6.2 % of FS quit smoking with help of pharmacotherapy, and only 1.8 % quit with help of alternative medicine. The majority of CS were not likely to intend to quit smoking within 6 months (n = 132, % 41.4). The minority were likely to intend to quit smoking within next 6 months (n = 122, 37.9 %). Only 20.7% of them (n = 66) stated that we were ready to quit smoking at right now.

Knowledge of health professionals smoking use and cessation

In table 3, knowledge level of nurses/midwives about the dangers of smoking among all participants along with comparisons between NS and ES was shown. Knowledge of nurses/midwives was observed as quite high. However, it was observed that agreement by nurses/midwives with item of "Health professionals who smoke are less likely to advise people to stop smoking" had lower ratio (79.8 %); compared to other items. Statistically significant differences were found all items between NS and ES. Majority of NS significantly marked as higher agreement with items related to knowledge level about smoking nurses/midwives than ES (99.8 % vs. 96.4 %, $p < 0.001$; 89.9 % vs. 80.4 %, $p < 0.001$; 98.2 % vs. 91.9 %, $p < 0.001$; 97.9 % vs. 95.3 %, $p = 0.008$; 91.4 % vs. 85.3 %, $p = 0.006$; and 84.1 % vs. 73.4 %, $p < 0.001$, respectively).

Attitudes of nurses/midwives towards smoking cessation practice

Attitudes of nurses/midwives towards smoking habits and tobacco control were stated in table 4. The ratio of agreement by nurses/midwives with items related their attitudes ranged between 46.6% and 97.5 %. The lowest ratio was observed in agreement with item of "Pharmacotherapy such as nicotine replacement and bupropion is efficient for smoking cessation" (46.6 %), and the highest ratio was observed in agreement with item of "Health professionals should routinely advise patients to avoid smoking around their children" (97.5 %). Majority of the NS among nurses/midwives agreed with anti-tobacco activities and smoking cessation practice, compared to ES. In only item of "Health professionals should routinely advise patients to avoid smoking around their children", there was no

Table 3. Items with respect to knowledge about smoking

Items with respect to knowledge about smoking (n = 1021)	Statement of Agreement			p*
	All (%)	ES ⁺ (%)	NS ⁺ (%)	
Smoking is harmful to your health.	98.3	96.4	99.8	< 0.001
Neonatal death is associated with passive smoking.	86.0	80.4	89.9	< 0.001
Passive smoking increases the risk of lung and heart diseases in non-smokers.	95.6	91.9	98.2	< 0.001
Paternal smoking increases the risk of lower respiratory tract illnesses such as pneumonia and asthma in exposed children.	96.9	95.3	97.9	= 0.008
Smoking during pregnancy increases sudden neonatal death syndrome	88.9	85.3	91.4	= 0.006
Health professionals who smoke are less likely to advise people to stop smoking.	79.8	73.4	84.1	< 0.001

* ES: ever-smoker; NS: never-smoker; **variables between ever and never smokers were analyzed with chi-square/Fischer's exact test, and, ***Variables were stated as percentage.

Table 4. Items with respect to attitudes towards smoking and tobacco control

Items with respect to attitudes towards smoking and tobacco control (n = 1005)	Statement of Agreement			p*
	All (%)	ES ⁺ (%)	NS ⁺ (%)	
Health professionals should serve as role model for their patients and the public.	89.9	82.4	95.3	< 0.001
Health professionals should set a good example by not smoking.	90.1	80.9	96.4	< 0.001
Health professionals should routinely ask about their patients' smoking habits.	75.1	76.6	82.5	= 0.045
Health professionals should routinely advise their smoking patients to quit smoking.	80.7	79.1	81.8	= 0.019
Health professionals should get a specific training on cessation.	78.3	76.2	79.7	= 0.018
Health professionals should speak to community groups about smoking.	70.0	66.9	72.1	< 0.001
Smoking in enclosed public area should be prohibited.	93.7	87.0	98.4	< 0.001
Health warnings on cigarette packages should be written and big print.	89.3	81.0	95.4	< 0.001
Sponsorships supported by tobacco industry should be banned.	86.5	89.7	81.0	= 0.001
There should be a complete ban on the advertising of tobacco products and it should be extended.	90.1	83.2	94.7	< 0.001
The price of tobacco products should be increased sharply.	70.8	51.4	84.2	< 0.001
Health professionals should routinely advise patients to avoid smoking around their children.	97.5	96.7	98.1	0.189
Pharmacotherapy such as nicotine replacement and bupropion is efficient for smoking cessation.	46.6	48.4	52.6	< 0.001
Patient's chances of quitting smoking are increased if a physician advises him or her to quit.	77.5	73.4	84.1	= 0.001

* ES: ever-smoker; NS: never-smoker; **variables between ever and never smokers were analyzed with chi-square/Fischer's exact test, and, ***Variables were stated as percentage.

statistically significant difference in disagreement between NS and ES (98.1 % vs. 96.7 %, $p > 0.05$). Significant differences were observed in statement of agreement with other items related to attitudes of the nurses/midwives towards smoking and tobacco control between NS and ES (95.3 % vs. 82.4 %, $p < 0.001$; 96.4 % vs. 80.9 %, $p < 0.001$; 82.5 % vs.

76.4 % $p = 0.045$; 81.1 % vs. 79.1 %, $p = 0.018$; 72.1 % vs. 66.9 %, $p < 0.001$; 95.4 % vs. 81.0 %, $p < 0.001$; 84.2 % vs. 51.4 %, $p < 0.001$; 52.6 % vs. 48.4 %, $p < 0.001$; 84.1 % vs. 73.4 % $p = 0.001$).

Skills of nurses/midwives regarding smoking cessation

In table 5, skills of nurses/midwives regarding smoking cessation practice were stated. Almost all of the participants had no any training course on smoking cessation practice (99.6 %). Majority of them were not competent for preparedness in smoking cessation (competent: 17.4 % vs. incompetent or somewhat: 82.6 %). Out of all, 79.2 % stated that they were rarely or never asking about patients' smoking habits (79.2 % vs. 20.8 %). It was observed that 14.0 % of them were advising smokers with relevant medical conditionals to stop smoking. Among nurses/midwives, a small number referred smokers to smoking cessation program or center (4.2 %). Between NS and ES, it was observed that there was significant difference in statement of agreement with items of "Degree of preparedness in smoking cessation practice" and "Advising patients (to all, or those relevant with medical condition) to stop smoking" (84.8 % vs. 77.9 %, $p=0.039$ and 87.9 % vs. 83.2 %, $p=0.028$). Between statement of agreement by NS and ES with items of "training in course on smoking cessation", "Asking patients about smoking", and "Referral to smoking cessation program or center", no significant differences were observed (99.8 % vs. 98.1 %, $p=0.740$; 78.8 % vs. 79.7 %, $p=0.939$; and 95.9 % vs. 95.5 %, $p=0.976$).

Discussion

Health professionals including nurses and midwives at primary care settings, as well as family physicians, serve as strong role models for their patients. They are also in the first step in position of health care system to screen smokers and advise them smoking cessation (22). Anti-tobacco law, health professionals and patient readiness account for trivet in challenge with smoking. To decrease the number of smoking, governmental policy, health professionals and patient readiness should equally cooperate in tobacco control. Health professionals in primary care settings have great responsibilities for these issues.

This study was important to show positions and contributions of health professionals in tobacco control. Based on results of this study, tobacco control in Turkey seemed to be majorly supported by governmental policy. The study investigated health professionals' smoking habits and their knowledge level of smoking, skills in smoking cessation practice and attitudes towards smoking and tobacco control in Turkey. Among health professionals, the frequency of smoking was comparably higher than normal female population in Turkey. The present study indicated that health professionals including nurses and midwives were not competent enough

Table 5. Items with respect to skills and practice in smoking cessation

Items with respect to skills and practice in smoking cessation (n = 960)	Statement of Agreement			p*
	All (%)	ES† (%)	NS† (%)	
Training in course on smoking cessation				
Never or rarely	99.6	98.1	99.8	= 0.740
Regularly	0.4	1.9	0.2	
Degree of preparedness in smoking cessation practice				
Incompetent or somewhat	82.6	77.9	84.8	= 0.039
Competent	17.4	15.5	18.7	
Asking about smoking to every patient				
Rarely or never	79.2	79.7	78.8	= 0.939
Often or always	20.8	20.3	21.2	
Advising to stop smoking				
To all smokers	86.0	83.2	87.9	= 0.028
To smokers with relevant medical conditions	14.0	16.8	12.1	
Referral to smoking cessation program or center				
Never or rarely	95.8	95.5	95.9	= 0.976
Often or always	4.2	4.5	4.1	

* ES: ever-smoker; NS: never-smoker; **variables between ever and never smokers were analyzed with chi-square /Fischer's exact test, and, ***Variables were stated as percentage.

for smoking cessation practice. The study also revealed that health professionals' knowledge level about smoking and tobacco control were high. In the study, attitudes of health professionals towards smoking habits and anti-tobacco activities were found to be considerably low. Particularly, ever smokers were significantly more incompetent and less prepared for smoking cessation practice, also more inhibited for advice patients to quit smoking.

We found that frequency of smoking among health professionals including nurses was 30.1 %. Tezcan et al. (23) reviewed studies on frequency of smoking among Turkish health professionals and reported that it was ranged between 40-50 %. Those studies had been conducted before tobacco law was passed. Our study was carried out after that. Therefore, lower frequency in the present study could be an effect of tobacco law and our study was conducted with large sample size, compared to those studies. In contrast, the frequency of smoking among nurses was reported as 10.9 % in Japan, 21.0 % in Ireland, 13 % in Jordan (24-26). We observed that initiation and cessation age, duration of smoking, nicotine dependence and cigarette unit per day among health professionals in the study were consistent with previous reports.

Achievement in tobacco control requires continues contributions of multi-dimension. Tobacco control is based on activities in trivet. Among them, the major one is legal regulation involving restrictions on smoking in public and workplaces along with comprehensive bans on advertising and promotions supported by some tobacco industries. Tabakoglu et al. (27) carried out a study on the influence of the anti-tobacco law on children in Edirne, Turkey. They reported that smoking among children in Edirne significantly was decreased; rating fell from 13.9 % in 13.9 to 2.2 in 2006, after the law was passed.

Another leg of trivet is health professionals. Health professionals from primary care are gate keepers and primary care settings are first stations in which the patients encounter for their health problem. In previous studies, it was shown that non-smoker health professionals were more interested and relevant to participant in smoking cessation practice (28, 29). Slater et al. (30) reported that nurses who smoke are less motivated to provide cessation support for patients, have less positive attitudes to the value of smoking cessation,

are less likely to have received smoking cessation training and are less likely to want further training.

In smoking cessation practice, five "A's" protocol (Ask, Advice, Assess, Assist and Arrange) was applied as general. To achieve in smoking cessation, every step should be practiced. Steps of "Ask" and "Advice" were usually practiced, but other steps of five "A's" (Advice, Assist and Arrange) were not fully practiced by health professionals. Chan et al. (31) found that 26.3 % and 37.6 % of nurses often or always practiced "ask" and "advice" steps and approximately 20 % and 8.4 % of nurses practiced "Assist" and "Arrange" step of five "A's" in their study. In contrast, we found that 20.8 % and 14.0 of our participants practiced "Ask" and "Advice", but 4.2 % of them always practiced "Arrange" the step of "5A's".

Attitudes or behaviors of health professionals towards represent their preparedness or status for tobacco control. The more they believe the tobacco control, the more they contribute. In the study, some items related with attitudes towards tobacco control was agreed by the majority of health professionals, whereas some items agreed by minority of them. As for attitude items, the differences in agreement with the statement related to role models of health professionals could be expected between ever and never smokers of them, and similar results were seen in another study conducted by Hodgetts et al.(32) in Bosnia. Consistent with our results, attitudes of never smokers towards smoking habits and tobacco control displayed higher agreement. Similarly with our results, Ramos et al. (33) reported that items with respect to attitudes of never smokers towards smoking and tobacco control were more agreed than non- smokers.

There are some weak and strength aspects for the study. Participation in the study was based on health professionals' willingness, so some current smokers among them could abstain to participate in the study. However, it was expected to not influence the opinions and thoughts of health professionals about items in the survey. The study was a qualitative study for evaluating the smoking cessation practice of health professionals. The survey was applied to nurses/midwives while they were working, so they could hasten to state items.

Conclusion

Among nurses/midwives including nurses/midwives at primary care in Turkey, the number of current smokers was still high. Knowledge level and skills in smoking cessation practice and attitudes towards smoking and tobacco control in nurses/midwives were observed as low and somewhat high, and there were significantly differences between ever and never smokers of nurses/midwives. On the light of the study results, nurses/midwives should be encouraged for quitting smoking and smoking cessation practice. Therefore, smoking cessation programs should be introduced among nurses/midwives to reduce the number of current smokers and prevent the initiation of smoking among potential physicians. A continuous education program should be instituted to increase motivation of them about their role in society and smoking cessation practice.

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Evaluation of effectiveness of preventive procedures in 7- year old children in Białystok, Poland

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Abstract

Introduction: Dental caries is the most common disease of the masticatory system and the main cause of loss of human teeth. It applies up to 90% of school children. Dental caries and periodontal disease can be prevented by formation of a positive pattern of systematic care for oral hygiene through the life. Treatment of reversible caries is based on non-invasive methods using fluoride compounds.

Aim: of study was to evaluate the effectiveness of selected preventive procedures, such as supervised brushing with Elmex gel and varnish with Fluor Protector in caries prevention in deciduous and permanent teeth in children.

Materials and methods: The examination was carried out on a group of 129 children who were 7 years old. First a tooth brushing instruction and explanation was conducted. Children were randomly divided into three groups: group 1 were brushing their teeth with the use of Elmex gel, every two weeks (16 times during investigation). Group 2 - the permanent teeth were varnished with Fluor Protector and all teeth were cleaned 6 times under supervision of school nurse. Group 3 – a reference group where teeth were cleaned 6 times under supervision of school nurse. Indices were calculated: caries frequency, intensity, caries incidence, caries increment, caries reduction and number needed to treat NNT ratio for the studied group of children.

Results: caries frequency of deciduous and permanent teeth showed an increase in the incidence of caries but not statistically significant. Analysis of the caries intensity dmf/DMF in the whole group of children considering the deciduous and permanent teeth during the study period showed an upward trend, and the growth was statistically significant. Caries increment (PP) in each group received the highest value in the reference group in the deciduous and permanent dentition. The greatest benefits

of performed preventive procedures (RPP) were recorded in group 1 and 2 in deciduous teeth and group 2 in permanent teeth. The best values of NNT index were obtained in both groups for primary teeth

Conclusions: prevention action conducted for one year did not stop the caries process, but it slowed down it comparing to the reference group. The usage of Elmex gel 6 times during investigation was less effective than 16 times in caries prevention in deciduous teeth. Within the permanent dentition - Fluor Protector was better. Preventive measures are necessary and should be carried out the long term.

Key words: Caries frequency, caries intensity, Elmex gel, Fluor Protector

Introduction

Dental caries is the most common disease of the masticatory system and the main cause of loss of human teeth. It applies up to 90% of school children and majority of adults. However, there is an increasing diversity of population health status among different regions and different social groups associated with different economic and environmental considerations, as well as different approaches to the problems of health promotion and prevention of oral cavity diseases (1,2,3).

In developed countries, where there is a good system of health care and high public awareness, there is declining trend in the incidence of caries. However, the reverse situation is not evident in developing countries where rapid access to increased consumption and lack of prevention programs had led to an increase in the incidence of caries disease (4,5).

Dental caries and periodontal disease can be prevented by formation of a positive pattern of systematic care for oral hygiene through the life. Preventive measures for children are designed to keep deciduous teeth up to the period of physiological replacement of teeth and allow the permanent teeth

freshly erupted to perform correctly role in the development of the stomatognathic system (5,6,7).

Treatment of caries lesions within the enamel, without interrupting its continuity can therefore be based on non-invasive methods, which aim to prevent the occurrence of dental caries. They focus primarily on efforts to mechanical and chemical plaque control, use of proper diet and the use of fluoride compounds, fissure sealing and screening. The most optimal effect does the use of all of these ways lifelong interindividual (8). For decades, fluoride compounds are used in all methods of caries prevention. Fluorides have an cariostatic effect by inhibiting demineralization on the surface of hydroxyapatite crystals, intensifying the remineralization of increasing resistance of crystals to acid and inhibition of bacterial enzymes – enolase. The condition for effectiveness of fluoride in this way is always persistent, slightly increased their concentration in saliva and dental plaque. In preventive actions more and more attention is paid to egzogenous (contact) effect of fluoride ions, by using fluorine compounds in the form of pastes, lotions, solutions, gels and varnishes (8,9,10,11). The aim of the study was to evaluate the effectiveness of selected preventive procedures, such as supervised brushing with Elmex gel and varnish with Fluor Protector in caries prevention in deciduous and permanent teeth in children.

Materials and methods

The study included 129 children (61 girls and 68 boys) attending primary school in a big city. The study was carried out after obtaining the consent of the Bioethics Committee (4-09585L) and written consent from parents of children enrolled. Each child received individual chart. The first step was to conduct talks aimed at introducing children to the influence of the principles of nutrition and oral hygiene on dental health, and teaching proper brushing with circular motion Fones method.

Oral examination was held in artificial light using a diagnostic kit. The presence of deciduous and permanent teeth and dental health was rated as recommended by WHO (12). In the examined group caries frequency and intensity was evaluated at baseline and after a year. With regard to the deciduous dentition in the assessment of caries in-

tensity teeth lost due to physiological replacement were not included. All children were randomly divided into 3 groups. Group 1 brushed teeth with the use of Elmex gel (Gaba International) every two weeks (16 times during study). In Group 2 – permanent teeth, their occlusal and smooth surfaces, were varnished with Fluor Protector (Ivoclar Vivadent) two times during study and all teeth were cleaned 6 times with Elmex gel under supervision of school nurse. Group 3 was reference group in which brushing with Elmex gel six times a year under the supervision of school nurse was declared. Indices were calculated: caries frequency, intensity, the incidence of caries, caries increment, caries reduction and number needed to treat NNT ratio for the studied group of children (13). The results were analyzed statistically (IBM SPSS Statistics 20.0) by independent Chi2 test, Mann-Whitney' test, Wilcoxon test, $p < 0,005$. The results were summarized in the tables.

Results

Caries frequency of deciduous teeth in the examined groups in the preliminary test was 96.9%, which means that 3.1% of the respondents were free of caries. The highest frequency was in group 3. The follow up examination after one year showed a slight increase in the incidence of caries 97.7% but not statistically significant (Table 1). However caries frequency of permanent teeth in the study group in the preliminary test was 8.5%, which means that 91.5% of respondents were free of caries. The highest frequency was in group 1. The follow up examination after one year showed an increase in the incidence of caries 23,2% but not statistically significant (Table 2).

Analysis of the results obtained by comparing the intensity of the caries process, expressed in dmf number, between group 1 and 2 in the preliminary test (Table 3, 4) revealed that they were not statistically significant. On the other hand, the results comparing of the number of missing teeth (m) in each group to the reference group was statistically significant in follow up examination.

The results obtained after comparing the mean number of DMF between group 1 and 2 and the reference group in the preliminary test (Table 5, 6) were not statistically significant, while the results

Table 1. Caries frequency in deciduous teeth in preliminary and follow up examination

group		Preliminary examination			p	Follow up examination			p
		%	absence	presence		absence	presence	total	
1	N		1	46	0,293	1	46	47	0,517
	%		2,1	97,9		2,1	97,9	100,0	
2	N		3	48		2	49	51	
	%		5,9	94,1		3,9	96,1	100,0	
3	N		0	31		0	31	31	
	%		0,0	100,0		0,0	100,0	100,0	
total	N		4	125		3	126	129	
	%		3,1	96,9		2,3	97,7	100,0	

Table 2. Caries frequency in permanent teeth in preliminary and follow up examination

group		Preliminary examination			p	Follow up examination			p
		%	absence	presence		absence	presence	total	
1	N		41	6	0,328	36	11	47	0,316
	%		87,2	12,8		76,6	23,4	100,0	
2	N		47	4		42	9	51	
	%		92,2	7,8		82,4	17,6	100,0	
3	N		30	1		21	10	31	
	%		96,8	3,2		67,7	32,3	100,0	
total	N		118	11		99	30	129	
	%		91,5	8,5		76,7	23,3	100,0	

Table 3. Comparison of the mean number of dmf in groups in the preliminary examination

		d		m		f		dmf	
		Śr	SD	Śd	SD	Śr	SD	Śr	SD
	gr1	3,96	3,237	0,28	0,971	1,72	1,862	5,96	2,637
	gr2	4,02	3,159	0,18	0,434	1,53	2,053	5,73	2,960
	gr3	4,35	3,372	0,06	0,359	1,52	2,219	5,94	3,224
p	1vs3	0,644		0,158		0,279		0,873	
	2vs3	0,683		0,094		0,880		0,950	

Table 4. Comparison of the mean number of dmf in groups in the follow up examination

		d		m		f		dmf	
		Śr	SD	Śd	SD	Śr	SD	Śr	SD
	gr1	3,81	2,871	0,64	1,092	1,94	1,938	6,38	2,609
	gr2	4,14	2,919	0,43	0,671	1,57	1,972	6,14	2,757
	gr3	4,58	3,491	0,39	1,647	2,23	2,390	7,19	4,708
p	1vs3	0,403		0,009		0,754		0,825	
	2vs3	0,686		0,026		0,171		0,707	

Table 5. Comparison of the mean number of DMF in groups in the preliminary examination

		D		M		F		DMF	
		Śr	SD	Śd	SD	Śr	SD	Śr	SD
	gr1	0,09	0,351	0,00	0,000	0,09	0,351	0,17	0,481
	gr2	0,10	0,361	0,00	0,000	0,00	0,000	0,10	0,361
	gr3	0,03	0,180	0,00	0,000	0,00	0,000	0,03	0,180
p	1vs3	0,530		1,000		0,154		0,146	
	2vs3	0,393		1,000		1,000		0,393	

Table 6. Comparison of the mean number of DMF in groups in the follow up examination

		D		M		FW		DMF	
		Śr	SD	Śd	SD	Śr	SD	Śr	SD
	gr1	0,13	0,397	0,00	0,000	0,28	0,877	0,4	0,925
	gr2	0,12	0,382	0,00	0,000	0,14	0,601	0,25	0,688
	gr3	0,42	0,886	0,00	0,000	0,06	0,250	0,48	0,890
p	1vs3	0,071		1,000		0,342		0,430	
	2vs3	0,049		1,000		0,799		0,124	

Table 7. Mean number dmf/DMF in preliminary and follow up examination in study group

gender	examination	d	m	f	dmf	D	M	F	DMF
girls	preliminary	3,93	0,19	1,60	5,72	0,09	0,00	0,03	0,12
	follow up	3,79	0,47	1,88	6,15	0,25	0,00	0,15	0,40
	p	0,407	0,000	0,053	0,000	0,021	1,000	0,034	0,001
boys	preliminary	4,25	0,18	1,59	6,02	0,07	0,00	0,03	0,10
	follow up	4,49	0,52	1,84	6,85	0,13	0,00	0,20	0,33
	p	0,177	0,004	0,208	0,000	0,157	1,000	0,023	0,006
Total	preliminary	4,08	0,19	1,6	5,86	0,08	0,00	0,03	0,11
	follow up	4,12	0,50	1,86	6,48	0,19	0,00	0,17	0,36
	p	0,720	0,000	0,021	0,000	0,007	1,000	0,002	0,000

Table 8. Shows the incidence of caries, caries increment PP, caries reduction RPP, NNT index in the study group of children within the deciduous and permanent teeth

dentition		caries incidence	PP	RPP	NNT index
deciduous	Gr 1	0,00%*	0,43	66,2%	1,20
	Gr 2	1,96%	0,41	67,3%	1,18
	Gr 3	0,00%**	1,26		
permanent	Gr 1	10,64%	0,23	48,2%	4,60
	Gr 2	9,80%	0,16	65,3%	3,39
	Gr 3	29,03%	0,45		

* no one new had caries

** because in the preliminary study all had caries

in follow up examination of comparison of the number of permanent teeth with caries in group 2 to the reference group was statistically significant to the detriment of the reference group.

Analysis of caries intensity dmf/DMF in the group of examined children considering the deciduous and permanent dentition during the study period showed an upward trend, and this increase was statistically significant (Table 7). The increase in the value of dmf had an impact the growth of m number in the examined group and the growth of number f in follow up examination. The increase in the value of DMF had an impact an increase in D number in girls and in the whole group, and an increase in number F in the whole group.

Based on the results contained in Table 8 we can be concluded that the largest percentage of

children with new cases of caries in permanent teeth appeared in the reference group. At that time, the caries increment (PP), i.e. the difference in the caries intensity measured by the mean number of DMF in each group between the next examinations, the highest value obtained also in the reference group in deciduous and permanent dentition. The greatest benefits of performed prophylactic treatments (RPP) can be reported in group 2 and 1 in deciduous teeth and in group 2 in permanent teeth. Another calculated ratio used to assess the effectiveness of medical interventions is an indicator of NNT. It expresses the number of children that would be subjected to fluoridation to prevent one tooth decay, as compared to the reference group. The better results in both groups study were obtained by deciduous teeth than permanent teeth.

Discussion

In 2003, due to the nationwide monitoring, seven years old children were examined in 16 provinces of Poland. The results show high caries frequency among children in our country. The average percentage of seven years old children with caries lesions was at 91%, which meant that only every tenth child starting primary school had no teeth with active caries, filled or removed because of this disease (14). In the Podlaskie area the percentage of seven-years olds with permanently damaged teeth as a result of the ongoing process of caries was 93.3% which means that only 6.7% of children did not have dental caries and this result was similar to my result (14). The mean value of DMF obtained for the permanent teeth was 0.82, and the values recorded in our region were at the level of 1.07. Comparing this result with previous years, we can be concluded that there was a further improvement of oral health status of primary pupils in our province, but compared to others, Podlaskie province was still one of the worst. In our study, although the mean value of the DMF in the follow up examination increased it is needed to emphasize that with the components D, M, F was lower than the result obtained in 2003 for the Podlaskie region. The condition of teeth in 7 years old children in the study, turned out to be better than the state of teeth from the same age group in the Podlaskie region in 2009 (DMFT = 1.34) (14).

The state of first molars is closely related to the state of deciduous teeth, and therefore it is important to choose the preventive methods that are effective in fighting tooth decay (15). *Maserejian and al* (16) observed the children with high risk for caries, aged 6-10 years who have not had fluoride prevention. After a year the increment of caries intensity was 0.7-0.8 DMF, and was almost twice as higher than in the control group (DMF 0,45).

To assess the effectiveness of preventive procedures that were carried out we used indicators that describe the effects of prophylactic treatments. Analysis of the incidence of caries, caries increment confirmed that conducting regular fluoride procedures causes the release of dental caries progress, as was seen in both groups with respect to the reference group.

Exact comparison of the effects of prevention activities conducted in our study is difficult with

data from literature. This is mainly due to differences in research methodology, which focus on: the frequency and type of treatments used their duration, mode of application, formulations used, the population size and severity of the disease (17). Presented forms of preventive action did not prevent the appearance of new carious lesions in the examined group. Caries increment of permanent teeth draw attention which but was not statistically significant. Children without a systematic prevention in the reference group were most affected by dental caries. The least of new outbreaks of lesions occurred in group 1 and 2 for the deciduous and permanent teeth. In vitro studies conducted in deciduous teeth by *Santos et al* (18), comparing eight different preparations containing fluoride compounds also failed to completely prevent the development of new carious lesions.

Most new cases of teeth decay in permanent teeth (29.03%) occurred among the group who least likely brushed teeth with Elmex gel. This can be explained by the fact that brushing with preparation in gel form every two months do not adequately protect against dental caries. Whereas, few new cases were in the group using varnish Fluor Protector and Elmex gel. Within the primary teeth greatest benefits (RPP) of the prophylactic treatment obtained group that received brushing 16 times during the study, and also the group that applied Fluor Protector and Elmex gel. However, undoubtedly the greatest prophylactic benefits to permanent teeth gave varnish with Fluor Protector. It is known that varnishes stay longer on the surface of teeth because fluoride ions can be released from 24 hours to 5 months after application (19,20). Mechanism of action of topical formulations with a high concentration of fluoride ions is to dissolve the most superficial layer of enamel and re-precipitation of calcium fluoride, the enamel remineralization becomes more resistant to acid and calcium fluoride is a reservoir of fluoride ions in the environment surrounding the tooth. It turned out that the protective effect of fluoride has both built into the structure of the enamel, and one that is present in the vicinity of the tooth (8,10). Better effect gives a regular use over the year, although there are studies indicating the remineralization of enamel after a single application of compounds with a high content of fluoride (21). Fluor Protec-

tor reduces enamel solubility in acids, because after its application microdemineralization process extends in the hard tissue of teeth (19).

Despite a significantly lower number of new cases of tooth decay in permanent teeth in group 2 and group where teeth brushing was done every three weeks the effectiveness of preventive interventions proved to be most effective in the group of teeth where the NNT index was the lowest. Perhaps this can be explained by the fact that dental caries usually locates on the occlusal surfaces of first permanent molars that erupt after the last primary molar teeth, and their location makes them badly brushed until they reach occlusal plane (NNT index 4,60 and 3,39). Enamel of first permanent molars immediately after eruption is immature and not very resistant to damaging agents, and the maturing process takes two years and consists of increasing the content of inorganic constituents (9).

Effectiveness of exogenous fluoride formulations depend on their type, concentration and pH. The most effective method of enrichment of the enamel in fluoride ions is the use of varnishes containing this ion (18,19,22,23,24). Data from literature shows that the ability of fluoride ions to assist remineralization is perhaps more important in the prevention of tooth decay than their ability to inhibit demineralization (8,18,19). Early application of fluoride compounds (directly after tooth eruption) should bring the best preventive effect. Incorporation of fluoride ions in the structure of the enamel increases its resistance against caries stimulating elements. According to different authors application of varnishes leads to a reduction in dental caries from 9.4% to 77% (18,24,25). It is not without significance that there are other factors acting locally as salivary flow rate and its buffer. In caries-resistant children, it is enough to applied varnish just twice a year, while in children at high risk for caries to obtain caries reduction, this treatment should be repeated regularly and long term (26,27). Good effects of varnishes confirmed statistically are more visible in children with high susceptibility to dental caries than the low (28,29). Based on the 3-year preventive program *Sköld et al.* (30) evaluated the efficacy of fluoride varnish applied twice a year and obtained caries reduction from 20% (in children with low caries risk) to 69% (in children at high risk for caries). The efficacy of

fluoride varnish in caries prevention decay is also confirmed by *Marinho* (31), *Splieth et al.* (32) and *Weintraub et al.* (33). Published studies indicate a higher efficiency of fluoride varnish formulations than gel forms, which also was confirmed by own research within the permanent dentition.

The effectiveness of fluoride gel in caries prevention is confirmed in many studies. *Marinho et al.* (34) on the basis of a detailed review of 23 clinical trials involving the use of aminofluoride in 7 years old children demonstrated that fluoridation contributes to a reduction in caries increment at the level of 21-22% comparing to the group of patients where prophylaxis was not applied. On the other hand *Ripa* (35) observed a reduction in caries increment school children of about 26%, while *Truin et al.* (28) after a four-year application of the gel in children aged 9-11 years obtained a reduction of 18%. In a study conducted by *Hawkins et al.* (26) the efficacy of fluoride varnish and gel in the caries prevention of permanent teeth was also comparable, although they preferred the use of varnish due to ease of application and elimination of the risk of ingestion of fluoride compounds by young patients. However, different opinion presented *van Rijkom et al.* (29) who stated that effects of fluoride gels can be questioned at low or medium caries increment in children.

Due to the multicausative etiology of dental caries there is no single method of prevention the progression of the carious process. The decision concerning caries prevention should be based on the general state of deciduous and permanent dentition, oral hygiene, willingness to cooperate and parent awareness, frequency of visits and financial capabilities. A very important aspect is to conduct long-term preventive actions, and is based on more than one method of prevention, because then they will have a positive impact on oral health, and consequently on the quality of our lives.

Conclusions

The preventive actions carried out for one year did not halt the caries process, but it slowed down comparing to the reference group. The use of Elmex gel 6 times during the study was less effective than brushing 16 times in the prevention of caries in deciduous teeth. Fluor Protector was more ef-

fective within the permanent dentition than within deciduous teeth. The preventive measures are necessary and should be carried out long term.

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A comparative evaluation of the effects of bevacizumab and 5-fluorouracil on wound healing in rat model

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Abstract

Purpose: Our aim is to evaluate the use of combined bevacizumab with 5-Fluorouracil (5-FU) on post-operative scarring survival following experimental skin incision surgery in comparison to the agents alone.

Material and methods: Skin incision surgery was performed on 28 female Sprague-Dawley rats. The rats were allocated to one of four treatments: 5-FU combined with Bevacizumab, 5FU alone, bevacizumab alone and phosphate buffered saline (PBS). A single subcutaneous injection was administered immediate postoperatively. Histological staining determined the presence of cutaneous fibrosis and mRNA expression of collagen I and fibronectin in the tissue was quantified.

Results: Relative quantity of Colla1 mRNA transcript 5 fold increased in Group 1 (PBS) in comparison to control group. However, *Colla1* level in Group 2 (5-FU) and 3 (bevacizumab) is decreased. The lowest level of Colla1 was detected in Group 4 (combination of 5-FU and bevacizumab). On the other hand, relative quantity of Fn1 is slightly elevated in Group 1 (PBS) and decreased in Group 2 (5-FU) and group 3 (bevacizumab) in comparison to control group. The lowest level of Fn 1 was detected in Group 4 (combination of 5-FU and bevacizumab).

Conclusions: Bevacizumab in combination with 5-FU resulted in a greater anti-fibrotic effect compared to monotherapy with 5FU or bevacizumab alone, as evidenced by the attenuation in fibronectin and mature collagen I expression and deposition. ($P<0.05$) The results provide compelling evidence that combined bevacizumab and 5-FU offers superior anti-fibrotic effect over monotherapy. A synergistic effect is suggested to be present.

Key words: Bevacizumab, 5-fluorouracil, wound healing.

Introduction

Wound healing process are categorized into four general topics as follows; coagulation, inflammation, proliferation and maturation. The main events are epitelisation, angiogenesis, granulation tissue formation and collagen deposition in the proliferation phase (1-4).

A scar is an essential part of this natural healing process following an injury to the layers of skin (the dermis or the epidermis). Sometimes, wound healing process may end up with the formation of a proliferative scar rather than a self-limited mature scar (5). Scars range from fine lines to raised, hard, red, pruritic and painful hypertrophic or keloid scars, which are severely disfiguring and cause significant morbidity. In addition to physical complications, the appearance of scars can be a major concern for both physicians and their patients (6-9).

Scar is a wound healing response, which is characterized by excessive fibrosis and collagen deposition. The healing of a deep surface wound in humans begins with the formation of granulation tissue and includes marked microvascular regeneration. Angiogenesis plays an essential role in the early stage of wound healing process, and microvascular abnormalities have been demonstrated in pathological scars. Vascular endothelial growth factor (VEGF) is one of the most potent promoters of angiogenesis and has been identified as a fundamental regulator of tumor neovascularization. VEGF is, thus, considered to be an important therapeutic target in antiangiogenic therapy. The over-expression of VEGF has been demonstrated in the early phase of

pathological scars formation and higher blood vessel density has been demonstrated higher in scar tissue than normal skin (10-13).

Despite the enormous amount of data available about wound healing in general, molecular features of wound healing in different areas of oral cavity are still emerging. A common observation by clinicians is that oral wounds heal quickly and in some areas such as gingiva and palatal mucosa without significant scar formation. These observations are supported by experimental evidence showing that palatal wounds in humans and pigs heal with minimal scarring (14,15). Although the molecular mechanisms of the scar-free healing in oral cavity are still being dissected, the current evidence points to reduced or fast resolving inflammation that separates scar-free oral wounds from skin wounds that heal with scarring (16).

Management of hypertrophic scars has advanced in the past years, the lesions remain difficult to prevent and treat, and no individual treatment modality appears to be generally effective (17,18).

Bevacizumab is a humanized monoclonal antibody that inhibits vascular endothelial growth factor A (VEGF-A). VEGF-A is a chemical signal that stimulates angiogenesis in a variety of diseases, especially in cancer, retinal proliferation of diabetes in the eye. Bevacizumab was the first clinically available angiogenesis inhibitor in the United States of America. So blockade of VEGF-A activity with bevacizumab may be used as an effective strategy in hypertrophic scars therapy. There has been extensive research in the area of antiangiogenic therapy for hypertrophic scars (13,17). However, we postulate, blockade of VEGF-A activity with bevacizumab, which represents an effective and generally well tolerated first line option for antiangiogenic cancer therapy, may be a new promising agent to prevent and treat hypertrophic scars.

The chemotherapy agent 5-FU (fluorouracil), which has been in use against cancer for about 40 years, acts in several ways, but principally as a thymidylate synthase inhibitor. Interrupting the action of this enzyme blocks synthesis of the pyrimidine thymidine, which is a nucleotide required for DNA replication. Thymidylate synthase methylates deoxyuridine monophosphate (dUMP) into thymidine monophosphate (dTMP). 5-FU causes a scarcity in dTMP, so rapidly dividing cancerous cells

undergo cell death via thymineless death. In other words 5-fluorouracil inhibits population growth of cells by blocking DNA replication. A single application in the first few days after wound closure seems to be effective in scar reduction. 5-FU is also used in ophthalmic surgery, specifically to augment trabeculectomy as an anti-scarring agent (19).

Our aim is to evaluate the use of combined bevacizumab with 5-Fluorouracil (5-FU) on post-operative scarring survival following experimental skin incision surgery in comparison to the agents alone.

Material and method

Twenty eight adult male Sprague-Dawley rats weighing 450-520 gr were included in this study. The rats were housed in individual cages in a controlled environment (21°C; 12:12 light cycle) cages. Standard food pellets and water ad libitum were available to the rats. All animal procedures were approved by the ethics committee and performed in compliance with the guidelines for the care and handling of experimental animals of the medical research center at University.

Experimental Design

Animals were anesthetized with an intramuscular injection of ketamine hydrochloride (Ketavett, 5 mg/kg body weight). Before skin skull incision, the region was shaved, washed, and decontaminated with an antiseptic iodine solution. A midline incision was made from the naso-frontal area to the external occipital protuberance along the mid-sagittal suture. The skin and underlying tissues including the temporal muscle were reflected bilaterally. After the isolation of the region 1 cm skin incision was performed and the fascia and skin were closed in separate layers with sutures.

Group Design

Rats were randomly assigned to 4 groups: In group 1 (n=7) an incision was performed and a single subcutaneous 0.1 ml phosphate buffered saline (PBS). In group 2 (n=7) an incision was performed and a single subcutaneous 5FU (0.1 ml of 50 mg/ml) injection was administered immediately postoperatively. In group 3 (n=7) an incision was performed and a single subcutaneous bevacizum-

ab (0.1 ml of 25 mg/ml) injection was administered immediate postoperatively. In group 4 (n=7) an incision was performed and a single subcutaneous combination of 5FU (0.1 ml of 50 mg/ml) and bevacizumab (0.1 ml of 25 mg/ml) injection was administered immediate postoperatively.

All of the subjects were sacrificed 28 days after the incision and specimens were harvested. Animals were killed by intravenous injection of 100 mg/kg of pentobarbital sodium (Pental; Bilim Pharmaceuticals, Istanbul, Turkey).

Isolation of RNA

Soft tissue samples were frozen in liquid nitrogen immediately after collection and were kept in -85 °C until RNA isolation. Twente five mg soft tissue were homogenized in (Kinematica, Gmdh, Switzerland). To avoid contamination, homogenizer is cleaned after each homogenization process of each sample. Total RNA isolation from 25 mg of homogenate were performed by using High Pure RNA Tissue Kit (Cat. No. 12 033 674 001, Roche, Germany) according to the kit manual. Total RNA was eluted with nuclease-free, sterile and double distilled 100 µl water, and it was kept in -85 °C.

Fibronectin (Fn 1)

Fibronectin is a high-molecular weight glycoprotein of the extracellular matrix that binds to membrane-spanning receptor proteins called integrins. In addition to integrins, fibronectin also binds extracellular matrix components such as collagen, fibrin and heparan sulfate proteoglycans.

Fibronectin exists as a protein dimer, consisting of two nearly identical monomers linked by a pair of disulfide bonds. The fibronectin protein is produced from a single gene, but alternative splicing of its pre-mRNA leads to the creation of several isoforms.

Fibronectin plays a major role in cell adhesion, growth, migration and differentiation, and it is important for processes such as wound healing and embryonic development. Altered fibronectin expression, degradation, and organization has been associated with a number of pathologies, including cancer and fibrosis.

Beta-Actin

Beta-actin (gene name ACTB) is one of six different actin isoforms which have been identified

in humans. This is one of the two non-muscle cytoskeletal actins. Actins are highly conserved proteins that are involved in cell motility, structure and integrity. Alpha actins are a major constituent of the contractile apparatus.

Beta-actin is usually used as a loading control, for among others, the integrity of cells, protein degradation, in PCR and Western Blotting.

COL1A1

Collagen, type I, alpha 1, also known as COL1A1, is a human gene that encodes the major component of type I collagen, the fibrillar collagen found in most connective tissues, including cartilage.

Collagen is a protein that strengthens and supports many tissues in the body, including cartilage, bone, tendon, skin and the white part of the eye. The COL1A1 gene produces a component of type I collagen, called the pro-alpha 1(I) chain. This chain combines with another pro-alpha 1(I) chain and also with a pro-alpha 2(I) chain (produced by the COL1A2 gene) to make a molecule of type I pro-collagen. These triple-stranded, rope-like pro-collagen molecules must be processed by enzymes outside the cell. Once these molecules are processed, they arrange themselves into long, thin fibrils that cross-link to one another in the spaces around cells. The cross-links result in the formation of very strong mature type I collagen fibers.

Complementary DNA (cDNA) synthesis

cDNA is synthesized from 5 µl of RNA of each sample via Precision qScript reverse transcription kit (Primer Design, U.K.) with Oligo-dT primer by using thermal cycler (Veriti, AB Biosystem, U.S.) according to protocol recommended in the product manual.

Quantification of type I Collagen alpha 1 (Colla1) mRNA and Fibronectin 1 (Fn1) mRNA expression

To quantify expression of *Colla1* (NM_053304) 5' CAACAGACTGGCAACCTCAAG-3', sense primer, 5' CAAGCGTGCTGTAGGTGAATC-3', antisense primer, and 5'-aCTCCTCAGGGCTCCAACGAGATCgaggagt-3', probe; of *Fn1* (NM_019143) 5' GCAGGCTGACAGAGATGATTC-3', sense primer, 5' GTGTGGATTGACCTTGGTAGAG-3', antisense primer, and

5'-aTTCCATCCAGCCCAAGCCAACAAGT-GTCgatggaat-3', probe, primer sets are used. As a reference gene transcript beta actin (Actb) mRNA (NM_031144) is selected. 5 µl cDNA of each sample with proper primers and probe was mixed with Primer Design Precision 2X qPCR mix. Then, PCR is performed under the conditions at 95 °C for 10 minutes (1 cycle) and at 95 °C for 15 seconds, at 60 °C for 60 seconds (50 cycles) in device (Rotorgene 9600, Qiagen, Germany). Relative quantity of *Colla1* and *Fnl* are calculated by using equations based on Threshold Cycle (Ct): $\Delta Ct = Ct_{\text{Target}} - Ct_{\text{Actb}}$, $\Delta\Delta Ct = \Delta Ct_{\text{Target}} - \Delta Ct_{\text{Actb}}$ and relative amount of target = $2^{-\Delta\Delta Ct}$.

Clinical Evaluation of Scar

Scars can be classified as to their clinical morphology, or their etiology. Scar types can include: hypertrophic; keloid; atrophic; hypopigmented; hyperpigmented, acne scars, including ice pick, boxcar and rolling types; surgical scars; and erythematous scars. Some even consider striae to be in this category, due to the histologic similarity to an atrophic scar.

Statistical Analysis

Each data set was tested for normality by means of the Shapiro-Wilk's test and by normality plots. Because the variances of the four groups were not equal, we used nonparametric (Kruskal-Wallis) analysis of variance and the Mann-Whitney *U* test to test for differences between groups. Bonferroni correction was used to correct these multiple comparisons, and $P \leq .0125$ was considered to indicate a statistically significant difference. Spearman correlation analysis was performed to ascertain quantitative comparison $P < 0.05$. All statistical analyses were performed with SPSS 15.0 (SPSS Inc, Chicago, IL, USA).

Results

Relative quantity of *Colla1* mRNA transcript 5 fold increased in Group 1 (PBS) in comparison to control group. However, *Colla1* level in Group 2 (5-FU) and 3 (bevacizumab) is decreased. The lowest level of *Colla1* was detected in Group 4 (combination of 5-FU and bevacizumab). On the other hand, relative quantity of *Fnl* is slightly elevated in Group 1 (PBS) and decreased in Group 2 (5-FU) and group 3 (bevacizumab) in comparison to control group. The lowest level of *Fnl* was detected in Group 4 (combination of 5-FU and bevacizumab) (Table 1,2).

Clinical Evaluation of Scar

Hypertrophic scar was detected in five subject of control group. All of the subjects in Group 2, 3 and, 4 was asymptomatic.

Among of all groups were significant differences ($p < 0.05$). The numbers of *Fnl* and Beta-actin and COL1A1 in the FB combination group (Group IV) were significantly higher than in the Placebo group (Group I) ($P < 0.0125$) (Table 3).

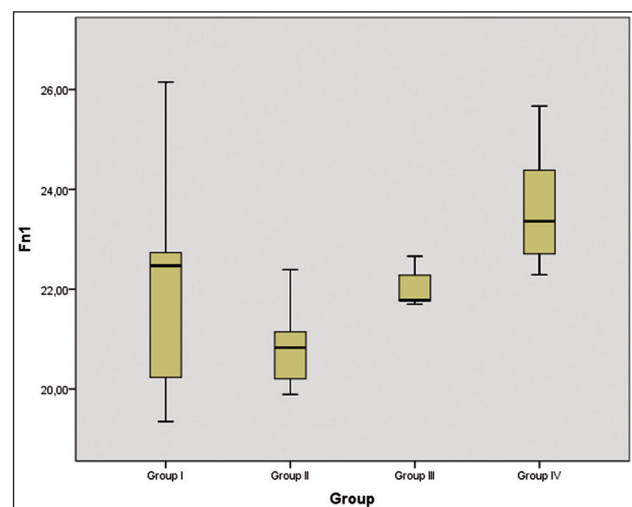


Figure 1. *Fnl* levels among groups

Table 1. Relative Quantitation of *Fnl* and Beta-Actin

	Fnl Ct	Beta aktin Ct	ΔCt	$\Delta\Delta Ct$	Relative Quantitation
Group 1	20,83	21,32	-0,49	1	1,00
Group 2	23,64	24,78	-1,14	-0,65	1,57
Group 3	22,13	23,43	-1,3	-0,81	1,75
Group 4	21,98	23,78	-1,80	-1,31	2,48

Table 2. Relative Quantitation of *Colla1* and Beta-Actin

	Colla1 Ct	Beta aktin Ct	Δ Ct	$\Delta\Delta$ Ct	Relative Quantitation
Group 1	22,26	21,32	-0,06	1	1,00
Group 2	24,84	24,78	0,06	0,12	0,92
Group 3	23,69	23,43	0,26	0,32	0,80
Group 4	20,22	23,78	-3,56	3,50	0,09

Table 3. Statistical comparison of all groups

	Group I (n = 7)	Group II (n = 7)	Group III (n = 7)	Group IV (n = 7)	Kruskal Wallis Test P	Mann- Whitney U Test P
Fn1	20.83±0.85	23.64±1.29	22.13±0.63	21.98±2.33	.008	.125 [†]
						.015 [‡]
						.003 [§]
						.949
						.338 [¶]
						.013 [#]
BetaAktin	21.32±1.22	24.78±1.53	23.43±1.07	23.78±2.11	.004	.277 [†]
						.085 [‡]
						.002 [§]
						.949
						.025 [¶]
						.035 [#]
colla1	22.26±1.43	24.84±2.22	23.69±0.94	20.22±3.14	.027	.025 [†]
						.443 [‡]
						.009 [§]
						.085
						.142 [¶]
						.048 [#]

[†] Comparison of Group 1-2 ($p < 0.0125$), [‡] Comparison of Group 1-3 ($p < 0.0125$), [§] Comparison of Group 1-4 ($p < 0.0125$),
^{||} Comparison of Group 2-3 ($p < 0.0125$), [¶] Comparison of Group 2-4 ($p < 0.0125$), [#] Comparison of Group 3-4 ($p < 0.0125$).

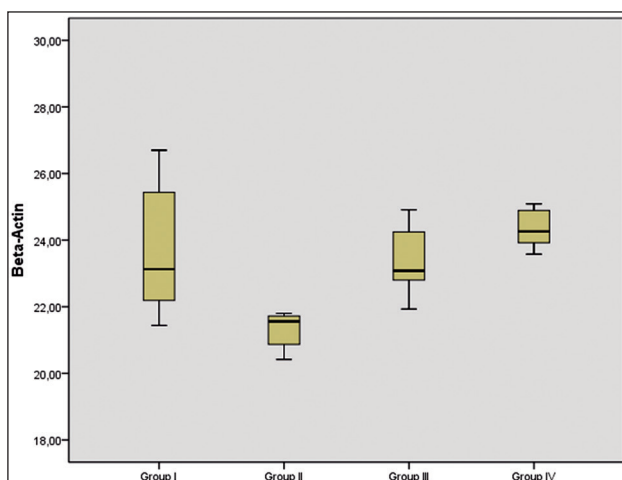


Figure 2. Beta-Actin levels among groups

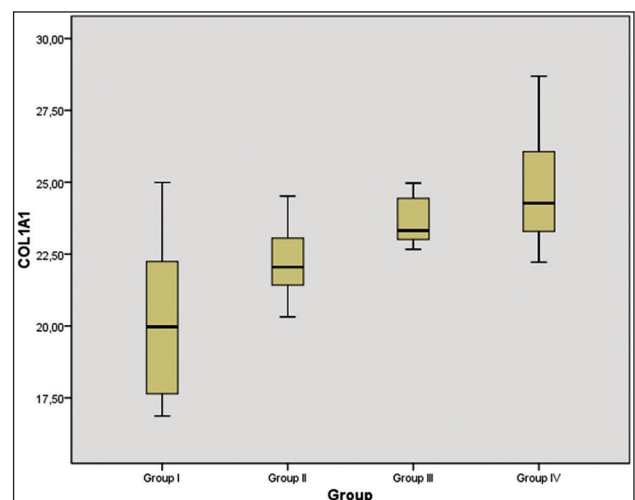


Figure 3. COL1A1 levels among groups

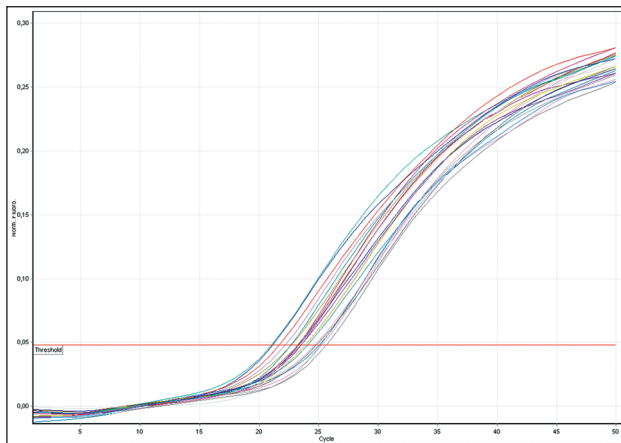


Figure 4. Real Time PCR for *Fn1* Gene

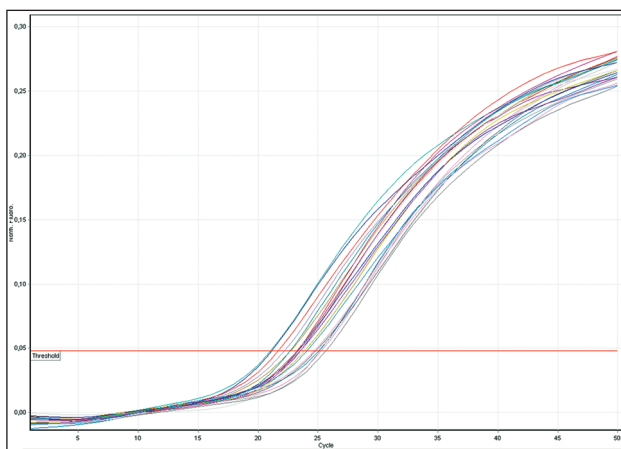


Figure 5. Real Time PCR for *Beta Actin* Gene

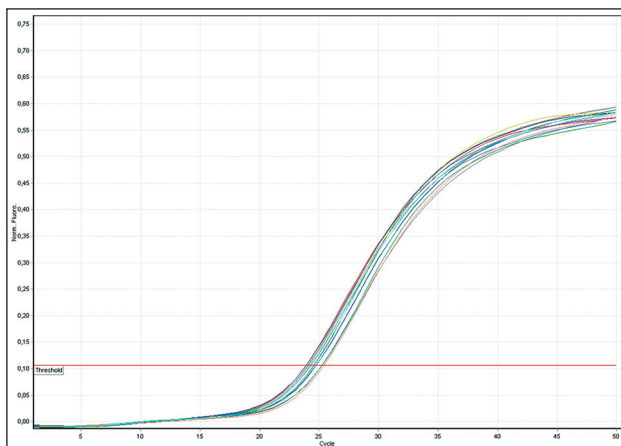


Figure 6. Real Time PCR for *Colla1* Gene

Discussion

Understanding of the biological and cellular mechanisms of scarring has led to new therapeutic approaches for scar reduction in the skin, and at other body sites, that are undergoing commercial development. A number of companies are investigating a range of devices as scar-improvement

therapies (e.g. silicon sheets, patient derived fibroblasts). Others are focusing on the development of molecular approaches for the development of new pharmaceuticals. Some of the pharmaceutical candidates are at the stage of evaluation in preclinical animal models, while others are currently under evaluation in different phases of human clinical trials. Scar treatments are used predominantly to treat excessive scarring resulting from extreme or chronic wounds, and the only published clinical guidelines for scar management focus predominantly on severe scars, particularly hypertrophic scarring and keloids (22,23). There is increasing focus on optimizing scarring following elective surgery and the increasing popularity of minimally invasive and cosmetic surgery. Scarring outcomes following surgery or trauma can be difficult to predict and sometimes several procedures may be required for the best result. Many patients seek surgery for scar revision. But the surgeons turn away large numbers of patients, as they believe that an improved result could not be achieved with current techniques and therapies (24).

Market research indicates that approximately 45 million patients per annum undergo procedures for a scar-reduction therapy. The high incidence of scarring concerns about scarring and the frequency of scar revision required following procedures or trauma.

A wide range of treatment has been evaluated for the management of scarring such as vitamin E, onion extract, corticosteroids, hydrogel sheeting, silicone sheeting, laser... No single therapy has been universally adopted as the standard of care for clinical procedures (25-29). A new concept for scar management is the prophylactic reduction of scarring by pharmaceutical agents that are given at the time of surgery to reduce subsequent scar formation. Currently, there are no marketed pharmaceuticals for the prophylactic improvement of scar appearance. The range of treatments used in clinical practice tends to have unclear mechanisms of action and have shown unpredictable, limited and variable effectiveness (30-36). These require repeated and long-term treatment, can be associated with side effects and can result in scar recurrence. A major limitation of this therapeutic area is that treatments have not generally been evaluated in prospective or strong randomized clinical trials.

To facilitate the development of effective prophylactic treatments, there was a clear requirement for the understanding of the processes involved in scarring at the molecular, cellular, tissue and clinical levels. The clinical efficacy and safety of therapeutics needs to be demonstrated in prospective, well-controlled, double-blind clinical studies. The multiple, overlapping molecular and cellular components of healing and scarring are complex and ultimately result in the restoration of tissue following injury. This normal healing response in the skin can result in significant clinical morbidity, for example in chronic wounds or in excessive healing and scarring in the case of hypertrophic scars and keloids. Studies have shown that understanding the mechanisms of the scarring response can lead to the regeneration of tissue that is more similar to normal skin and has led the way to identifying feasible new therapeutic options (37). In terms of the discovery of targets for the modulation of scarring, further understanding of the exact mechanisms underlying this process in relevant preclinical and clinical models is required. Using a range of preclinical foetal, transgenic and adult models (in species including mice, rats, rabbit, sheep and pigs), the mechanisms underlying wound healing and scarring must be evaluated the development of rationally based scar-improvement agents for clinical evaluation (36-38).

One approach for the development of therapies has focused on development of agents for the prophylactic reduction of scarring. This approach involves agents that are administered locally at the time of surgery, or injury, that lead to long-term improvements in scarring. In this way, the mechanism of action and administration of candidate products align with current clinical practices. This is a novel pharmaceutical approach to scar improvement and there are challenges associated with designing clinical trials in this pioneering therapeutic area, which include evaluating the effectiveness of a prophylactic drug (38-40).

Angiogenesis constitutes an important element of wound repair. Vascular remodeling occurs due to the carefully balanced interplay of pro-angiogenic and anti angiogenic factors. In addition to assisting in the removal of cellular debris, angiogenesis facilitates the beginning of wound closure by providing the vascular scaffold for granulation

tissue formation. Both angiogenic agonists and antagonists have been identified at various stages of wound repair with either vessel growth or regression occurring depending on the overall stimulus at any one stage in the repair process.

Aberrant healing and fibrosis are major causes of mortality and morbidity. Vascular endothelial growth factor (VEGF) is a potent endothelial cell specific cytokine that enhances micro-vascular permeability and vascular endothelial cell proliferation and plays a pivotal role in angiogenesis (1). However, the role of VEGF in wound healing is less clear. VEGF is generally thought to drive fibrosis mainly through promoting angiogenesis, 6-8 but there is also evidence to show that VEGF therapy attenuates renal fibrosis, thereby improving kidney function (9). Bevacizumab (Avastin; Genetech, Inc, San Francisco, California, USA) is a full-length humanized monoclonal antibody directed against all isoforms of VEGF-A and is FDA approved for the treatment of metastatic colorectal cancer. Although it is now widely established that VEGF-A is responsible for normal vasculogenesis, haemangiogenesis and lymphangiogenesis, 23-26 relatively little attention has previously been given to the reported anti-fibrotic effects of VEGF-A. VEGF inhibition has been shown to attenuate fibrosis in a murine model of allergic airway disease through down regulation of transforming growth factor-beta-1 expression and the phosphoinositide 3-kinase/Akt pathway signalling 27 VEGF also induces a profibrogenic gene expression profile in glomerular endothelial cell line, which was accompanied with upregulation of VEGFR-2 phosphorylation and mRNA expression. 28

As a pyrimidine analogue, 5-FU is transformed inside the cell into different cytotoxic metabolites which are then incorporated into DNA and RNA, finally inducing cell cycle arrest and apoptosis by inhibiting the cell's ability to synthesize DNA. It is an S-phase specific drug and only active during certain cell cycles. In addition to being incorporated in DNA and RNA, the drug has been shown to inhibit the activity of the exosome complex, an exoribonuclease complex of which the activity is essential for cell survival.

Finally, the combined delivery of bevacizumab and 5-FU magnified the antifibrotic effect compared to the two agents separately. Taken together,

these findings provide compelling evidence that VEGF-A is a key mediator for the development of conjunctival vascularisation and plays a role in the development of subconjunctival fibrosis. Furthermore, it is also important to note that bevacizumab and 5-FU are likely to be working synergistically to induce a more profound effect on fibrosis. It is proposed that the use of 5-FU together with bevacizumab would improve the post-operative wound healing response.

Conclusion

We present data demonstrating that the anti-VEGF-A monoclonal antibody, bevacizumab confers potent anti-fibrosis activity in an established animal model of subcutaneous incision. Our data support the potential clinical benefit in the use of bevacizumab and 5-FU as an effective anti-fibrotic combination for the treatment of scarring following injury.

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Comparison of once versus twice daily dose of amikacin in neonatal early sepsis

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Abstract

Objective: The purpose of this study was to compare the efficacy and safety (nephrotoxicity, ototoxicity) of the once daily dosing (ODD) program vs. twice daily dosing of amikacin in neonates with suspected or proven early sepsis.

Methods: This study was a prospective single center randomized clinical trial in Boalisina hospital, Iran during May 2010 - December 2011. Thirty-two neonates of gestational age ≥ 37 weeks with sepsis were randomized to receive amikacin either at a dose of 15 mg/kg once per day ($n = 16$), or a dose of 10 mg/kg twice per day ($n = 16$). Amikacin peak and trough serum concentrations were measured on days 1 and 3 of therapy. The nephrotoxicity was assessed by serum creatinine and glomerular filtration rate. Ototoxicity was assessed by oto-acoustic emissions (OAE) at discharge from hospital.

Results: There was no statistically significant difference between the two dosing regimens concerning clinical, laboratory, ototoxicity and nephrotoxicity of amikacin groups. No statistical significant variability was evident between the mean steady state trough levels of the ODD and twice daily dose subgroups [5.77 ± 4.45 lg/ml versus 4.13 ± 3.87 lg/ml, respectively, P -value = 0.27] and the mean steady state of peak concentrations of amikacin [21.37 ± 14.01 lg/ml versus 14.65 ± 12.14 lg/ml, respectively, P -value = 0.15].

Conclusion: Our data indicate that the ODD is preferred in early neonatal sepsis to twice daily dosing as shown by comparable efficacy, nephrotoxicity, ototoxicity and lesser need for therapeutic drug monitoring.

Key word: Amikacin, once daily dose; nephrotoxicity, ototoxicity.

Objective

Neonatal sepsis remains one of the main causes of mortality and morbidity of newborn infants admitted to a neonatal intensive care unit (NICU) (1). Amikacin is used for the treatment of neonates with suspected or proven Gram-negative bacterial infection, which is potentially life-threatening in neonates. The literature on the pharmacokinetics of amikacin in the neonate is sparse and scanty. A study on the extended interval between doses is lacking (2). Although once-daily aminoglycoside dosing has become increasingly prevalent in practice, the optimal once-daily dosing strategy remains unknown for amikacin (3). Nevertheless, the relationship between peak and trough levels and efficacy or toxicity has not been studied in randomized comparative trials with clinical outcomes (4). The remarkable interindividual variability in the pharmacokinetics of amikacin requires that their optimum dosing be defined (5). The clinical use of aminoglycosides is limited by toxicity. Nephrotoxicity and ototoxicity are reportedly more likely to occur after repeated exposure and prolonged courses of therapy with aminoglycosides (5-7). The incidence of aminoglycoside nephrotoxicity in neonates is not well known but seems to be considerably lower than in adults. Although reversible tubular dysfunction has been shown in many studies involving neonates, persistent glomerular filtration impairment has not been conclusively shown in prospective studies. Ototoxicity is an infrequent occurrence in neonatal studies (8). Optimal dosing with aminoglycosides such as amikacin requires a thorough knowledge of their pharmacokinetics and pharmacodynamics. The once -daily dosing (ODD) approach has many theoretical benefits, including improved efficacy though optimization of pharmacokinetic and pharmacodynamic principles regarding the concentra-

tion dependent killing by aminoglycosides (10). However, because trough levels have been implicated in the nephrotoxic effect and are usually assumed to be low 24 hours after a dose, plasma concentration monitoring is often overlooked in the once-daily regimen. In addition, a fixed once-daily regimen ignores changes in volume of distribution and in creatinine clearance that may occur in patients with hemodynamic response to sepsis. Recent systematic reviews of the efficacy and safety of giving aminoglycosides as an ODD to children and neonates have Concluded that ODD is preferable to twice daily dose, because ODD both minimizes costs and simplifies administration while remaining efficacious and safe (10,11). To the best of our knowledge, the nephrotoxicity, ototoxicity and pharmacokinetics of amikacin in neonatal sepsis has not yet been clearly reported. The purpose of this study was to compare the efficacy and safety (nephrotoxicity, ototoxicity) of the once daily dosing (ODD) program vs. twice daily dosing of amikacin in neonates with suspected or proven sepsis and assess the drug's pharmacokinetics in these subjects.

Materials and Methods

This study was a prospective single center randomized clinical trial with sequential enrolling in neonate admitted in Boalisina hospital, Iran during 2010 May-2011 December. Thirty-two neonates of gestational age ≥ 37 weeks with suspected or proven sepsis were randomized to receive amikacin either at a dose of 15 mg/kg once per day; group I (n = 16), or a dose of 10 mg/kg twice per day, group II (n = 16) (8,12). Original approval for this study protocol was granted by the ethics committees of Mazandaran University of Medical Sciences. Informed consent was obtained from parents or legal guardians of the patients prior to enrollment. All neonates received classical treatment of sepsis including antibiotics, hemodynamic support, inotropic support based on blood pressure levels and size of the heart in chest X-ray, if needed. Neonates with age >7 day, pathologic icter, weight <1500 gr., congenital anomalies, meningitis, DIC, multiple drug therapy and deranged renal functions were excluded from the study. Amikacin was infused over 1 h. Serum creatinine levels were

measured before administering the first dose and on the third day. Amikacin peak and trough serum concentrations were measured on days 1 and 3 of therapy by Roush kit Fluorescence Polarization Immunoassay. After sampling, plasma was separated and frozen at 70°C until processed (within 1 month) (13,17). The nephrotoxicity was assessed by serum creatinine and glomerular filtration rate prior to the start of therapy with amikacin and every 48 h thereafter until its discontinuation and 7 days after therapy.¹¹ Nephrotoxicity was defined as an increase in serum creatinine of 0.5 mg/dl at any time during treatment or up to 1 week after stopping treatment. Ototoxicity was assessed by oto-acoustic emissions (OAE) and brainstem auditory evoked potentials at discharge from hospital (4,9,18). Clinical efficacy was compared using both observation of clinical status and normalization of laboratory tests. Data were collected on special format, verified and then coded when needed prior to analysis. P-value < 0.05 was considered significant, i.e., 95% confidence interval was used. All analysis was done using SPSS version 16 and graphics utilizing MS Excel. mean and standard deviation of quantitative variables reported and compared by Student t-test. Chi-square test was used for assessing association in categorical data. When the mean values were violated Mann-Whitney test or Wilcoxon signed ranks test was performed to assess the difference between two groups.

Results

Thirty-two Iranian neonates with suspected or proven sepsis were enrolled in the study. All were admitted to the Boalisina Hospitals and all completed the study. Their characteristics are shown in (Table 1). Patients in the once daily dosing (ODD) and twice daily dosing subgroups were comparable with respect to inclusion and exclusion criteria. Moreover, a statistically non-significant difference in sex distribution between the two groups was obtained.

The statistical analysis of the data showed that there was no statistically significant difference between the two dosing regimens concerning clinical, laboratory, ototoxicity and nephrotoxicity of amikacin groups. No statistical significant variability was evident between the mean steady state trough levels of the ODD and twice daily dose

Table 1. Principle and demographic data

<div>Groups</div> <div>Variable</div>	Once daily		Twice daily		P.Value	Confidence interval	
	SD ± Mean		SD± Mean			Upper	Lower
AGE(day)	2.75	± 1.87	3.25	± 2.14	0.742	0.95	-1.5
Hb(g/dl)	15.89	± 1.45	15.58	± 1.95	0.926	1.5	-0.93
WBC Count	10687.50	± 3521.1	14987.5	0 ± 5679.18	0.051	-888.28	-7711.71
Plt Count	214568.750	±95424.92	223362.50	±77422.622	0.573	-	-
CRP ⁽¹⁾	4.437	± 4.47	7.87	± 11.56	0.02	-	-
ESR ⁽²⁾	0.3750	± 1.50	0	± 0	0.04	-	-
Urine Output	3.40	± 0.82	3.65	± 0.72	0.544	0.31	-0.81
Serum Cr	0.53	± 0.11	0.51	± 0.07	0.229	0.09	-0.04
BUN	21.18	± 4.86	18.37	± 5.41	0.803	6.52	-0.90
Weight(gr)	3031.87	± 404.87	3088.75	± 415.59	0.629	-	-
GA(week)	38.25	± 0.85	38.31	± 0.87	0.965	0.56	-0.68
Bil.T	7.98	± 2.84	7.06	± 5.33	0.02	-	-
Bil.D	0.60	± 0.19	0.45	± 0.28	0.08	-	-
Clearance Cr	42.25	± 12.44	44.87	± 6.84	0.103	4.62	-9.87
PH ⁽³⁾	7.41	± 0.05	7.40	± 0.06	0.240	0.05	-0.03
PCo2 ⁽⁴⁾	33.85	± 2.49	33.72	± 31.19	0.69	-	-
PO2 ⁽⁵⁾	96.31	± 26.39	87.68	± 18.94	0.27	-	-
HCO3 ⁽⁶⁾	23.55	± 2.27	23.47	± 3.19	0.01	-	-
BS	87.93	± 40.19	86.25	± 22.57	0.18	-	-
Serum Ca	8.28	± 2.27	8.63	± 0.66	0.22	-	-
Serum Na	136.12	± 6.06	136.75	± 3.73	0.40	-	-
Serum k	4.48	± 0.38	4.50	± 0.45	0.41	-	-

Table 2. Outcome and laboratory data

Variables	Groups		Once daily		Twice daily		P.Value
			Numbers	Percent	Numbers	Percent	
B/C	Positive		1	6.3	1	6.3	1
	Negative		15	93.8	15	93.8	
U/C	Positive		1	6.3	1	6.3	1
	Negative		15	93.8	15	93.8	
OAE ⁽¹⁾	Pass		15	93.8	15	93.8	-
	Reffer		-	-	1	6.3	
	Not Done		1	6.3	0	-	
DRUGS	Nephrotoxic		1	6.3	1	6.3	0.569
	Ototoxic		-	-	1	6.3	
	None		15	93.8	14	87.5	
OUTCOME	Cure		16	100	16	100	-
	Die		0	-	0	-	
LP	Positive		0	-	-	0	0.669
	Negative		3	18.8	4	25	
	Not Done		13	81.3	12	75	
Nonresponder	Yes		1	6.3	2	12.5	0.544
	No		15	93.8	14	87.5	
TORCH ⁽²⁾ Study	Positive		0	-	0	-	-
	Negative		0	-	0	-	
	Not Done		16	100	16	100	
U/A	Normal		14	87.5	14	87.5	1
	Abnormal		2	12.5	2	12.5	

Table 3. Comparison peak and trough of ODD and MDD

Groups Variables	Once daily		Twice daily SD± Mean		P.Value	Confidence interval	
						Upper	Lower
Amik.P1 ⁽¹⁾	23.58	± 19.82	23.24	± 10.74	0.952	11.87	-11.16
Amik.P2 ⁽²⁾	21.37	± 14.01	14.65	± 12.14	0.157	16.19	-2.74
Amik.T1 ⁽³⁾	6.79	± 5.04	6.88	± 8.40	0.970	4.90	-5.09
Amik.T2 ⁽⁴⁾	5.77	± 4.45	4.13	± 3.87	0.274	4.65	-1.37

subgroups[5.77± 4.45 lg/ml versus 4.13 ±3.87 lg/ml, respectively, P-value = 0.27] and the mean steady state of peak concentrations of amikacin [21.37± 14.01 lg/ml versus 14.65 ±12.14 lg/ml, respectively, P-value = 0.15].(Table 3) The mean serum creatinine and creatinine clearance at steady state were comparable in the two subgroups [0.53± 0.11 mg%, 42.25 ±12.44 ml/min in the ODD subgroup versus 0.51± 0.07 mg%, 44.87± 6.84 ml/min in the Twice daily dose subgroup, respectively, P-value > 0.05] (Table 2).

Discussion

The aminoglycosides have a low therapeutic index and thus knowledge about their pharmacokinetics is essential. The present study aimed at evaluating the once daily dosage program of amikacin in early neonatal sepsis compared to multiple daily doses. In addition, assessing the incidence of nephrotoxicity and ototoxicity associated with both regimens in these groups. Hearing disorders related to therapy with aminoglycosides have been attributed to their distribution to the statoacoustic apparatus with subsequent apoptotic death of hair cells and vestibular destruction (10). It is understood that when renal function is changing rapidly, estimation of the CL of aminoglycoside antibiotics may be a more accurate indicator of glomerular filtration rate than serum creatinine. It has been proposed that once-daily dosing of aminoglycosides should reduce, or even preclude, the need for extensive kinetic monitoring (19). In accordance with any study dealing with neonatal sepsis; it was difficult to assess antibiotic efficacy and prevent treatment failure because of the relatively rare incidence of culture-proven cases. Up to our best knowledge the relationship between peak and trough levels and efficacy or toxicity of amikacin has not been studied in randomized compa-

rative trials in neonatal early sepsis. We propose a safe and effective dose of amikacin to be 10 mg/kg/day ODD for term neonates. This study shows that ODD of amikacin is an effective and equally safe regimen in comparison to twice daily dose. Our study did not find any significant differences in the clinical evaluation between the two groups of patients, i.e., body temperature, leukocyte count, and serum CRP concentration. This study did not show a statistically significant difference between the two regimens with regard to efficacy. There was not therapeutic failure with the ODD regimen. Our study, like others, showed a similar low incidence of ototoxicity and nephrotoxicity in the two therapeutic groups (3,5,6,11,20-24). The mean peak and trough concentrations were comparable in two group patients. There is a need for regular therapeutic drug monitoring and renal function assessment in all infants receiving amikacin therapy in order to avoid nephrotoxicity (26,27). Neonates are thought to be at higher risk for aminoglycoside toxicity, but some published data are conflicting (4,9,11,13,28,29). Individualized pharmacokinetic dosing of aminoglycosides reduces the incidence of nephrotoxicity and allows the use of greater doses of aminoglycosides. Our results indicate that it is also a safe regimen, leading to a significantly reduced incidence of nephrotoxicity. Langhendries et al suggest administering amikacin to neonates once daily. These authors compared peak and trough concentrations of amikacin after once-daily and twice-daily dosing. Conversely, the trough concentration was not different with two dosages (20). However, there are no clear guidelines for monitoring once-daily administration of aminoglycosides. Whether peak and trough levels are related definitively to nephrotoxicity and ototoxicity remains controversial (9,26,30). It is generally believed that trough levels with once daily regimens are low enough

to obviate the need for monitoring plasma level. Thus, the accepted approach is to measure trough levels every 3 days, at best (14-16,31). There is a need for regular therapeutic drug monitoring and renal function assessment in all infants receiving amikacin therapy in order to avoid nephrotoxicity. This study was not designed to address a cost-benefit analysis of twice daily dose vs. ODD. However, one could hypothesize that the ODD regimen might reduce the cost of antibiotic treatment in patients with neonatal early sepsis, based on the fact that this regimen implies a reduction in the cost of preparation, administration, and the total amount of drug used for each patient. Current consensus is that some monitoring is required, but there is continuing debate over the best strategy (9,18,26,27,32).

Conclusion

This study shows that ODD of amikacin is an effective and equally safe regimen in comparison to twice daily dose and did not find any significant differences in the clinical outcome. Our data indicate that the once daily dosing regimen is preferred in early neonatal sepsis to individualized multiple daily dosing as shown by comparable efficacy, nephrotoxicity, ototoxicity and lesser need for therapeutic drug monitoring and frequent dose adjustments required in the individualized multiple daily dosing regimen.

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Effects of sample temperature and storage time on arterial blood gases values

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Abstract

Background: Arterial blood gas analysis is vital during diagnosis and treatment monitorization of mechanically ventilated patients. Work overload delays blood gas analysis lead to false results. Therefore syringes and the blood samples is recommended to kept cool or cold environment. The aim of this study is to investigate the effect of refrigerator-cooled syringes on blood gas analysis.

Methods: We prepared 12 heparinized polypropylene plastic syringes for blood gas analysis for each patients before the study. Syringes divided in tree group as kept at room temperature (Group Room, n=4), or stored in the refrigerator for 30 minutes (Group Refrigerator, n=4), or stored in the refrigerator for 30 minutes but blood samples stored at room temperature (Group Refrigerator and Room, n=4). 40 for each patient's blood samples on mechanical ventilation were analyzed immediately as reference value (T_0). Samples analyzed at 15, 30, 45 and 60 minutes.

Results: Patients characteristics and mechanical ventilation parameters were similar in the three groups. In terms of impact of sample temperature and storage time on arterial blood gas analysis; pH, pCO_2 , and pO_2 values were not differ significantly among the groups (Table 2, $P>0.05$). There was significant difference in 60 minutes SpO_2 value among the groups (Table 2, $P<0.05$).

Conclusion: Storage of syringes at room temperature or cooling in refrigerator was not affect arterial blood gas analysis results immediately before obtaining of blood samples. Blood gas analysis with plastic syringes at room temperature can provide safe results up to 60 minutes.

Key words: Temperature, storage time, arterial blood gas, plastics syringes.

Introduction

Arterial blood gas analysis is of vital importance for the diagnosis, treatment plan and follow-up of intensive care patients. Proper blood gas analysis plays a key role in the success of ventilator support by ensuring that oxygenation and ventilation parameters are evaluated correctly (1).

Errors during arterial blood gas analysis may occur due to; the temperature of the environment where blood gas device and the sample are located, the duration of analysis, the type of injector used, the type of blood gas drawing and the presence of air bubbles inside the injector (2). Today, it has been stated that making the blood gas analysis in the shortest possible time or having the samples wait for up to 30 minutes in a plastic injector at room temperature or up to 60 minutes in a glass injector inside iced water may lead reliable results (3). The increasing work loads of intensive care units may result in late blood gas analyses and erroneous results. It is suggested that the samples be cooled or left to wait in a cold environment so that the results are not affected (4). However, having glass injector and ice cube ready at intensive care units is most often difficult and the analysis time lengthens out due to the work load.

The effect of injectors cooled in refrigerators on blood gas analysis is not known. In our study, we believe that cooling injectors in refrigerators instead of having them placed in iced water is a method that can easily elongate the reliable waiting time for blood gas analysis. Our objective is to examine the effects of injectors cooled in refrigerators on the blood gas values of samples placed in them.

Material and method

Forty eight patients with no previous respiratory problem and no respiratory tract infection

treatment who are connected to mechanic ventilator were included in the study after taking the approval of the Board of Ethics of Inonu University Faculty of Medicine and the informed consents from the relatives of the patients. Eight patients with a history of smoking, acid-base disorder due to non-respiratory reasons, renal dysfunction, diabetic ketoacidosis, lactic acidosis, ethanol intoxication along with patients using metformin and diuretic were left out of the study. Prior to the study, 13 polypropylene plastic injectors (2 mL, Hayat, Turkey) washed with sodium heparin and emptied (by moving the injector piston several times while the injector needle is turned downward) were prepared for the blood gas analysis of each patient (5). The blood sample drawn to a plastic injector (+22 °C) from each of the 40 patients connected to mechanic ventilator were sent over in 5 minutes to the RapidLab 348 brand blood gas analysis device (Bayer-Germany) and were set as (T_0) reference value. The temperatures of the environment (room and refrigerator) along with the injectors were measured and three groups were formed: Group Room (O): injector (22 °C) + blood samples (+22 °C), Group Refrigerator (B): injector (+4 °C) + blood samples (+4 °C), Group Refrigerator+Room (B+O): injector (+4 °C) + blood samples (+22 °C). The injector and blood samples were left to wait at ambient temperatures stated for each group for 15, 30, 45 and 60 minutes and were then sent to analysis. Bubbles were removed from the blood gas samples in order to avoid erroneous results.

The values were given as median (min-max) or average \pm SD. The goodness of fit of the data to normal distribution was carried out via Shapiro-Wilk test. The comparison of the variables among the 3 groups was made by Kruskal-Wallis H test. Multiple comparisons were made using the Conover test whenever statistically significant differences were found. Variance analysis was used for the repetitive measurements of the inter group comparisons of the five repetition measurement. Multiple comparisons were made using the Bonferroni test whenever statistically significant differences were found. Values of $P < 0,05$ were accepted to be statistically significant.

Results

Information regarding patients has been given in Table 1. In inter group evaluation, no statistically significant effect of medium temperature and duration of wait during blood gas analysis on pH, PaO_2 and $PaCO_2$ values were determined ($P > 0.05$, Table 2). A statistically significant difference was determined between groups for the 60th minute SaO_2 value ($P < 0.05$, Table 2). During inter group comparisons, the pH value of group B for measurements at 15, 30 and 45 minutes measurements; PaO_2 values at 30 and 60 minute measurements were determined to be significantly lower in comparison to T_0 ($P < 0.05$). It was determined that in parallel to the increasing waiting time, the value of $PaCO_2$ increased significantly for all measurement times whereas the value of SaO_2 decreased significantly ($P < 0.05$, Table 2). The pH value of Group O was determined to be significantly low for the measurements taken at the 30th and 45th minutes while the value of PaO_2 was determined to be significantly lower than T_0 for the measurements taken at the 15th and 60th minutes. Whereas it was shown that the value of SaO_2 decreased significantly for all measurement times parallel to increasing waiting duration ($P < 0.05$, Table 2). The pH value of Group B+O for the measurements taken at 45 and 60 minutes and the PaO_2 value at the 45th and 60th minute measurements were determined to be significantly lower in comparison to T_0 . It was shown that the value of $PaCO_2$ increased for all measurement times in parallel to increasing waiting duration while SaO_2 value significantly decreased ($P < 0.05$, Table 2).

Table 1. Characteristics of Patients

Variables	
Age (year)	32 (28-33)
Hb (g/dL)	11,2 (10,4-13,5)
FiO ₂ (%)	35 (30-40)
SpO ₂	100 (99-100)
Heart rate (bpm/min)	84 (68-92)
PEEP (cm/H ₂ O)	6,5 (5-8)
V _T (mL)	480 (420-550)
ETCO ₂ (mmHg)	40 (32-43)
Temperature (°C)	37,2 (36,5-37,7)

*Table 2. Effects of Sample Storage Time on pH, pO₂, pCO₂ and SpO₂ Values
The median (minimum-maximum)*

pH (mmHg)	T _o	15 min	30 min	45 min	60 min
Group Refrigerator (n=40)	7,54 (7,52-7,65)	7,54 (7,49-7,65)	7,51 (7,48-7,65)	7,52 (7,47-7,59)	7,53 (7,45-7,68)
Group Refrigerator+Room (n=40)	7,54 (7,52-7,65)	7,54 (7,49-7,69)	7,54 (7,50-7,69)	7,52 (7,48-7,70)	7,51 (7,47-7,66)
Group Room (n=40)	7,54 (7,52-7,65)	7,54 (7,51-7,71)	7,52 (7,47-7,62)	7,52 (7,49-7,60)	7,54 (7,48-7,77)
pO ₂ (mmHg)					
Group Refrigerator (n=40)	123 (50-188)	106 (53-168)	97 (54-161)	102 (51-163)	97 (48-142)
Group Refrigerator+Room (n=40)	123 (50-188)	112 (53-175)	98 (52-167)	108 (53-164)	86 (52-160)
Group Room (n=40)	123 (50-188)	114 (51-198)	114 (51-201)	113 (51-209)	115 (53-171)
pCO ₂ (mmHg)					
Group Refrigerator (n=40)	32,9 (25-44)	33,5 (27-42)	33,3 (26-44)	33,7 (26-47)	35,7 (26-45)
Group Refrigerator+Room (n=40)	32,9 (25-44)	34,2 (26-44)	33,6 (26-41)	32,6 (25-40)	33,5 (25-46)
Group Room (n=40)	32,9 (25-44)	33,5 (26-40)	32,7 (25-43)	33,8 (26-40)	34,6 (25-40)
sPO ₂ (%)					
Group Refrigerator (n=40)	98,4 (91-99)	98,4 (92-99)	98,1 (92-99)	98 (91-99)	97,5 (89-99)
Group Refrigerator+Room (n=40)	98,4 (91-99)	98,7 (93-99)	98,4 (91-99)	98,3 (92-99)	97,8 (91-99)*
Group Room (n=40)	98,4 (91-99)	98,7 (91-99)	98,6 (92-99)	98,8 (92-99)	98,6 (92-99)&

* significant difference between Group Room with Group Refrigerator+Room ($p < 0,05$),

& significant difference between Group Refrigerator with Group Room ($p < 0,05$)

Discussion

There are many studies for the ways to draw arterial blood gas samples, environment temperature, injector material and analysis methods regarding arterial blood gas analysis. For PaO₂ measurements, keeping the arterial blood sample in a glass injector placed in an ice cup and having the sample analyzed as soon as possible is suggested as the standard (5). The main result of this study is that injectors cooled in refrigerators pose no statistically significant difference for blood gas analysis.

Since blood is a living tissue, O₂ consumption and CO₂ production continues inside the injector after the sample is drawn (6). As the duration of analysis increases, the PaO₂ level and depending on the metabolism rate of the patient the analy-

sis results change. Metabolism rate basically depends on the temperature of the blood gas sample (7). While keeping the blood gas sample at room temperature (20-24°C) decreases its metabolism to half of its level at 37°C, adding ice to the ice case (0-4°C) drops it up to 10 % level (7). The effect of keeping the blood gas injector inside the refrigerator instead of an ice case on metabolism and analysis values is not known. Smeenket.al. (8) have determined that the PaO₂ levels of samples left to wait at room temperature in plastic injectors for a period of 30 minutes and more have decrease significantly in comparison with those of the samples in the ice case. Schmidt (9) has shown that the PaO₂ levels at the 15th and 30th minutes of samples in plastic injectors left to wait in an ice bucket at 4°C are higher than those left to wait at

room temperature. Wu et.al. (10) have stated that as the analysis duration lengthens, statistically significant differences in PaO_2 levels occur in plastic injectors and that the samples should be placed in glass injectors if the waiting period will be long. Bird et.al. (11) have stated that there is no statistically significant difference in the PaO_2 levels of the capillary samples of patients undergoing oxygen treatment when they are left to wait during blood gas analysis. In our study, it was determined that cooling the injectors to be used in the analysis in a refrigerator or keeping them at room temperature prior to the analysis has no effect on the level of PaO_2 for samples with the same initial PaO_2 levels. This result leads us to think that based on injector temperature the blood gas sample metabolism does not change or that heating the sample and the injector up to 37°C and the injector temperature have no effect on blood gas analysis value. Many studies state that the level of PaCO_2 does not change depending on the medium temperature where the injector is kept (10-12). It was also determined in our study that cooling the injectors in the refrigerator and keeping them at room temperature had no effect on the value of PaCO_2 . The reason for this may be the fact that CO_2 does not diffuse through the injector wall.

Cooling of the blood gas sample results in the increase of blood gas partition coefficient. This in turn causes the partial pressures in the blood to decrease and the balancing of the oxygen in the injector with the gases surrounding it by easing the diffusion of the gases in the environment from the injector to the blood sample (2). When the blood is cooled to 4°C , the solubility of oxygen in the blood is almost doubled thus causing the diffusion of oxygen to the injector from outside. Higher amounts of PaO_2 diffuses from blood samples with high PaO_2 and low hemoglobin levels to the injector (2). Deane et.al. (12) have stated that the injector material, storage temperature and the waiting time effects the value of PaO_2 whereas the value of PaCO_2 is not affected by the variables. In a study carried out to examine the effects of plastic and glass injectors on oxygen consumption by letting the samples wait in the ice bucket, Mahoney et.al. (13) have suggested that the samples should be placed in glass injectors and should be kept in the ice bucket. Wiwanitkit states that nanometric PaO_2

changes can be preserved better in glass injectors (14). In our study, no effect of cooling of the injectors in refrigerators on the PaO_2 was determined. According to the results of our study, we think that the injectors cooled in refrigerators cannot be used securely for blood gas analysis.

As limitations of our study; even though the attributes of the patients from whom we took blood gas samples and the mechanic ventilator parameters were similar, the data obtained from the blood gas analysis may not reflect the real results due to the fact that the basal metabolism changes from patient to patient. In addition, another limitation is that there was no group of samples in glass injectors left to wait in an ice bucket which is stated to be the golden standard in terms of ambient temperature in blood gas analysis. The reasons for this are that many studies have shown the net effect of this method and the difficulty of the method.

Conclusion

No difference was determined between keeping the injectors used in blood gas analysis either in refrigerators or at room temperature. We think that the samples left to wait for up to an hour at room temperature will yield reliable analysis results.

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Chitosan in the chewing gum, an innovative caries prevention method? Initial in vitro study

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Abstract

Introduction: Chitosan is a natural substance with antibacterial effect, commonly used in the industry and cosmetics for years. The latest research indicates its strong antibacterial effect on cariogenic bacteria.

Aim of the paper: In vitro pilot study on antibacterial effect of the chewing gum containing chitosan on *Streptococcus mutans* (Sm) and *Lactobacillus* (L) strains.

Material and methods: over a period of 14 days, 30 dental students (21 women and 9 men) regularly chewed chitosan gum 3 times a day for 30 minutes. Before the study and after its completion, samples of stimulated saliva were taken and the amount of Sm and L bacteria colonies was determined. CRT® bacteria tests (Ivoclar Vivadent, Madrid, Spain) were used.

Results: In consequence of chewing chitosan-containing gum, in 70% of the subjects the amount of Sm bacteria colonies in saliva samples considerably decreased ($p < 0.0001$), whereas the amount of L bacteria colonies in saliva considerably decreased in 60% of the subjects ($p < 0.0001$).

Conclusions: The initial study showed a significant antibacterial effect of the chitosan-containing gum which lasted when the gum was regularly used.

Key words: chitosan, cariogenic bacteria, gum chewing.

Introduction

Chitosan is a substance used - commonly and for many years - in the industry, cosmetics and medicine in such chemical forms as Chitosan Ascorbate, Deacetylated chitosan, Enzymatic polychitosamine hydrolisat, HEP-30; Mono-carboxymethylated chitosan, N-Carboxybutyl Chitosan; N,O-Sulfated Chitosan; O-Sulfated N-Acetylchitosan; Sulfated N-Carboxymethylchi-

tosan; Sulfated O-Carboxymethylchitosan, Trimethyl chitosan chloride. Chitosan facilitates the chelation of metal ions (such as mercury, copper, nickel, zinc, chromium) and dyestuffs from water, which is used in the sewage treatment process and the potable water production (1,2). Due to natural occurrence (polysaccharide, component of exoskeletons and limbs of arthropods – mainly shrimps, crabs and lobsters and fungal cell walls) it demonstrates a considerable biocompatibility with the natural human environment (1). Despite the nitrogen content, chitosan does not produce immunological reactions and is commonly used in cosmetics and medicine since it accelerates the division of fibroblasts, stimulates the production of cytokines and facilitates the healing of skin wounds and the regeneration of bone tissue (2). Its fat absorption and little solubility in liquids properties are the reason for the wide use of chitosan as an oral dietary supplement for persons trying to lose weight (fat fighting fibre) (1). Significant from the medical point of view is also the fact that a regular, several months' use of gastro-resistant chitosan causes a characteristic reduction of total blood cholesterol concentration, and a drop in high arterial pressure (1,3).

Interesting from the dental point of view proved to be the study of Hayashi et al. (4) which showed a considerable drop in the total amount of the oral bacterial flora after just 5 minutes of chewing a chitosan-containing gum (made for the needs of the study) and lasting for at least 1 hour; this effect concerned in particular the *Streptococcus mutans* bacteria (a drop in the number of colonies by 80% after 1 h) (4). In addition, the Japanese authors observed a considerable stimulation of salivary secretion during gum chewing (5). The object of our study was to evaluate the effect of a regular use of the chewing gum containing chitosan on the content of *Streptococcus mutans* (Sm) and *Lactobacillus* (L) bacteria in saliva.

Material and methods

The clinical pilot study included a group of dental students who voluntarily agreed to participate in it. The only disqualifying criterion was taking oral antibiotics within the last 14 days or using antibacterial oral mouthwashes within the last 12 hours. The subjects were thoroughly explained how to prepare the chitosan chewing gum by themselves and instructed to use it 3 times a day for the next 14 days (Table 1).

Table 1. Chitosan gum production instructions

	Method description
1	Thoroughly chew two sugar-free gum capsules to obtain homogeneous consistency
2	Open the capsule with chitosan powder
3	Pour the powder out onto the gum
4	Chew the gum prepared in such way for about 30 minutes

Twice, i.e. before the commencement of the study and after its completion, 2-5 ml of paraffin-stimulated saliva samples were taken from the subjects. The study was conducted after the end of the classes at the university, without previous tooth brushing, only after thorough mouth rinsing with water. From the material obtained in this way, a saliva sample was taken using a disposable pipette, and agar substrates of CRT® bacteria kits (Ivoclar Vivadent, Madrid, Spain) were thoroughly moistened strictly in accordance with the manufacturer's instructions. Hermetically sealed agar vials, vertically positioned, were placed into an incubator in the temperature of 37°C for 48 hours. Afterwards the amount of colonies was read out using the template provided by the manufacturer.

The statistical analysis was carried out by means of the Statistica for Windows 10.0 software. The intensity differences, depending on gender, of *Streptococcus mutans* and *Lactobacillus* colonies in saliva before the beginning of gum chewing and after 14 days of the study were analysed using the precise Mann-Whitney U Test. Other changes in the amount of bacteria colonies were investigated using the precise Wilcoxon Test. The test probability at the level of $p < 0.05$ was assumed to be significant, and the test probability at the level of $p < 0.01$ was assumed to be highly significant.

Results

When analysing the results, we arranged our observations in classes (Table 2).

Table 2. Classes of bacterial amount

Classes of bacterial amount	Amount of bacterial colonies
1st	total absence
2nd	$< 10^5$
3rd	$\geq 10^5$

It turned out that before the beginning of gum chewing the 1st class only in 4 persons as regards *Streptococcus mutans* (Table 3), and in 3 persons as regards *Lactobacillus* bacteria (Table 4) was found. Before the study, most individuals had the 2nd class (Tables 3 and 4) with regard to both bacterial species. The 3rd class before the study was found in 40% of individuals as regards *Lactobacillus* (Table 4) and in 30% as regards *Streptococcus mutans* (Table 3). Either before the study (for Sm $p=0.3968$, for L $p=0.8590$) or after ceasing gum chewing (for Sm $p=0.3258$, for L $p=0.4224$), no significant differences in the intensity of occurrence of Sm and L colonies depending on gender were found.

After the 14-day, regular chitosan-containing gum chewing, over 80% of the subjects obtained the 1st class of bacterial amount as regards the presence of *Streptococcus mutans* (Table 3), whereas only 13% had this class at the beginning. As regards *Lactobacillus*, the bacterial amount changed to the 1st class in more than 50% of the subjects (Table 4), including an improvement from the 3rd to the 1st class in 26% of the subjects as regards *Streptococcus mutans* and in 16% as regards *Lactobacillus* (Table 5). The shift from the 2nd to the 1st class occurred in 43% of the subjects for *Streptococcus mutans* and in 36% of the subjects for *Lactobacillus* (Table 5). Both these changes proved to be highly statistically significant (Table 5). A similar improvement (by one class: from the 3rd to the 2nd) was found in 1 individual (3.33%) for *Streptococcus mutans*, and in 3 individuals (10%) for *Lactobacillus* (Table 5). The amount of bacterial colonies did not noticeably change in about 20% of the subjects as regards *Streptococcus mutans* (4 individuals remained in the 1st class, and 3 in the 2nd, Table 5) and in over 30% of the subjects as regards *Lactobacillus* (3 individuals remained in the

Table 3. Distribution of the amount of Streptococcus mutans colonies before the study and after finishing chitosan-containing gum chewing, including the distribution depending on gender

Class for Sm before the study	Men n/%	Women n/%	Total n/%	Class for Sm after the study	Men n/%	Women n/%	Total n/%
1	1/3.3	3/10	4/13.3	1	9/30	16/53.3	25/83.3
2	4/13.3	13/43.3	17/56.6	2	0/0	4/13.3	4/13.3
3	4/13.3	5/16.6	9/30	3	0/0	1/3.3	1/3.3
Total	9/30	21/70	30/100	Total	9/30	21/70	30/100

Table 4. Distribution of the amount of Lactobacillus colonies before the study and after finishing chitosan-containing gum chewing, including the distribution depending on gender

Class for L before the study	Men n/%	Women n/%	Total n/%	Class for L after the study	Men n/%	Women n/%	Total n/%
1	1/3.3	2/6.6	3/10	1	7/23.3	12/40	19/63.3
2	4/13.3	11/36.6	15/50	2	1/3.3	6/20	7/23.3
3	4/13.3	8/26.6	12/40	3	1/3.3	3/10	4/13.3
Total	9/30	21/70	30/100	Total	9/30	21/70	30/100

Table 5. Changes in the amount of bacterial colonies and classes which occurred as a result of conducted study

Sm				L			
Class before the study	Class after the study	n	%/p	Class before the study	Class after the study	n	%/p
3	1	8	26.6/ <0.0001	3	1	5	16.6/<0.05
2	1	13	43.3/<0.0001	2	1	11	36.6/<0.0001
1	1	4	13.3/-	1	1	3	10/-
3	3	0	0/-	3	3	4	13.3/-
3	2	1	3.33/>0.05	3	2	3	10/>0.05
2	3	1	3.33/>0.05	2	3	0	0/-
2	2	3	10/-	2	2	4	13.3/-

1st class, and 4 in each of the 2nd and 3rd classes, Table 5). Only in 1 individual an increase of the amount of Streptococcus mutans bacteria after the study, which resulted in shifting from the 2nd to the 3rd class (Table 5), was observed.

Discussion

Our pilot study was conducted with the participation of a small group of volunteers. In view of the fact that the subjects were required to prepare chitosan-containing gum by themselves, we decided to include in the study individuals willing to cooperate in this form, i.e. dental students. The results proved to be very promising and certainly encouraging to repeat a similar study on a larger group of patients with dental diseases (advanced caries, dental calculus).

We had some difficulties in obtaining the gum for the study. The method of preparation of such gum was not described in the methodology of the study presented by Hayashi et al. (4,5). At present, there is no such product on the market. We found, however, that the possibility of manufacturing and selling chitosan-containing chewing gum is currently being assessed by the US health and patent protection agencies (6). A practical method, which we used, can consist in adding powdered chitosan contained in slim capsules to an already partly softened xylitol gum.

We can compare the findings of our study only to the findings included in the publication of Hayashi et al. (4,5). In that study, the effect of a considerable drop in the amount of bacterial colonies concerned primarily Streptococcus mutans and was assessed directly after 5 minutes of chewing chitosan-conta-

ining gum. The students participating in our study chewed such gum over the period of 14 days 3 times a day. We wanted to observe whether the effect of a drop of the amount of oral bacteria lasts when chitosan-containing gum is regularly chewed over a longer period. We observed a considerable drop in the amount of both Sm and L colonies. This can be a beginning of the research on another product for oral disease prevention.

A regular chewing of a sugar-free gum is a recognised method of improving the general oral hygiene. It is recommended to use it up to 30 minutes after each meal, primarily to remove food debris (7). In addition, it was proven that the chewing gum considerably stimulates saliva production, which in turn results in a more thorough tooth cleaning, increases the pH of saliva (caries-preventive effect) and the secretion of immunoglobulins, albumins, glycoproteins and a range of enzymes with anti-inflammatory, protective and lubricating action on the oral mucosa (8). A regular gum chewing has a significant effect on the reduction of dental calculus formation and the improvement of periodontal status (including blood flow within the periodontium) and reduces the frequency of dental caries (7,8,9). The recent scientific reports have shown that (especially mint flavoured) gum chewing considerably improves the mood, the alertness and the reaction time in stress situations (without the accompanying increase of cortisolemia) (10).

Conclusions

The results of our initial study showed that chewing chitosan-containing gum considerably reduces the level of *Streptococcus mutans* and *Lactobacillus* bacteria in the oral cavity. The antibacterial effect lasted when the gum was regularly used.

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The diagnostic value of the lactate level in the vaginal fluid for determining the premature rupture of membranes

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Abstract

Aim: To determine the diagnostic value of the lactate concentration in vaginal secretions in determining the premature rupture of membranes (PROM) in pregnant women at the Alavi Educational Treatment Center in Ardebil 2010.

Methods: This diagnostic clinical trial enrolled 100 pregnant women with a single pregnancy at the gestational age of 20–41 weeks. The women were divided to two groups of 50; the case group enrolled women with the premature rupture of membranes, and the control group consisted of women with intact membranes. To verify the PROM in both groups, the speculum, fern, and nitrazine tests were used. A Lactate Pro manual instrument was used to measure the lactate level of the vaginal fluid via enzymatic staining. A 5- μ m aliquot of vaginal fluid was sufficient to determine the lactate level, which was displayed on the instrument's liquid crystal display after 60 seconds. Descriptive analytic statistics and SPSS 17 software were used to analyze the data.

Results: The threshold of the lactate concentration was determined to be 4.6 mM. A sensitivity of 96%, specificity of 98.8%, accuracy of 97%, positive predictive value of 97.95%, and negative predictive value of 96.07% were determined for the lactate concentration in the vaginal fluid for the diagnosis of the PROM.

Conclusion: Testing of the lactate level of the vaginal fluid appears to be an easy, rapid and valid method with high specificity and sensitivity that

can be applied for the diagnosis of the PROM in pregnant women.

Key words: lactate level, vaginal fluid, rupture, membranes.

Introduction

Introduction: The premature rupture of membranes (PROM) is defined as the spontaneous rupture of embryonic membranes before labor contractions at any gestational age (1,2,3) and occurs in 2–25% of pregnancies. Its major complications are infections in the woman and unborn child, umbilical cord prolapse, prenatal mortality, and premature labor.(4, 5) PROM accounts for 30% of instances of premature labor (6, 7) and 18–20% of prenatal mortality. (8) Therefore, its accurate diagnosis is of great importance because a false positive diagnosis can lead to antibiotic therapy, corticosteroid therapy, or even labor induction. (9) However, the inability to diagnose PROM can lead to complications such as chorioamnionitis and preterm labor. (8, 10) The diagnosis of PROM is varied and usually based on clinical evaluations such as observing the fluid discharge from the cervix during speculum testing, observing the fern model in microscopic tests, and biochemical tests. (11) Among the biochemical tests, the detection of nitrazine, vaginal di-amine oxydase, prolactin, alpha fetoprotein, insulin-like growth factorbinding protein-1, human chorionic gonadotropin, fibronectin, and amniSure placental alpha macroglobulin-1 are frequently used. (12, 13) Most of these tests have

low sensitivity and specificity, have high false negative and false positive rates, or are invasive. (14) Diagnosis based on clinical findings fails in 10% of cases. (15) Furthermore, the speculum test has a false negative rate of 12%. (16) The nitrazine test is 90–97% sensitive and 16–70% specific, with a false negative rate of 9.4% and a false positive rate of 17.4%. The false positive readings arise from vaginitis, cervicitis, or contamination with blood, semen, urine, meconium, or antibiotics. The fern test is 51% sensitive and 70% specific. False negative readings can result from an incorrect sampling technique or contamination with blood or vaginal fluid, and the false negative rate ranges from 12.9 to 48.6%. False positive readings can be caused by contamination with cervical mucus or semen as well as an incorrect sampling technique, and the false positive rate ranges from 5.8 to 30%. (8, 10, 5) Recently, a new method has been devised for the diagnosis of PROM that relies on the measurement of lactate levels in the vaginal fluids. This method has gained popularity because it is easy to perform, can be performed at the patient's bedside, does not require advanced equipment, is relatively inexpensive, and is highly reliable and valid. Lactate is a metabolite generated from anaerobic metabolism and is an indicator of tissue hypoxia. Lactate is mostly produced in the myometrium and/or chorionic deciduas and is transferred to the amniotic fluid through membranes. (4, 16, 17) High concentrations of lactate (7–9 mM/l) can be detected in amniotic fluid (16); the amount of lactate in the amniotic fluid is 4–6 times higher than that in the fetus's or mother's blood (16, 18). Iberg-Itzel et al (2005) tested the diagnostic value of the lactate level in the vaginal fluids for the determination of PROM and estimated a sensitivity of 86% and a specificity of 92%. The positive predictive value was 92% and the negative predictive value was 87%. The timely and accurate diagnosis of PROM is critical. The measurement of the lactate concentration in the vaginal fluids is an easy, inexpensive, rapid, non-invasive, and available diagnostic method. Because few studies have addressed this technique, the present study was conducted to determine the diagnostic value of the lactate concentration in vaginal fluids for the determination of PROM in pregnant women at the Alavi Educational Therapeutic Center.

Methods

This diagnostic clinical trial enrolled 100 pregnant women who attended the pregnancy care clinic and midwifery emergency room of Alavi Educational Therapeutic Center in Ardebil. A data form was used to collect data in this study including demographic data, midwifery information, conditions of sample selection, manual Lactate Pro data, test tape for Lactate Pro data, nitrazine tape data, slide data, microscopy data, the observation checklist for recording the results of the examination using the speculum test, nitrazine test data, fern test data, and the lactate level of the vaginal fluids. Periodic calibration and standard control tapes were used to validate the enzymatic staining method. The expiration date of Japanese-made tapes (Okra, Japan) was also checked. The reputation of the manufacturing company (Okra, Kyoto, Japan) was used to validate the Lactate Pro equipment. The information form and observation check list were validated with regard to content validity. The test re-test method was used to check the reliability of the information form. Questions with a correlation over 0.85 were accepted. To confirm the reliability of the nitrazine and fern tests, 5 samples were taken from a pregnant woman and their correlation was evaluated (correlation coefficient=0.97). To confirm the reliability of the nitrazine test, fern test, and testing for the lactate concentration of the vaginal fluid, the inter observer method (kappa coefficient =0.86) was used. Participants were selected using convenient sampling. Based on the prevalence of PROM, $\alpha=0.05$, and $\beta=0.20$ were applied to estimate a sample size of 50 in each group. Women who were pregnant with one fetus at a gestational age of 20–41 weeks with the chief complaint of leakage and who attended the pregnancy care clinic and midwifery emergency room of the Alavi Educational Therapeutic Center in Ardebil entered the study. Exclusion criteria included known fetal abnormality, known fetal asphyxia, fetal death, known diseases, known pregnancy complications, visible bloody vaginal fluid, application of vaginal medication the night before, intercourse the night before, meconium in the amniotic fluid, and regular contractions. To determine the gestational age, the participants had to know the exact date of their

last menstrual period, have had a sonogram before week 14, or have had two harmonious sonograms between 14 and 24 weeks. After written informed consent was obtained, pregnant women (PROM and control groups) who met the inclusion criteria enrolled in the study. The women filled out the preliminary questionnaire and took the NST test. The participants were then placed in the lithotomy position for speculum testing to observe fluid leakage from the cervix. Based on the speculum test results, participants were divided to two groups of positive and negative. The observations were recorded in the checklist. Immediately after the speculum test, the nitrazine test was performed. A swab was used to obtain a sample from the posterior fornix. The swab was then drawn on a strip of nitrazine paper. The color was read against the colors and numbers on the nitrazine package. A pH higher than 6.5 was considered to represent the rupture of the membranes. The results of the nitrazine test were recorded as positive or negative in the check list. A swab was then used in the same way to obtain a sample of vaginal fluid, which was drawn on a slide. After drying, the slide was examined with a light microscope at 10x magnification. Observation of the fern model was considered to represent a positive fern test. The results were recorded as positive or negative in the check list. To determine the amount of lactate in the vaginal fluid, a sample of vaginal fluid was collected on the posterior arm of the speculum. The sample was transferred to a strip of paper that was already coated with the enzyme and attached to the Lactate Pro equipment. The amount of lactate in the vaginal fluid was studied using enzymatic staining by Lactate Pro equipment. An aliquot of only 5ml of vaginal fluid was sufficient to measure the lactate concentration. The amount of lactate was displayed in 60 seconds. All samples were measured using equipment made by the Japanese company Okra (Kyoto, Japan). The ROC was then used to determine the threshold concentration of lactate for measurement, and concentrations higher than 4.6 mM were considered to represent the rupture of membranes. The control group was selected from women who attended the clinic for a routine pregnancy check up without complaint of leakage. The women in the control group were matched for age with the women in case group. The evaluation

of the amount of lactate in the vaginal fluid as well as the speculum testing, fern testing and nitrazine testing were performed in the control group using the same techniques used for the case group, and the results of both groups were compared.

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To analyze data, SPSS software version 17 was used. Frequency distribution tables, the mean and standard deviation, the Mann-Whitney test, the Chi-squared test, Fisher's exact test, and independent t-tests were used to describe and analyze the data. Statistical significance was defined as $p < 0.05$.

Results

The study was conducted on 100 pregnant women, of whom 50 had PROM and 50 were healthy. The characteristics of the sample populations are shown in Table 1. The mean age of participants in the case group was 25.72 ± 5.45 years, and the mean age in the control group was 25.74 ± 6.21 years. Most of the participants in the case group (36%) had a high school diploma, and most of the control group (36%) had an elementary school education. Most of the participants in the case group (86%) and the control group (92%) were housewives. The husbands of most of the participants in the case group (52%) and the control group (75%) were self-employed (Table 1). Frequency distribution of women with PROM and women in the control group based on the demographic characteristics of pregnant women attending the Alavi Educational Therapeutic Center in Ardebil in 2010.

The mean gestational age was 37.51 ± 2.51 weeks and 37.08 ± 2.91 weeks in the PROM and control group, respectively. Because the distribution of the gestational age was not normal, according to Kolmogorov-Smirnov test, the Mann-Whitney test was used, and no significant difference was observed between the two groups with regard to gestational age.

The mean number of pregnancies was 1.24 ± 1.22 and 1.68 ± 0.86 in the case and the control groups, respectively. No significant difference

Table 1. Frequency distribution of women with PROM and women in the control group based on the demographic characteristics of pregnant women attending the Alavi Educational Therapeutic Center in Ardebil in 2010

Group	Group Prom	Group Control
Age	72±5/45/ 25 25	25/74±6/21
Education	(18) 36% High school school	(18) 36% Elementary School
Job (housewife)	(48)% 86	(46)% 92
Job (husband) (Selfemployed)	(26)% 52	(35)% 75

Table 2. Frequency distribution of women in the PROM and control groups based on the lactate concentration in the vaginal fluid of pregnant women attending the Alavi Educational Therapeutic Center in Ardebil in 2010

Lactat concentration	Group Prom		Group Control		Total	
	N	%	N	%	N	%
Positive	48	96	1	2	49	49
Negative	2	4	49	98	51	51
Total	50	100	50	100	100	100

was observed between the two groups. The mean number of miscarriages was 0.12 ± 0.24 and 0.26 ± 0.52 in the PROM and control groups, respectively. No significant difference was observed between the two groups. The mean number of deliveries was 1.01 ± 0.70 and 0.42 ± 0.86 in the PROM and control groups, respectively. No significant difference was observed between the two groups. No still births were reported in any of the groups.

The mean lactate concentration in the vaginal fluid was 8.39 mM and 1.99 mM in the PROM and control groups, respectively. After the threshold of 4.6 mM was determined using the ROC (Figure 1), 48 women (96%) in the PROM group were positive and 49 women (98%) in the control group were negative for the enzymatic staining of lactate in the vaginal fluids (Table 2).

Based on these data, the sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of the lactate concentration in the vaginal fluid with a threshold of 4.6 mM for diagnosing PROM were 96%, 97.8%, 97.95%, 96.07%, and 97%, respectively.

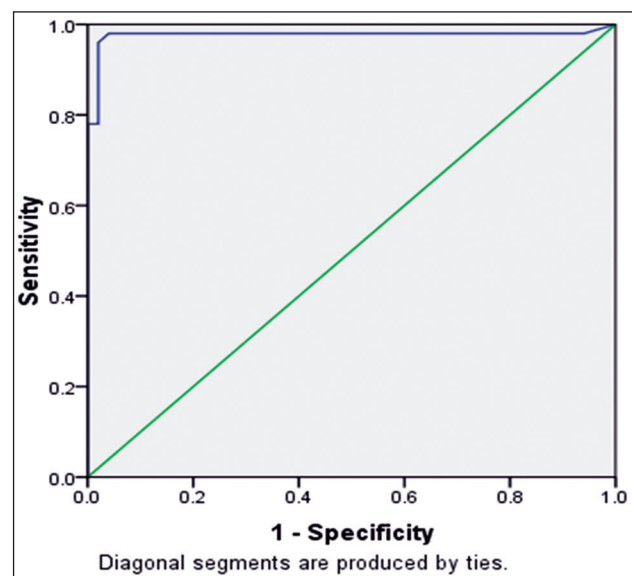


Figure 1. ROC of the lactate concentration in the vaginal fluid of pregnant women attending the Alavi Educational Therapeutic Center in Ardebil in 2010.

Discussion

In this study, the lactate concentration of the vaginal fluid was used to diagnose PROM. The present study showed that this technique has an acceptable diagnostic value. A method is diagnostically

acceptable only when its diagnostic indicators (sensitivity, specificity, positive predictive value, and negative predictive value) have values greater than 80% (10). Viberg-Itzel et al (2005) conducted a study to determine the optimal cut-off point for the lactate level to distinguish healthy membranes from ruptured membranes and to determine whether the lactate level in the vaginal fluid can be used as a diagnostic test when PROM is suspected. Viberg-Itzel et al. determined a cut-off point of 4.5 mM for the lactate concentration to achieve a sensitivity of 86%, specificity of 92%, positive predictive value of 92%, negative predictive value of 87%, kappa coefficient of 78%, and false negative of 15%. The results of the study of Viberg-Itzel et al. and the present study are similar, but the sensitivity, specificity, positive predictive value, and negative predictive value are higher in the present study. One of the reasons for this difference is the prospective nature of the study of Viberg-Itzel et al.; in contrast, our study was cross-sectional. Viberg-Itzel et al. excluded women who were suspected of PROM and enrolled only women who were positive for all 3 tests of speculum, fern, and nitrazine. Their control group consisted of women who were negative in all 3 tests. In the present study, 3 tests were used to confirm or exclude PROM. However, in the study of Viberg-Itzel et al., only speculum test was used. The use of only one test to diagnose PROM increases the probability of error, which may result in reduced sensitivity and specificity.

The present study showed that the determination of the lactate concentration in the vaginal fluid is reliable, easy, consistent, and inexpensive in comparison with common diagnostic methods such as the nitrazine, fern, and speculum test. It is easier and less expensive than sonography, and it is easier, less expensive and less invasive than amniocentesis. Other methods that have been studied for the diagnosis of PROM include the measurement of vaginal D-amino oxydase, prolactin, alpha fetoprotein, insulin-like growth factor binding protein-1, human gonadotropin, fetal fibronectin, placental alpha macroglobulin 1, urea, creatinine, and thyroid hormones.

Park et al (2007) reported a sensitivity of 97–98%, specificity of 70–97%, and positive and negative predictive value of 98–100% for fetal fibronectin (19). Lee et al (2007) reported a sensitivity

of 98.7%, specificity of 87.5%, positive predictive value of 98.1%, and negative predictive value of 91.3% for placental alpha macroglobulin 1 (20).

Kariman et al (2006) reported a sensitivity of 95.3%, specificity of 97.7%, positive predictive value of 97.6%, negative predictive value of 95.5%, and accuracy of 96.5% for HCG using the ELISA method (21).

Kefali and Exalz (2007) and Kariman et al (2008) reported a sensitivity, specificity, positive predictive value, and negative predictive value of 100% for urea and creatinine (12, 22). It can therefore be inferred that the determination of the lactate concentration of the vaginal fluid is an easy, inexpensive, rapid, available, and reliable diagnostic test for PROM when compared with other tests.

Conclusion

The determination of the lactate level of the vaginal fluid is a reliable test with high sensitivity and specificity for PROM in pregnant women. Using a cut-off point of 4.6 mM and considering the PROM confirmation test as the gold standard for diagnosing PROM, the lactate concentration of the vaginal fluid has a favorable diagnostic value. Furthermore, compared with other diagnostic tests, it is reliable, easy, rapid, available and non-invasive.

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The inhibitory effects of Bevacizumab and Dexamethasone on corneal neovascularization

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Abstract

Purpose: To investigate the effect of bevacizumab and dexamethasone in the prevention of experimentally induced corneal neovascularization in a rat model.

Methods: Thirty male Wistar-Albino rats weighing between 250 g and 300 g were used in the study. Silver nitrate sticks (75% silver nitrate, 25% potassium nitrate) were used to induce chemical cauterization on the corneas of 30 eyes. The rats were randomized to 1 of 5 groups and each group contained 6 rats: Group 1 (control group) without treatment; group 2 received topical 0,1% dexamethasone phosphate twice daily; group 3 received a subconjunctival injection of bevacizumab (0.1 mL, 2.5 mg); group 4 received topical 25mg/ml bevacizumab twice daily, and group 5 was treated with 0.1ml,2.5 mg of subconjunctival bevacizumab once a day plus topical 25mg/ml bevacizumab twice daily. Corneas were evaluated by operating microscope on the tenth day. Number of major blood vessels was determined. After the examination, enucleation was performed. Histopathologic examinations were made with paraffin block, Hematoxylin-Eosin and Masson's trichrome staining. Blood vessels were counted in the histopathologic cornea sections. Cornea sections were evaluated with regard to the intensity of new vessels, collagen fibers, oedema and fibroblastic activity.

Results: The corneal neovascularization in Group 1 were significantly higher than groups 2, 3, 4 and 5 ($P<0.05$). Corneal neovascularization in bevacizumab treated groups was less than the group treated with topical dexamethasone phosphate and the control group ($p<0.05$). However, there was no statistically significant difference between the three groups treated with bevacizumab ($p>0.05$). Masson's trichrome staining in the control group in the region below the epithelium, severe edema and

collagen fibers were observed in apparent disorder and separation. The severity of symptoms was less severe in the group treated with topical dexamethasone than the control group. Collagen fibers were organized in bevacizumab treated rats and a marked edema was not observed in them.

Conclusion: Bevacizumab and dexamethasone decreased the number of new blood vessels significantly in experimental corneal neovascularization model.

Key words: Corneal neovascularization, Bevacizumab, Dexamethasone.

Introduction

Corneal neovascularization (NV) is a consequence of infection, inflammation, trauma and toxic or degenerative corneal disorders. Corneal NV may cause edema, scar formation or lipid deposition, leading to significant visual impairment (1). Moreover, corneal NV is a significant risk factor for immunological rejection or failure of corneal grafts because it involves increased contact with the afferent and efferent arms of the systemic immune system (2,3).

It has been shown that vascular endothelial growth factor (VEGF) and its receptors play an important role in the pathophysiology of corneal NV and are up regulated in corneal angiogenesis in studies using human corneal buttons, experimental models of corneal NV, and in experimental herpes simplex keratitis. Moreover, in experimental models of corneal NV, increased levels of corneal VEGF mRNA and protein, as well as of VEGF receptors, have been demonstrated (4). VEGF and its receptors were found to be present in higher concentrations in corneal buttons with NV than in normal corneas, irrespective of the cause of NV (5). VEGF promotes several steps of angiogenesis, including proteolytic activities, endothelial cell proliferation, migration and capillary tube formation (1,2).

Vascular endothelial growth factor has been proven to be a major inducer of corneal neovascularization, both in experimental models and in the human cornea. Bevacizumab (Avastin) is a recombinant, humanized, monoclonal antibody that binds to VEGF and prevents linking to its receptor. Bevacizumab was the first anti-angiogenic drug which showed topical effects against corneal neovascularization. Previous studies have described the regression of corneal neovascularization by topical bevacizumab administration at various concentrations (6,7).

Dexamethasone, a synthetic corticosteroid analogue, is a potent anti-inflammatory drug that is used in the treatment of various immune and inflammatory diseases. Folkman and Ingber (8) reported that dexamethasone is an angiostatic steroid. The anti-angiogenic effect of dexamethasone has also been confirmed in various animal models (9,10,11).

The aim of this study was to investigate the effect of bevacizumab and dexamethasone in the prevention of experimentally induced corneal neovascularization in a rat model.

Methods

The animals used in this work were treated in accordance with the ARVO Resolution for the Use of Animals in Ophthalmic and Vision Research, as well as specific national laws. The approval of our university academic research council and ethics committee was also obtained.

Thirty adult, male Wistar rats, weighing between 200 and 250g, were used in this study. The rats were initially housed in a standard animal room with a 12-h light-dark cycle and food and water was provided ad libitum.

The silver nitrate cauterization technique described by Mahoney and Waterbury (12) was used to induce corneal neovascularisation under general anesthesia, induced by an intraperitoneally administered 25 mg/kg body weight ketamine hydrochloride supplemented by topical anesthesia (0.5% proparacaine hydrochloride). The experiment was performed on the left eye of each rat. Briefly, one cornea of each animal was cauterized by pressing an applicator stick with a diameter of 2 mm coated with 75% silver nitrate/ 25% potassium nitrate to the central cornea for 10 seconds under the operat-

ing microscope. Excess silver nitrate was removed by rinsing the eyes with 5 ml of a balanced salt solution and then gently blotting the eyes with tissue paper. To increase the reproducibility of the injuries, a single investigator (SA) cauterized all animals. For each eye, the extent of burn stimulus response was scored as 0 (no blister, not raised above corneal surface), +1 (small blister, raised slightly above the surface), +2 (medium blister, raised moderately above the surface), +3 (large blister). Only the corneas with a burn stimulus score of +2 or higher were included for the calculation of the mean burn stimulus and neovascularization scores in each group. The exclusion criteria were poor alkali burn extent and corneal perforation.

Following cauterization, animals were randomized into five groups. Group 1 (n=6) (control group) without treatment this group. Topical 0.1% dexamethasone phosphate was administered twice a day in the 2nd group (n=6). The 3rd group (n=6) received a subconjunctival injection of bevacizumab (Avastin) (0.1 mL, 2.5 mg) just after the lesion. Topical 25mg/ml bevacizumab (Avastin) was administered twice a day in the 4th group (n=6). A single dose of subconjunctival 0.1 ml, 2.5 mg of bevacizumab (Avastin) and topical 25mg/ml bevacizumab (Avastin) twice a day was administered in the 5th group (n=6). Treatment started immediately after cauterization. All animals were anaesthetized as described above, and their corneas were evaluated by operating microscope on the tenth day. Corneal photographs were taken with x40 magnification using a Sony digital camera (CCD-IRIS; model DXC 107 AP; Sony Corp, Tokyo, Japan). Neovascularization of each cornea was evaluated by an examiner (S.A.) who was blinded to the treatment groups in order to minimize observer bias. The number of major blood vessels was determined. A drawing of corneal blood vessels was made by one of the investigators to compare with digital photos. After ten days of therapy, following sedation with intraperitoneally administered 25 mg/kg body weight ketamine hydrochloride, enucleation was performed after the animals were killed. The right eyes were not used and kept intact in our study.

Immediately after enucleation, the globes were penetrated with a 27G needle, 1.0mm from the limbus at the 3 and 9 o'clock meridians to allow the fixative to fill the eyes rapidly. The eyes were

prepared for histological examination using 10% formaldehyde. After fixation for 24 h, they were removed from the fixative, and corneas were dehydrated and sectioned. The corneas were cut into two halves from the line passing from the center to the limbus. They were embedded in paraffin wax based on the distances equal to three sections of each cornea were gathered. Hematoxylin-eosin and Masson's trichrome staining were performed in a total of 6 cross-sectional surface of the cornea. Vessel count and examination of the stromal collagen fibers were performed with 40 x 10 magnification in each cross-sectional surface. Light microscopic examination was performed on every section by an examiner who was blinded to the treatment groups.

The Kruskal-Wallis test followed by the Dunn test with $P < 0.05$ was used for comparisons.

Results

The burn stimulus was similar between the groups, and stimulus scores were +2 or higher. The number of corneal neovascularizations were 46.66 ± 11.72 (mean \pm Standard deviation [SD]) in the first group, 19.33 ± 4.08 in the 2nd group, 11.00 ± 1.78 in the 3rd group, 10.16 ± 4.40 in the 4th group, and 5.00 ± 2.60 in the 5th group. The total number of corneal neovascularizations in the histopathologic examination were 26.66 ± 11.02 , 11.83 ± 3.86 , 4.83 ± 1.32 , 3.83 ± 1.16 , and 3.83 ± 1.16 in Groups 1, 2, 3, 4 and 5, respectively (Figures 1 to 2). The corneal neovascularization in Group 1 were significantly higher than the other groups ($p < 0.05$). Corneal neovascularization in rats treated with bevacizumab was less than the animals treated with topical dexamethasone phosphate and the control group ($p < 0.05$). However, there was no significant difference between the three groups treated with bevacizumab ($p > 0.05$).

Masson's trichrome staining showed that there was severe edema, increase in collagen fibers density with apparent disorder and separation below the epithelium in the control group (Figure 3). The severity of findings were less severe in the topical dexamethasone- treated group compared to the control group,. Collagen fibers are organized in the groups that used bevacizumab and marked edema was absent (Figure 4).

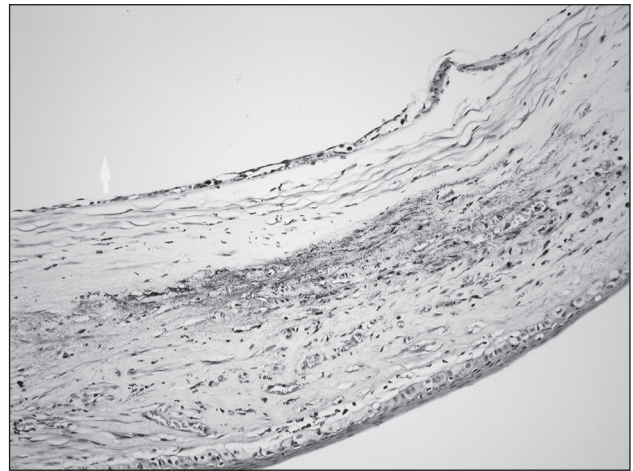


Figure 1. Hematoxylin eosin staining in the control group. Intense edema and vascular structures were shown in the stroma

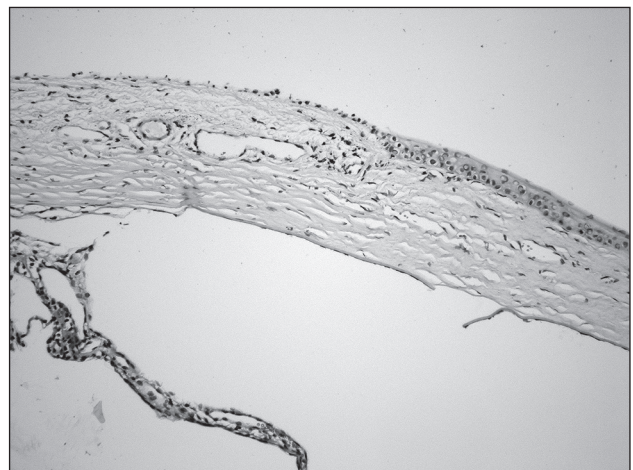


Figure 2. Hematoxylin eosin staining in the group 5. Corneal neovascularization in treated groups with bevacizumab was less than the topical dexamethasone phosphate and control groups

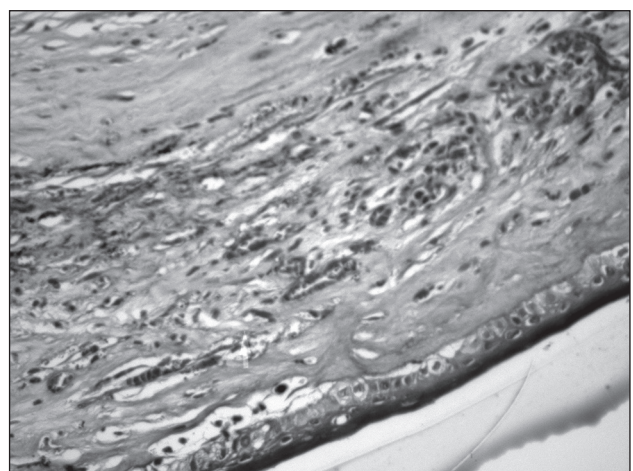


Figure 3. Masson's trichrome staining in the control group. Collagen fibers were observed in apparent disorder and separation

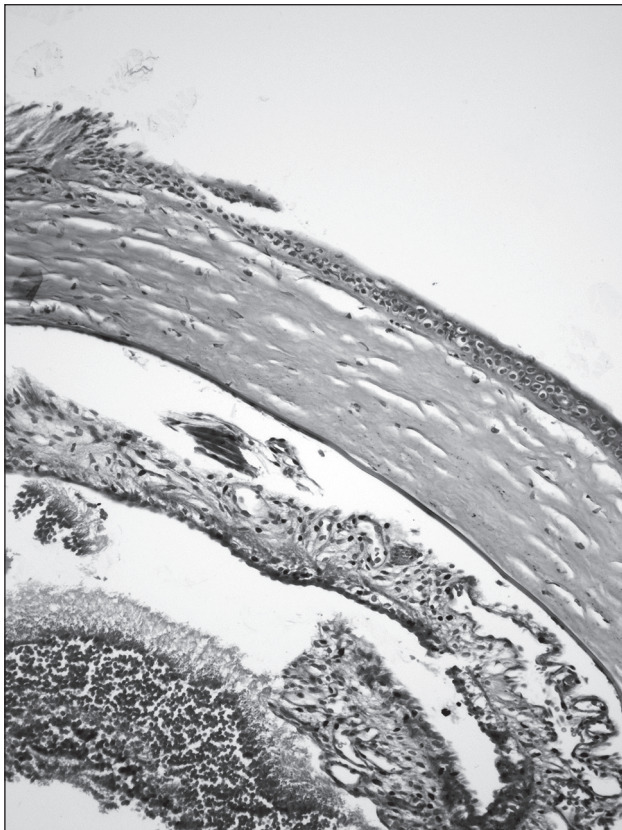


Figure 4. Organized collagen fibers were shown in Masson's trichrome staining in the group 5

Discussion

Inhibition of vision-threatening corneal neovascularization is a major challenge following corneal chemical insult or inflammation and in many clinical situations corneal anti-angiogenic treatment would be helpful. The efficacy of topical bevacizumab administration on corneal neovascularization at various concentrations has been investigated before (6,13,14).

Recently, bevacizumab, a humanized monoclonal antibody to VEGF, was used for the treatment of corneal neovascularization. Some of the short-term results suggest that topical and subconjunctival bevacizumab is well tolerated but associated with a partial regression of corneal neovascularization (15). The present study suggests a clear corneal neovascularization in bevacizumab treated groups with better results than the topical dexamethasone phosphate and control groups ($p < 0.05$). However, there was no statistically significant difference between the administrative routes; topical, subconjunctival and combination of both, respectively.

Bevacizumab inhibits VEGF signaling only by binding to free extracellular VEGF. (16). The prominent role of VEGF in the pathophysiology of corneal neovascularisation has been demonstrated in experimental models of corneal neovascularisation, (17) in experimental herpes simplex keratitis (18) and in studies from human corneal buttons (19). Additionally, VEGF antagonism, whether at the protein or mRNA level, has been shown to reduce corneal neovascularisation and improve corneal graft survival in experimental animals (20,21).

Steroids seem by far to be the best therapy to inhibit experimental corneal neovascularization (22) and remain the mainstay of clinical therapy in prevention of corneal neovascularization (23). To date, steroid therapy has been the standard anti-inflammatory and angiostatic treatment in the cornea (9). Eyes included in this study that were treated with the dexamethasone had significantly milder manifestations of corneal neovascularization after chemical burn than the control group.

The mechanisms by which steroids inhibit angiogenesis include both direct effects on vascular endothelial cells, and indirect effects through actions on other cells in tissues that may produce angiogenic stimuli (24,6). The significant lower corneal neovascularization in the dexamethasone group are related to these anti-inflammatory properties.

Dexamethasone is widely used in the treatment of corneal inflammation; however, steroid therapy in the management of some corneal diseases remains controversial because of its side effects (9,25). Further studies will be necessary to assess the safety and side effects for the treatment of human corneal diseases.

Our results suggest that bevacizumab, a commercially available monoclonal anti-VEGF antibody, and dexamethasone inhibit corneal neovascularisation in this rat model of corneal neovascularisation. Further trials which will use bevacizumab and dexamethasone as an adjunct in the treatment of corneal neovascularisation and/or for high-risk corneal graft recipients are needed to understand clinical applicability of these agents.

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Prediction of birth weight base on maternal characteristics: A descriptive-correlation study

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Abstract

Aim: To determine whether prediction of birth weight is possible base on maternal characteristics.

Methods: In this descriptive-correlation study, 220 iranian women with uncomplicated term pregnancy were studied. ten maternal characteristics (height, weight, gestational weight gain, body mass index (BMI), BMI at the end of pregnancy, weight at the end of pregnancy, fundal height, abdominal girth, arm girth, parity) and two fetal characteristics (fetal sex and gestational age) were evaluated in combination for their predictive values in determining birth weight. A multiple regression analysis was used to determine which combinations of these variables is significant and finally a birth weight prediction equation was developed. Data were analyzed by SPSS 11.5.

Results: Significant predictors of term birth weight were maternal height, fundal height, gestational age and fetal sex. Our term birth weight prediction equation is: Birth weight (g) = $-2643.91 + 8.02$ (gestational age in day) + 844.46 (mother's height) (m) + 65.23 (fundal height) (cm) + 144.25 (fetal sex) (boy=1, girl=0).

Conclusion: Term birthweight can be accurately predicted using pregnant mother characteristics this equation give a useful and simple estimate of expected fetal weight and help to health providers controled delivery better and if necessary refer mother to Tertiary health center for birth to avoide morbidities that are related to fetal weight.

Key words: Prediction, birth weight, maternal characteristics.

Introduction

Fetal weight is an important and an effective factor in delivery (1) and it should be estimated and registered before all deliveries. 20% of 4 millions born infants in U.S.A are placed on two ends of growths spectrum annually (2).

Despite advances in the modern fields of Midwifery like ultrasound which can measure the dimensions of fetus in the uterus, Estimation of fetal weight still has remained a problem for Midwifery (3).

With the proper estimation of fetal Weight, we can avoid the risks such as death, fetal heart deceleration, meconium aspiration, prolonged labor, vaginal and uterine rupture and postpartum heamorrhage (4).

We can use methods for estimation of fetal weight such as growth chart, the mother's estimation of fetal weight, evaluation of fetal size by physical examination and ultrasound which each of them has some limitations (5).

So far, no method is sufficient accuracy in predicting of birth weight (6). A new method for estimating of fetal weight is an equivalent based on the evaluation of maternal characteristics. It is an objective method, requiring no special tools and test, important information is easily accessible and it is inexpensive and non- affiliated to experience of doctors and midwives (3).

In present study, researchers have considered a set of variables in combination for their predictive values in determining birth weight, which is a comprehensive review, while other studies in this field only have considered one or more variables related to birth weight. Therefore, according to the importance of fetal weight estimation. We need an accurate, simple, inexpensive accessible and practical

method which the personnel of health centers can easily use it. Because few studies has been done in this area; the present study was conducted to predict birth weight before delivery based on the characteristics of pregnant mothers at the Fatemye Educational Therapeutic Center in Hamedan in 2008.

Methods

This descriptive-correlational study was done on the pregnant women who attended the fatemye Educational Therapeutic Center in Hamedan for delivery in the period of half of Jan 2008 to late March 2008. There were 1238 hospitalizations for delivery in this period.

The researchers interviewed 312 women and among them, 220 healthy women (without diabetes, high blood pressure, smoking and...) who met the inclusion criteria enrolled in the study. Inclusion criteria were included: aged 18-35 years with no complication in pregnancy and gestational age between 37-41 weeks based on the exact date of last regular menstrual period or based on ultrasound of 8-16 weeks of gestation and having prenatal care before 12 weeks gestation age, Single pregnancy with cephalic presentation and not engagement of fetal head, intact membranes, normal amniotic fluid volume, healthy infant without malformations, consent to participate in the study.

A questionnaire, two infant and adult scales and a standard, firm, flexible and inextensible tape were used for data collection. The questionnaire was validated by content method and test-retest method was applied for the reliability of it to prove reliability, the quantitative data such as (Mother's age, arm girth,...) were evaluated by Spearman correlation coefficient ($r=0.99$), and qualitative data (sex of infant) by Kappa coefficient ($k=1$). Maternal weight was measured with a frequently calibrated spring balance scale and the infant weight was measured with Seca scale. After weighing 10 times, the adult scale with 1 Kg and infant scale with 100gr were re-evaluated.

At first, the questionnaire data was completed by interview (sociodemographics information including age, occupation, and educational level of the subjects and of their spouses, as well as their gynecological history), then the characteristics of pregnant mother were evaluated include: Mother's

height without shoes, and the fundal height was measured as the distance between the symphysis pubis and the highest point of the uterine fundus in the supine position, defined with a gentle pressure on a plane at right angle of the abdominal wall and was marked, Abdomen circumference was measured as same situation at the level of the umbilicus by cross-over technique. Mid-arm circumference was measured in the right arm at the level, mid way between acromion and olecranon processes, Gestational age was derived from the last menstrual period unless it differed from the sonographic estimate by more than 2 weeks, in which case the latter was used. Mother's weight taken from antenatal records in first trimester. Full term neonates were examined within 24 hours of delivery and their weights were recorded.

The Ethics Review Board of Shahid Beheshti University of medical science and health services, Tehran, Iran (approval number: 7842) approved the study.

A multiple regression analysis was used to determine which combinations of these variables were significant and a birth weight prediction equation was developed. And PRESS index (PRESS_Predicted Residual Sum of Squares) was used to determine the accuracy of model predictions. Data processing and statistical analyses were performed using SPSS 11.5.

Results

Results of the study showed that most samples of the research was nollypara 58.6 percent, the mean of gestational age was 276.9 ± 7.43 days, the mean maternal weight at the beginning of pregnancy was 60.35 ± 11.01 Kg, weight at the end of pregnancy was 72.32 ± 11.09 kg, weight gain in pregnancy 11.96 ± 3.54 kg, Mean maternal height 1.58 ± 0.05 meter, mean BMI in early pregnancy 23.91 ± 4.17 Kg/m², mean BMI at end pregnancy 28.64 ± 4.90 Kg/M², the mean fundal height was 35.14 ± 3.11 Cm, mean abdominal girth was 102.05 ± 8.38 cm and arm girth was 28.08 ± 2.99 cm. 50.5 percent of the research samples were girl infants and infant's weight in 50 percent of samples was 3000-3499 gr with the mean of 3305.68 ± 356.13 .

In determining of the regression equation and its efficiency based on pregnant mother's characteristics to predict of birth weight, From 12 researching

variables (height, weight, gestational weight gain, BMI, fundal height, abdominal girth, arm girth, parity, BMI at the end of pregnancy and weight at the end of pregnancy ,gestational age and fetal sex) 4 variables including gestational age, mother height, fundal height and fetal sex were significant. (table 1) and the regression equation was obtained as follows:

$$\text{Birth weight} = -2643.91 + 8.02(\text{gestational age}) + 844.46(\text{mother height}) + 65.23(\text{fundal height}) + 144.25(\text{fetal sex})$$

and corrected coefficient of determination (R^2), the value of correlation between actual birth weight and predicted birth weight, 0.44 was obtained which shows 44 percent of birth weight changes is described by 4 variables of gestational age, Maternal height, fetal sex and fundal height. And to determine the accuracy of model predictions of the PRESS index (PRESS_ Predicted REsidual Sum of Squares) was used which showed that selected model is an appropriate model capable of prediction ability.

Discussion

The present study showed that birth weight can be correctly predicted using the obtained regression equation based on maternal characteristics before delivery. In this study, from twelve variables in the regression, 4 of them including: gestational age, maternal height, fundal height and fetal sex were significant. Nahum and et al (7), conducted a study to predict term birth weight from prospectively measurable maternal characteristics. They studied 9 variables, including gestational age, fetal sex,

Maternal height, weight, weight gain in the third trimester, parity, BMI, age and glucose screening test. They showed that the first six variables could predicted birth weight. In another study Frederick and et al (8) used of multiple regression equation to determine the relationship of BMI alone and BMI with the other variables, with birth weight. They showed that 5 variables including: BMI, gestational age, fetal sex, parity and pre-eclampsia were significant and had correlation with birth weight.

In present study, like study of Nahum (9) correlation between gestational age, fetal sex and maternal height with birth weight was significant and also like study of Frederick et al (8) correlation between, gestational age and fetal sex had correlation with birth weight. In this case, Nahum (9) stated that gestational age is the most important determinants of birth weight at delivery time and the birth before 37 weeks of pregnancy is the biggest reason for birth weight of less than 2500 grams.

Also Coad and Dunstall stated that the small size of mother has a limiting effect on fetal growth and in relation to fetal sex, infant boys are averagely heavier than infant girls because the ovaries have the limiting ability of steroid hormones synthesis while the testes produce testosterone which has anabolic effects. But in present study, parity, maternal weight, weight gain in pregnancy and BMI of mother were not significant. The reason of the difference between this study and other studies can be due to the difference of the types of variables which were evaluated together. Based on the study of Joshi, et al. (11).

One of the reasons that parity affects on the birth weight is the mother's nutritional status. In present study, the nutritional status has been eva-

Table 1. Table of regression coefficients in women referred to fatemieh Hospital in Hamedan for delivery in 2008

Model	Coefficient of non-standard corrected determination	Coefficient of standard corrected determination	t	P value
	B	Beta		
Constant Coefficient	-2643.908	0.172	-2.985	0.003
Gestational age	8.023	0.128	3.397	0.001*
Mother's height	844.460	0.571	2.505	0.013*
Fundal height	65.230	0.203	11.138	0.000*
Infant Sex	144.248		3.964	0.000*

*significant**

luated by other variables such as maternal height, weight and BMI .and parity has not been significant along with the other variables which could explain birth weight better. In this study, another variable, fundal height, is also evaluated. Westin¹² found that the distance of the pubic symphysis to the fundus of uterus is preferred to maternal weight gain, maternal abdominal girth and biochemical analysis for determining of small infant of gestational age in low-risk pregnancies. These results are consistent with the present study.

In present study, the corrected determiner coefficient is 0.44 which means 44 percent of the changes of birth weight is explained by four significant variables, but in the study of Nahum (9) the rate is 0.33. The difference with our study could be due to the types of desired variables.

Conclusion

Term birthweight can be accurately predicted using pregnant mother characteristics. This equation give a useful and simple estimate of expected fetal weight and help to health providers controled delivery better and if necessary refer mother to Tertiary health center for birth to avoide morbidities that are related to fetal weight.

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Digital clubbing may be an indicator of systemic atherosclerosis even at microvascular level

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Abstract

Background: Presence of any relationship between digital clubbing and microvascular atherosclerosis was tried to be understood.

Methods: Cases with digital clubbing and controls were studied.

Results: The study included 104 cases with clubbing and 120 controls. Mean age of clubbing cases was 49.2 years, and there was a male predominance (81.7%) among them. There were significantly higher prevalences of smoking and chronic obstructive pulmonary disease (COPD) in the clubbing group (69.2 versus 41.6% and 27.8 versus 10.8%, respectively, $p < 0.001$ for both). Although body mass index (BMI), weight, and fasting plasma glucose (FPG) were lower in the clubbing group, the differences were nonsignificant probably due to the small sample sizes. Although the negative effect of small sample sizes, prevalence of type 2 diabetes mellitus (DM) and mean value of systolic blood pressure (BP) were significantly lower in the clubbing group (12.5 versus 21.6% and 127.6 versus 136.9 mmHg, respectively, $p < 0.05$ for both). On the other hand, prevalence of coronary heart disease (CHD) and/or peripheral artery disease (PAD) were significantly higher in the clubbing group (7.6 versus 0.0%, $p < 0.01$).

Conclusions: There are significant relationships between digital clubbing and smoking, COPD, and CHD and/or PAD probably due to strong atherosclerotic effects of smoking with highly suspected atherosclerotic background of COPD. Whereas the BMI, weight, FPG, systolic BP, and prevalence of DM are inversely related with digital clubbing probably due to suppressor effects of smoking on appetite. So clubbing may be a significant indicator of systemic atherosclerosis even at microvascular level.

Key words: Clubbing, atherosclerosis, smoking.

Introduction

Digital changes may help to identify some systemic disorders in the body. Clubbing is a deformity of the fingers and fingernails that is known for centuries. It is characterized by bulbous enlargement of the distal phalanges due to an increase in soft tissue. Clubbing develops in the following steps; fluctuation and softening of the nailbed, loss of normal $<165^\circ$ angle between the nailbed and fold, increased convexity of the nail fold, thickening of the whole distal finger, and shiny aspect and striation of the nail and skin (1). Schamroth's window test is a popular test for the diagnosis of clubbing (2). When the distal phalanges of corresponding fingers of opposite hands are directly opposed, a small diamond-shaped 'window' is normally apparent between the nailbeds. If this window is obliterated, the test is positive and clubbing is present. Although many diseases may be associated with digital clubbing, the reports are mostly anecdotal. Prospective studies of patients with clubbing have not yet been performed, and hence there is no conclusive evidence of these associations. It may be associated with pulmonary and cardiac diseases that are featuring with chronic hypoxia (tuberculosis, bronchiectasis), gastrointestinal and hepatobiliary diseases (malabsorption, Crohn's disease, ulcerative colitis, cirrhosis), hypothyroidism, thymoma, thalassemia, and HIV infection (3-9). There is not any associated underlying disease in 60% of cases that are called as idiopathic clubbing (10). We tried to understand significance of digital clubbing as an indicator of systemic atherosclerosis even at microvascular level in the present study.

Material and methods

The study was performed in the Internal Medicine Polyclinic of the Mustafa Kemal University

between March 2007 and May 2011. We studied all patients applying for any complaint. Their medical histories including smoking habit, claudication, and already used medications were learnt, and a routine check up procedure including fasting plasma glucose (FPG), low density lipoprotein cholesterol (LDL-C), triglyceride (TG), and an electrocardiography was performed. Clubbing was diagnosed by determining ratio of the distal phalangeal diameter to the interphalangeal diameter which is required to be >1.0 and with the presence of Swamroth sign (2,10). Current daily smokers for the last six months and cases with a history of five pack-years were accepted as smokers. Cigar or pipe smokers were excluded. Body mass index (BMI) of each case was calculated by the measurements of the Same Physician instead of verbal expressions. Weight in kilograms is divided by height in meters squared (11). Office BP was checked after a 5-minute of rest in seated position with a mercury sphygmomanometer (ERKA, Germany). Cases with an overnight FPG level of 126 mg/dL or greater on two occasions or already using antidiabetic medications were defined as diabetics (12). An oral glucose tolerance test with 75-gram glucose was performed in cases with a FPG level between 100 and 125 mg/dL, and diagnosis of cases with a 2-hour plasma glucose level of 200 mg/dL or higher is DM (12). A stress electrocardiography was performed in suspected

cases, and a coronary angiography was obtained only for the stress electrocardiography positive cases. Color doppler ultrasonography of arterial system in the lower extremities were obtained in cases with a history of claudication for the diagnosis of PAD. Chronic obstructive pulmonary disease (COPD) was diagnosed via spirometric measurements. The criterion for diagnosis is post-bronchodilator forced expiratory volume in 1 second/forced vital capacity of less than 70%. Eventually, the nail clubbing cases and age- and sex-matched controls were compared according to the prevalences of smoking, COPD, DM, and CHD and/or PAD and mean values of pack-years, BMI, weight, FPG, LDL-C, TG, and systolic and diastolic BPs in between. Mann-Whitney U test, Independent-Samples t test, and comparison of proportions were used as the methods of statistical analyses.

Results

The study included 224 cases (104 patients with digital clubbing), totally. The clubbing cases were detected among 2,428 cases (1,384 females and 1,044 males), totally. So the prevalence of clubbing was 1.3% in females, 8.1% in males. The mean age of clubbing cases was 49.2 years, and there was a male predominance (81.7%) among them (Table 1). Parallel to the result, the-

Table 1. Characteristics of the study cases

Variables	Clubbing cases	Control cases	p-value
Number	104	120	
Male ratio	81.7% (85)	81.6% (98)	ns*
Mean age (year)	49.2 \pm 15.2 (21-81)	49.3 \pm 16.2 (21-82)	ns
Prevalence of smoking	69.2% (72)	41.6% (50)	<0.001
Prevalence of COPD†	27.8% (29)	10.8% (13)	<0.001
Mean BMI‡ (kg/m ²)	26.4 \pm 4.9 (16.1-40.5)	27.3 \pm 4.6 (17.1-39.2)	ns
Mean weight (kg)	74.3 \pm 14.0 (38-120)	77.9 \pm 13.6 (45-116)	ns
Mean FPG§ (mg/dL)	113.7 \pm 43.5 (73-301)	120.8 \pm 40.8 (68-271)	ns
Prevalence of DM	12.5% (13)	21.6% (26)	<0.05
Mean LDL-C¶ (mg/dL)	130.0 \pm 38.0 (10-237)	126.9 \pm 35.7 (54-265)	ns
Mean triglyceride (mg/dL)	152.5 \pm 79.3 (55-438)	143.4 \pm 79.8 (49-383)	ns
Mean systolic BP** (mmHg)	127.6 \pm 25.6 (80-200)	136.9 \pm 28.0 (80-220)	0.011
Mean diastolic BP (mmHg)	88.0 \pm 12.5 (60-120)	88.3 \pm 12.2 (50-120)	ns
Prevalences of CHD*** and/or PAD****	7.6% (8)	0.0% (0)	<0.01

*Nonsignificant ($p>0.05$) †Chronic obstructive pulmonary disease ‡Body mass index §Fasting plasma glucose ||Diabetes mellitus ¶Low density lipoprotein cholesterol **Blood pressure ***Coronary heart disease ****Peripheral artery disease

re was a significantly higher prevalence of smoking in the clubbing cases (69.2% versus 41.6%, $p < 0.001$). The mean pack-year was similar in both groups (28.5 versus 28.0 years, $p > 0.05$). Similarly, there was a significantly higher prevalence of COPD in the clubbing group (27.8% versus 10.8%, $p < 0.001$). Although mean values of the BMI, weight, and FPG were lower in the clubbing group, the differences were nonsignificant probably due to the small sample sizes of the groups ($p > 0.05$ for all). But the prevalence of type 2 DM was significantly lower in the clubbing cases (12.5% versus 21.6%, $p < 0.05$). On the other hand, the mean LDL-C and TG values were higher in the clubbing cases but the differences were nonsignificant probably due to the same reason above ($p > 0.05$ for both). Although, both the systolic and diastolic BP values were lower in the clubbing group, the difference was only significant for systolic BP (127.6 versus 136.9 mmHg, $p = 0.011$). As one of the most significant results of the study, prevalence of CHD and/or PAD was significantly higher in the clubbing group (7.6% versus 0.0%, $p < 0.01$). There were seven cases with CHD and one with PAD in the clubbing group, whereas no case could be detected in the control group neither with CHD nor with PAD.

Discussion

Digital clubbing remains as an unknown box in the medical field, and its possible association with significant health problems is still needed to be explained. The exact underlying cause of clubbing is unknown, but there are numerous theories about this issue. Chronic tissue hypoxia, vasodilation, secretion of growth factors from the lungs, and other mechanisms have been proposed (13-16). Moreover, the significance of diagnosing clubbing is not well established. For example, only 40% of clubbing cases turned out to have significant underlying disease of various causes, while 60% had no medical problems on further investigations and remained well over the subsequent year in a previous study (10). On the other hand, the exact frequency of clubbing in the population is not known. A previous study found clubbing in 0.9% of all patients admitted to a department of internal medicine (10). Whereas the prevalence of clubbing was 4.2% in

both sexes in our study, which should be searched with further studies. In the above study (10), 15 patients were diagnosed with clubbing among 1,511 admissions, and 10 of them were males, and five were females. So, only 33.3% of clubbing cases were females in the study (10), whereas this ratio was 18.2% in the present study. Probably due to the higher prevalence of smoking in males (17), such great gender differences were seen in clubbing cases. So smoking takes the main role in the etiology of clubbing probably due to its strong atherosclerotic effects on endothelium.

Atherosclerosis is an inflammatory process probably affecting all sizes of arterial vasculature. The origin of this inflammation is unclear, but excess weight, smoking, and aging may be the most important of the several possible causes. Any type of irritation causes an innate inflammatory response. The inflammatory process is enhanced by the release of various chemical factors by the lymphocytes to repair the damaged arterial endothelium. However, due to the continuous irritation process of the endothelial cells in case of excess weight, smoking or aging, prominent changes develop in the architecture of the arterial vasculature, since the chronic inflammatory process of the endothelial cells terminates with fibrosis and atherosclerosis all over the body. But as also understood from the clubbing cases in the present study, the atherosclerotic process starts at microvascular level initially. It is not surprising that stopping of smoking before the development of macrovascular changes terminate with the healing of nail changes. But after the development of COPD, CHD, and/or PAD, the vascular changes could not be reversed, probably due to the long term and irreversible fibrotic effects on endothelial cells. The same rules may also be true both for excess weight and aging.

Probably the accelerated atherosclerotic process is the main structural background of the functional changes characteristic of many diseases in the human body including CHD, PAD, stroke, COPD, and chronic renal failure. Although the CHD and stroke are the most commonly seen clinics of the accelerated atherosclerotic processes, there are several evidences about existence of an associated systemic endothelial inflammation all over the body in the literature (18-20). For example, there

may be a close relationship between COPD and cardiovascular diseases probably due to the accelerated atherosclerotic process (21). In a multi-center study performed on 5,887 smokers aged between 35 and 60 years, two-third of mortality cases were caused by cardiovascular diseases and lung cancer, and coronary heart disease was the most common cardiovascular complication among them (22). When the hospitalizations were searched, the most common causes were the cardiovascular diseases again (22). In another study, 27% of all mortality cases were due to the cardiovascular causes in the moderate and severe COPD cases (23).

Excess weight, smoking, and aging are probably the most significant causes of the accelerated systemic atherosclerotic process. Excessive adipose tissue may function as an endocrine organ and causing a systemic inflammatory process. The systemic inflammatory effect of smoking on endothelial cells is already known with Buerger's disease in the literature. Increased oxidative stresses, inactivation of antiproteases, and release of proinflammatory mediators may terminate with a systemic inflammatory process with smoking. The smoking induced systemic inflammatory process probably affects the whole arterial vasculature of the body, but organ systems may be affected with different severities in different individuals with unknown reasons. It is not surprising that the pulmonary endothelial cells will be the most severely affected tissues in most persons due to the higher concentrations of the irritant substances of smoke in the lungs. Similarly, aging may be another significant cause of the systemic atherosclerotic process that preventing adequate tissue repair. On the other hand, both the COPD frequency and its complications are increasing in the society. For example, although age-matched mortality for all other diseases decreased with a 32% ratio in the last 30 years, the COPD related mortality increased with a 102% ratio in the same period of time (24). According to the most optimistic estimates, the COPD mortality rates will increase by 50% over the next 15 years (25). Although the achieved development in the health services and decreased smoking prevalence worldwide, the increased COPD mortality and morbidity can only be explained by the increasing frequencies of excess weight and aging in the world (26). The over-

rall male predominance of the clubbing cases in the present study may also indicate the effects of smoking on clubbing, since the smoking is significantly higher in males all over the world.

As a conclusion, there are significant relationships between digital clubbing and smoking, COPD, and CHD and/or PAD probably due to strong atherosclerotic effects of smoking with highly suspected atherosclerotic background of COPD. Whereas BMI, weight, FPG, systolic BP, and prevalence of DM are inversely related with clubbing probably due to suppressor effects of smoking on appetite. So clubbing may be a significant indicator of systemic atherosclerosis even at microvascular level.

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Antibiotic sensitivity/resistance of *Streptococcus Pyogenes* to certain antimicrobial medications (Penicillin, Ceftriaxone, Cefuroxime and Erythromycin)

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Abstract

Tonsillopharyngitis is a common bacterial infection, which represents an acute inflammation of the throat lining and adenoid tissue of the upper respiratory tract. This bacterial infection is caused by *Streptococcus pyogenes*, while pathogens can be also viruses. *Streptococcus pyogenes* is a beta-hemolytic streptococci of serological group A. It is one of the most important bacterial pathogens in humans. It causes one-third of all acute pharyngitis in children and adolescents.

Streptococcus pyogenes is susceptible to Penicillin, while Erythromycin and cephalosporins are also used in patients who are allergic to Penicillin.

Isolation and identification of streptococci from various clinical specimens is usually done by testing microscopic and cultural characteristics.

The Goal of this study is to examine and validate microbial diagnostic tests for etiological agent of tonsillopharyngitis in the study population and to examine antibiotic sensitivity/resistance of *Streptococcus pyogenes* to certain antimicrobial medications (Penicillin, Ceftriaxone, Cefuroxime and Erythromycin) using the disc diffusion method.

The study was conducted as prospective during the six-month period in 2010 and 2011, including a total of 108 positive samples with isolated strains of *Streptococcus beta-haemolyticus* group A (*Streptococcus pyogenes*) tested in a Microbiological laboratory of the Institute of Public Health of the Sarajevo Canton.

Isolation and identification of *Streptococcus beta-haemolyticus* group A was performed using standard microbiological methods.

The presence of *Streptococcus pyogenes* in the throat swab culture of outpatients was confirmed in 50.0% of males and 50.0% of female respondents.

Test for degree of sensitivity of *Streptococcus pyogenes* strains isolated from throat samples to Penicillin did not identify any resistance.

The degree of sensitivity of *Streptococcus pyogenes* strains isolated from throat samples on macrolides identified resistance in 27.8% of cases.

Key words: Resistance, *Streptococcus pyogenes*, tonsillopharyngitis, antimicrobial medications, Penicillin, Ceftriaxone, Cefuroxime, Erythromycin.

Introduction

Streptococcus pyogenes is a beta-hemolytic streptococci of serological group A. It is one of the most important bacterial pathogens in humans. It causes one-third of all acute pharyngitis in children and adolescents. Reservoir of infection is usually a man (patient, former patient, carrier). Source of infection are usually nasopharyngeal secretions and saliva (1).

Routes of infection are direct (Fligge droplets) and indirect (through contaminated objects, food, and air). *To the spread of infection are susceptible places with big overpopulation, particularly in winter* (2).

Tonsillopharyngitis is a common bacterial infection, which is an acute inflammation of the lining of the throat and adenoid tissue of the upper respiratory tract. This bacterial infection is caused by *Streptococcus pyogenes*, while other pathogens can be viruses.

Streptococcus pyogenes is susceptible to Penicillin and Erythromycin, while cephalosporins are used in patients who are allergic to Penicillin.

Isolation and identification of streptococci from various clinical specimens are usually done by determination of microscopic and cultural characteristics. The finding of Gram-positive cocci in pairs and chains with white blood cells is an important

sign for a diagnosis, since no streptococci colonize the skin surface under normal conditions. In contrast to this, the streptococci are regular inhabitants of the oropharynx and their presence in the respiratory tract samples in patients with pharyngitis has a little diagnostic value (1).

Besides appearance and types of hemolytic colonies on blood agar, to extract the group A streptococci is commonly used in the laboratory bacitracin test.

For the ultimate bacteriological diagnosis, method of choice is the serological group and type identification of streptococci. Unlike infections that are caused by direct action of streptococci, nonsuppurative, post streptococcal sequelae, are most commonly diagnosed indirectly by serological tests.

Disk diffusion method (by Kirby-Bauer principle) is a qualitative method. It is based on the principle of diffusion of antibiotics into the disk or tablets and inhibition of growth of bacteria. The principle of the test is based on the preparation of Mueller-Hinton or other substrates in order to seed the bacteria. The substrate is then seeded with previously prepared suspension of standard bacterial concentration (McFarland method), to which is then applied discs or tablets soaked by standardized amounts of the examined antibiotics, according to the adjusted and pre-agreed pattern. Then, the prepared substrate goes through the incubation period of 18 hours at 35-37 °C and the reading and interpretation of the findings. The finding is interpreted for the zone of inhibition of bacterial growth within the zone of disks or tablets. Diameter of the zone of inhibition of bacterial growth is measured in millimeters and then compared with known values for standard bacterial strains. If all conditions are standardized (inoculum size, substrate, temperature, time of incubation, the pH of the substrate), the resulting diameter or zones of bacterial growth inhibition for each antibiotic is interpreted as R-resistant (not suitable for therapy), S-susceptible (suitable for therapy) and I-low sensitive (intermediate, suitable for therapy at the site of secretion). Diffusion method has its limitations and benefits. It's simple, quick and with results that are interpretable (3).

Goal

The goal of this study is to examine and validate microbial diagnostic tests for etiological agent of tonsillopharyngitis in the study population and to examine antibiotic sensitivity/resistance of *Streptococcus pyogenes* to certain antimicrobial antimicrobial medications (Penicillin, Ceftriaxone, Cefuroxime and Erythromycin) using the disc diffusion method.

Material and methods

Material and methods

The study was conducted as prospective during six-month period of 2010 and 2011 and covered a total of 108 positive samples with isolated strains of *Streptococcus beta-haemolyticus* group A (*Streptococcus pyogenes*) tested in a Microbiological laboratory of the Institute of Public Health of the Sarajevo Canton.

Isolation and identification of *Streptococcus beta-haemolyticus* group A was performed using standard microbiological methods.

Swab samples were adequately placed on blood agar and incubated for 24-48h in an atmosphere with CO₂ (the pot with a candle) at 37 °C.

Processing of samples taken was made within the primary and secondary treatment. *Streptococcus pyogenes* was identified based on colony morphology, beta-hemolysis, bacitracin test and commercial agglutination test on plate using Slidex kit - Bio-Merieux for determination of group A.

The results of testing the sensitivity/resistance of the isolates were obtained using the standard interpretation of inhibition zone diameter. Data collection was performed by examining the medical records, then the data, after sorting, grouping, control and grouping were imported into the statistical software package SPSS 16.0. (Version 16.0, SPSS Inc., Chicago, Illinois, USA) where after defining the variables was made statistical analysis of data.

Results

The presence of *Streptococcus pyogenes* in the throat swab culture of outpatients was verified in 50.0% of males and 50.0% of female respondents. Table 1. Gender structure of the respondents

Gender	No. of respondents	Relative frequency (%)
Female	54	50.0%
Male	54	50.0%
Total	108	100.0%

The obtained results show that there was no antibiotic resistance of *Streptococcus pyogenes* on: Penicillin, Ceftriaxone, Cefuroxime and also in subjects of both genders with isolated *Streptococcus pyogenes* there was no antibiotic resistance to the first three antibiotics: Penicillin, Ceftriaxone and Cefuroxime.

Of the total sample (n=108), in 78 (72.2%) samples with isolated *Streptococcus pyogenes* is proven antibiotic sensitivity to Erythromycin, while in close to one third, or 30 (27.8%) samples/cases appeared antibiotic sensitivity of *Streptococcus pyogenes* isolates resistance to Erythromycin.

Discussion

It is known that upper respiratory tract infections, especially in the pediatric population, represent the most common reason for visiting a doctor. Although these infections are usually of viral origin, they are still the most common reason for prescribing antibiotics in outpatient conditions, which is again particularly pronounced in pediatric practice (4). In contrast to the high efficiency of treatment with Penicillin and other beta-lactams, in medical practice, there is more and more tendency the use of non-beta-lactam antibiotics, especially macrolides in the treatment of respiratory infections. There are many reasons that contribute to it. Hypersensitivity in patients on Peni-

cillin and Cephalosporin antibiotic use, real or assumed, is the most common reason why doctors choose treatment with non-beta-lactam agents. Practical impossibility of accurate microbiological diagnosis of respiratory infections, the following is an important reason in choosing the means to treat a broader spectrum of antimicrobial activity, which are effective against atypical respiratory infections. Factors of nonmedical nature are increasingly present in the treatment of streptococcal infections. It is, above all, the market positioning of certain drugs and echoes of the marketing activities of their developers on the awareness of doctors and patients.

Rational use of antibiotics in the treatment of infections of the upper respiratory tract of children is a strategic measure in the treatment of these diseases. Increasing resistance of the most common respiratory pathogens to standard antibiotics further points to the need for a rational approach to antibiotic treatment by doctors but also patient's responsibility (5).

Generally, the level of resistance in some areas correlates with the consumption of antimicrobials. Exceptionally, the spread of resistance to impact and other factors inherent in most hospital settings. Severity hospitalized patients and length of hospital stay and persistence in the systematic implementation of measures for the prevention of nosocomial infections, are decisive factors for the emergence of

Table 2. Sensitivity of *Streptococcus pyogenes* on tested antimicrobial medications

Antibiotic	Sensitivity		Resistance		Total	
	n	%	n	%	n	%
Penicillin	108	100.0%	0	0.0%	108	100.0%
Ceftriaxone	108	100.0%	0	0.0%	108	100.0%
Cefuroxime	108	100.0%	0	0.0%	108	100.0%
Erythromycin	78	72.2%	30	27.8%	108	100.0%

Table 3. *Streptococcus pyogenes* sensitivity to antibiotics according to gender

Antibiotic	Gender	Sensitivity		Resistance		Total	
		n	%	n	%	n	%
Penicillin	Female	54	100.0%	0	0.0%	54	100.0%
	Male	54	100.0%	0	0.0%	54	100.0%
Ceftriaxone	Female	54	100.0%	0	0.0%	54	100.0%
	Male	54	100.0%	0	0.0%	54	100.0%
Cefuroxime	Female	54	100.0%	0	0.0%	54	100.0%
	Male	54	100.0%	0	0.0%	54	100.0%
Erythromycin	Female	38	70.4%	16	29.6%	54	100.0%
	Male	40	74.1%	14	25.9%	54	100.0%

resistance (6). While about 10% of total consumption of antibiotics is related to the hospital and 90% of antibiotics are used in outpatient treatment (7). It is customary that all cases of pharyngitis and tonsillitis, without proving the cause, are treated with oral antibiotics. The use of antibiotic agents with no evidence of cause with oral administration, favoring the development of pathogen resistance to antimicrobial drugs, which were previously used as effective and reliable therapeutic agents.

In our study was identified a total of 108 isolates of beta-hemolytic group A streptococci from cultures of samples taken from the throats of patients with tonsillopharyngitis. Test results of antimicrobial susceptibility/resistance of *Streptococcus beta-haemolyticus* group A, which were isolated from samples of the throat (pharynx), show that the resistance of 27.8% was in case of Erythromycin, while the Penicillin, Cefuroxime and Ceftriaxone showed no resistance.

Sore throat is a disease that would usually self-heal. The symptoms disappear after 3 days in 40% of patients and after 7 days in 85% of patients (8). Drugs of choice are Penicillin based antibiotics. Due to the favorable pharmacokinetics of amoxicillin the same can be used as an alternative medicine, while in case of Penicillin allergy can be used newer macrolides, noting the relatively high resistance of BHS-A to macrolides. Cephalosporins can be used in case of Penicillin allergy with caution as an alternative drug, although new meta-analysis shows that cephalosporins are superior to Penicillin, experts prefer Penicillin due to the rationality, as due to the impact of the increasing resistance, also because of the cost (9). Therapy duration is usually 10 days for the eradication of streptococci from the pharynx and the prevention of rheumatic fever. Numerous studies show that a shorter duration of therapy is acceptable because of the good correlation between the microbiological findings and clinical recovery.

Empirical use of antibiotics is recommended in the following cases: in the presence of significant systemic symptoms associated with sore throat, unilateral peritonsillitis, information that a person has had rheumatic fever, in individuals with an increased risk of acute infection (diabetics and immunodeficient persons) (10). In streptococcal sore throat antibiotics can help prevent the spread of disease in a closed collective, but with this

goal they are not indicated for use in the general population. Tonsillectomy is highly recommended in cases of recurrent tonsillitis and if all of the following criteria are met: if a child has five or more inflamed tonsils a year, if symptoms are present for at least one year and episodes of sore throat affect the child's quality of life (10,11).

More and more is clearer the fact that the problem with unnecessary and inappropriate prescribing of antibiotics need to be directed towards further study of mutual relations between doctor-prescriber and patients-users, to enhance continuing education knowledge and skills on antimicrobial treatment, along with training in communication skills through specially designed programs, as is being implemented in some countries. Therefore, it is necessary to introduce a national program for control of resistance and gaining insight into the resistance of *Streptococcus pyogenes*.

Conclusions

The presence of *Streptococcus pyogenes* in the throat swab culture of outpatients were found in 50.0% of males and 50.0% of female respondents.

Test of the degree of sensitivity of *Streptococcus pyogenes* strains isolated from throat samples on Penicillin show no resistance.

The degree of sensitivity of *Streptococcus pyogenes* strains isolated from throat samples of Erythromycin showed resistance in 27.8% of cases.

It is necessary to organize the supervision of antimicrobial resistance of *Streptococcus pyogenes* and ensure implementation of guidelines in order to optimize treatment.

Antibiotic resistance of *Streptococcus pyogenes* is a public health problem and a significant clinical problem.

The results of our study confirm the importance of knowledge about antimicrobial susceptibility in assisting clinicians in the selection of drugs for empirical antimicrobial therapy.

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Influence of lifestyle habits and behaviours on quality of life during pregnancy

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Abstract

Introduction: It is well known that numerous habits can affect the quality of life.

Goal: The aim of the study was to assess the influence of different lifestyle habits of pregnant women on their quality of life during pregnancy.

Methods: Study involved every sixth women who gave birth in our Clinic during the year 2010. They filled in SF36 questionnaire, Beck's Depression Inventory, Fatigue Severity Scale, Pregnancy Symptom Scale, Multidimensional Personal Support Scale and Acceptance of Illness Scale. Information regarding habits such as smoking, drinking alcohol and doing sports and recreation were taken from all women.

Results: Study included 604 respondents. The correlation between smoking duration and depression was positive and significant ($p=0.042$). Depression and fatigue were significantly higher ($p=0.002$; $p=0.008$) in women who drank alcohol during pregnancy. Social support was significantly better for women who did sports ($p=0.044$). Depression ($p=0.001$), social support ($p=0.001$) and all SF36 scores ($p_{\text{PHC}}=0.028$; $p_{\text{MHC}}=0.017$; $p_{\text{TOL}}=0.013$) were significantly higher in women doing recreation during pregnancy. A significant model of impact on physical health, of all habits together, was made: $\text{PHC}=62.039+1.732 \times \text{SMOKING DURATION}$.

Conclusion: Pregnant women should continue with physical activities during pregnancy but quit smoking and drinking in order to ensure healthy pregnancy and good quality of life during pregnancy.

Key words: Lifestyle habits, quality of life, pregnancy.

Introduction

Numerous aspects of lifestyle can affect the course and outcome of pregnancy and especially influence the quality of life during pregnancy. Factors that are traditionally seen to reflect an unhealthy lifestyle are smoking, drinking alcohol and drug abuse (1). Nicotine and alcohol are legal drugs, which damage not only the health of the consumer, but also the society due to health-economic costs. It is well confirmed that cigarette smoking during pregnancy negatively affects unborn fetus (2). Alcohol use by women has a deteriorating effect on their health and lives, including reproductive function and pregnancy outcomes, which all can worsen their quality of life. Moreover, use of alcohol can be both the cause and the consequence of alcohol abuse (2). On the other hand, healthy lifestyle includes regular recreational or leisure-time physical activity which is a preferable behavior that should be incorporated by everyone, including pregnant women (3). Nevertheless, exposure to highly demanding physical activities during pregnancy might represent a threat to the health of both mother and fetus (3). There are few studies in literature that assess the influence of overall lifestyle factors on pregnant women, their offspring and particularly quality of life during pregnancy.

Goal

The aim of the study was to assess the influence of different lifestyle habits and behaviors of pregnant women on their quality of life during pregnancy.

Methods

Study involved all women who gave birth in the Clinic for Gynecology and Obstetrics Clinical Centre of Serbia during the year 2010. Inclusion criteria were: term singleton pregnancy, vaginal birth within last 12-24h, newborn's Apgar score >8, age >18 years, residence of Belgrade, speaking Serbian and signed informed consent. Exclusion criteria were: unfulfilling the inclusion criteria, rejecting to take part in the study and verified psychiatric disorders. Quality of life as well as lifestyle habits were investigated using questionnaires. Women were randomized by a simple manual randomization process which implied administration of questionnaires to every sixth women (4).

On the first postpartal day, respondents filled in SF36 questionnaire (Serbian translation), Beck's Depression Inventory (BDI), Fatigue Severity Scale (AISS), Pregnancy Symptom Scale (PSS), Multidimensional Personal Support Scale (MSPSS) and Acceptance of Illness Scale (AIS) (19). From these questionnaires composite scores for mental health (MHC), physical health (PHC), total quality of life (TQL), depression, fatigue, symptoms throughout pregnancy, social support and condition acceptance were calculated. The details and references of all used scales were described in our previously published results (4).

Data regarding habits such as smoking, drinking alcohol and doing sports or just recreation were taken from all women. Questions regarded the presence or absence of the habit, length, quantity and quality of examined behavior. Smokers were defined as women who reported regular smoking up to the time of completing the questionnaire. Ex smokers were women who completely quit smoking prior to pregnancy or upon finding out that they were pregnant (the end of the second gestational month). Non smokers were women who have never smoked. Alcohol consumption was determined by the type of alcoholic beverage (hard liquor, beer, wine, combination) and drug abuse by the frequency and type of drugs used (marijuana, cocaine, heroin etc.). Moderate recreational activities for pregnant women were walking, yoga or any other activity that does not cause significant increase in breathing or heart rate. As more demanding recreational activities we considered

aerobics, cycling, swimming or any other activity that causes noteworthy increase in breathing or heart rate. Training sports meant being a member of a sports club and going to sports competitions.

Statistical analysis: For general description of the examined groups we mostly used percents (%). Methods of analytical statistics, such as χ^2 test, Kruskal-Wallis ANOVA, Mann-Whitney and McNemar test, were used for determining differences between examined women regarding the investigated parameters. Furthermore, simple correlations and multiple linear regression were used to test the influence of habits, individual and all together, on scale scores. At the end binary logistic regression was applied to investigate the impact of all habits together on the level of depression and fatigue. The level of significance was 0.005 and of high significance 0.001. Obtained data were analyzed using the Statistical Package for the Social Sciences (SPSS) software (Advanced Statistics, version 17.0), Chicago, IL (4).

Results

There were 4572 women who delivered vaginally during the year 2010 in our Clinic. After randomization 762 pregnant women were involved in the study. Out of that number 158 had to be excluded due to not fulfilling inclusion criteria. Fifty four women rejected participating in the study. Consequently, the responses of 604 pregnant women underwent the final statistical analysis (4).

Smoking

There were highly significantly more women who were not smokers (53.6%), significantly less ex smokers (26.5%) and highly significantly less (19.9%) smokers ($\chi^2=116.079$; $p=0.000$). There were no significant differences ($p>0.05$) in either one of the examined scale scores between smoking categories: smoker, ex smoker, non smoker (Table 1).

Highly significantly more women did not smoke during pregnancy (80.1%) and less (19.9%) did ($\chi^2=219.364$; $p=0.000$). There were no significant differences ($p>0.05$) in values of either one of the examined scores regarding whether woman was smoking or not during pregnancy (Table 1).

Examined women smoked in average for 8.9 (1 to 20) years and 13.1 (2 to 40) cigarettes per day.

Table 1. Relationship of examined smoking aspects and investigated scale scores

Smoking/ Scales	Smoking Categories		Smoking during pregnancy		Smoking Duration		Smoking Amount	
	KW(χ^2)	p	Z	p	p	p	p	p
PHC	1.370	0.504	1.153	0.249	0.026	0.668	0.030	0.614
MHC	0.282	0.869	0.300	0.764	- 0.029	0.628	- 0.010	0.863
TQL	0.678	0.712	0.780	0.435	0.001	0.987	0.016	0.789
BDI	3.208	0.071	0.950	0.342	0.122	0.042	0.083	0.166
FSS	1.321	0.517	1.051	0.293	0.014	0.817	0.070	0.247
MSPSS	2.788	0.248	1.348	0.178	0.045	0.453	0.074	0.216
AIS	0.115	0.944	0.185	0.853	0.020	0.742	0.015	0.800
PSS	1.864	0.394	0.383	0.702	0.028	0.638	0.016	0.793

Table 2. Relationship of examined alcohol drinking aspects and investigated scale scores

Drinking/ Scales	Drinking during pregnancy		Drinking Frequency		Drinking Amount		Beverage Type	
	Z	p	KW(χ^2)	p	p	p	KW(χ^2)	p
PHC	0.762	0.446	2.934	0.231	0.085	0.685	2.314	0.510
MHC	1.363	0.173	0.935	0.627	0.252	0.225	1.211	0.750
TQL	1.176	0.240	2.207	0.332	0.210	0.313	1.606	0.658
BDI	3.066	0.002	0.027	0.987	0.063	0.766	0.039	0.998
FSS	2.652	0.008	1.275	0.529	0.305	0.139	1.270	0.736
MSPSS	0.626	0.531	3.111	0.211	- 0.049	0.817	1.122	0.772
AIS	0.174	0.862	3.240	0.198	- 0.154	0.464	2.546	0.467
PSS	2.348	0.019	0.519	0.771	0.110	0.600	1.491	0.684

The smoking duration was in positive correlation with scores of all tested scales, except with MHC where it was negative (Table 1). Only the correlation with BDI was significant.

The daily average of smoked cigarettes was in positive correlation with scores of all tested scales, except with MHC where it was negative (Table 1). However, none of the correlations were statistically significant.

Drinking alcohol

Highly significantly more (86.6%) women did not drink during pregnancy and less (13.4%) did ($\chi^2=323.450$; $p=0.000$). BDI and FSS were highly significantly higher while PSS was significantly lower in women who drank alcohol during pregnancy. There were no significant differences ($p>0.05$) in values of other of scores between women who drank alcohol or not during pregnancy (Table 2).

During pregnancy, highly significantly more women drank less often than once a month (61.8%), highly significantly less drank once a day (2.6%), while the frequency of women who drank once a month (22.4%) or once a week (13.2%) did not significantly differ from the expected

($\chi^2=167.928$; $p=0.000$). There were no significant differences ($p>0.05$) in neither one of the examined scale scores between drinking frequencies during pregnancy: every day, once a week, once per month, less than once per month (Table 2).

Examined women in average drank 2.0 (1 to 5) glasses of alcohol beverage per week. Number of alcohol glasses that women drank per week during pregnancy, was positively correlated with all scale scores except MSPSS and AIS (Table 2). Nevertheless, none of these correlations were statistically significant ($p>0.05$).

Highly significantly more pregnant women drank wine (65.4%), less both beer and wine (2.5%), while the frequency of women who drank only beer (32.1%) during pregnancy did not significantly differ from expected ($\chi^2=48.222$; $p=0.000$). There were no significant differences ($p>0.05$) in neither one of the examined scale scores between types of alcohol beverages (wine, beer, both) drank during pregnancy (Table 2).

Drug abuse

Only 8 patients used some kind of psychoactive substance prior to pregnancy ($\chi^2=572.424$; $p=0.000$).

Out of them 5 used only marihuana while the remaining also tried other drug types ($\chi^2=0.572$; $p=0.449$). The length of drug abuse did not significantly differ ($\chi^2=1.571$; $p=0.210$) between examined categories: less than a year, one, three or five years. None of the examined women used psychoactive substances during pregnancy ($\chi^2=602.002$; $p=0.000$). KS was significantly higher in patients who used drugs. There were no significant differences in values of other scores regarding whether woman was using drugs or not during pregnancy (MHC: $Z=0.979$; $p=0.328$; PHC: $Z=1.010$; $p=0.303$; TQL: $Z=1.026$; $p=0.305$; BDI: $Z=1.389$; $p=0.165$; FSS: $Z=2.520$; $p=0.012$; MSPSS: $Z=0.783$; $p=0.434$; AIS: $Z=0.655$; $p=0.512$; PSS: $Z=0.384$; $p=0.701$).

Sports

Highly significantly less women had been actively doing some sports (17.9%) during pregnancy and more (82.2%) did not ($\chi^2=249.245$; $p=0.000$). ZS was significantly higher in women who did sports during pregnancy. There were no significant differences in values of other scores regarding whether woman did sports or not during pregnancy (Table 3).

Examined women in average did sports for 7.2 (2 to 36) hours a week. Average time spent doing sports per week was in positive correlation with TQL, PHC, MHC, BDI and MSPSS and negative with FSS, AIS and PSS (MHC: $\rho=0.108$; $p=0.269$; PHC: $\rho=0.054$; $p=0.580$; TQL: $\rho=0.093$; $p=0.339$; BDI: $\rho=0.002$; $p=0.985$; FSS: $\rho=-0.125$; $p=0.200$; MSPSS: $\rho=0.195$; $p=0.044$; AIS: $\rho=-0.026$; $p=0.793$; PSS: $\rho=-0.100$; $p=0.307$). Only the correlation with MSPSS was statistically significant.

Recreation

Highly significantly more (72.0%) women did some type of recreation during pregnancy and less (28.0%) did not ($\chi^2=116.459$; $p=0.000$). BDI and MSPSS were highly significantly higher, while TQL, PHC and MHC were significantly higher in women doing recreation during pregnancy. There were no significant differences in values of other scores regarding whether woman did recreation or not during pregnancy (Table 3).

Significantly less women (43.5%) did light recreations such as walking or yoga while significantly more (56.5%) did physically more demanding activities like running, aerobics, cycling etc. ($\chi^2=7.226$; $p=0.007$). There were no significant differences in values of either one of examined scores regarding the type of recreation: light or more physically demanding (MHC: $Z=0.081$; $p=0.396$; PHC: $Z=0.464$; $p=0.643$; TQL: $Z=0.240$; $p=0.810$; BDI: $Z=1.397$; $p=0.162$; FSS: $Z=0.982$; $p=0.326$; MSPSS: $Z=1.927$; $p=0.054$; AIS: $Z=0.285$; $p=0.776$; PSS: $Z=0.298$; $p=0.765$).

Examined women in average spent 6.8 (1 to 30) hours per week in recreational activities. Average time spent per week doing recreation was positively correlated to TQL, PHC, MHC, BDI and AIS and negatively to FSS, MSPSS and PSS (MHC: $\rho=0.081$; $p=0.102$; PHC: $\rho=0.049$; $p=0.316$; TQL: $\rho=0.075$; $p=0.128$; BDI: $\rho=0.019$; $p=0.697$; FSS: $\rho=-0.012$; $p=0.808$; MSPSS: $\rho=-0.019$; $p=0.698$; AIS: $\rho=0.013$; $p=0.792$; PSS: $\rho=-0.033$; $p=0.510$). However, none of these correlations were statistically significant.

Parameters evaluated together

There were highly significantly ($\chi^2_{McN}=8.969$; $p=0.003$) more women who smoked but did not

Table 3. Differences in scale scores regarding doing sports and recreation

Activity / Scales	Sports		Recreation	
	Z	p	Z	p
PHC	1.126	0.260	2.193	0.028
MHC	0.793	0.428	2.390	0.017
TQL	0.956	0.339	2.491	0.013
BDI	1.910	0.056	3.294	0.001
FSS	0.778	0.437	0.278	0.774
MSPSS	2.719	0.007	3.270	0.001
AIS	1.055	0.291	1.313	0.189
PSS	1.193	0.233	0.887	0.375

Table 4. Differences in scale scores regarding multiple habits

Habits / Scales	Smoking and Drinking (both/neither)		Sport and Recreation (both/neither)	
	Z	p	Z	p
PHC	0.956	0.339	1.874	0.061
MHC	0.927	0.354	1.937	0.053
TQL	1.052	0.293	2.065	0.039
BDI	0.526	0.599	3.020	0.003
FSS	1.149	0.250	0.626	0.531
MSPSS	0.621	0.535	3.554	0.000
AIS	0.526	0.599	1.434	0.152
PSS	1.209	0.227	1.197	0.231

drink (100) and less those who did not smoke but drank (61) during pregnancy. Highly significantly ($\chi^2_{McN}=366.612$; $p=0.000$) less women smoked and drank (20) and more neither smoked nor drank (423) during pregnancy. Women who smoked and drank during pregnancy had higher values of BDI, FSS and PSS, while values of TQL, MHC, PHC, MSPSS and AIS were lower. However, none of the differences were significant (Table 4).

Frequency of women who did not do sports but did some sort of recreation (335) was highly significantly higher ($\chi^2_{McN}=24.119$; $p=0.000$) than frequency of those who did sports but not recreation (9). Frequency of women who did both sports and recreation (99) was highly significantly smaller ($\chi^2_{McN}=8.969$; $p=0.003$) than of those who did not do either sports or recreation (160). Women who did sports and recreation had higher values of TQL, PHC, MHC, BDI and MSPSS, while values of FSS, AIS and PSS were lower. Values of BDI and MSPSS were highly significantly higher, while TQL was significantly higher in women who did sports and recreation during pregnancy compared with those who did not (Table 4).

Patients habits such as smoking (number of cigarettes and length), drinking (number of glasses), doing sports or just recreation (hours spent per week) assessed together did not have significant influence on TQL ($R=0,335$; $\text{adj}R^2=0,025$; $F=1,293$; $p=0,289$) and MHC ($R=0,288$; $\text{adj}R^2=0,006$; $F=0,928$; $p=0,457$), but the duration of smoking has proven to be of significant ($p=0,042$) influence on PHC according to the Step wise method. So, the model was made:

$$\text{PHC} = 62,039 + 1,732 \times \text{SMOKING DURATION}$$

We also examined the influence of all habits (smoking, drinking, sport and recreation) together on depression, but the model was not significant ($\chi^2=6,101$; $p=0,296$). So, it can be said, that neither one of the examined parameters had influence on BDI ($b>0.05$). The model classification success was 98.2% and R^2 Nagelkerke 0,060.

When influence of all habits together on fatigue was assessed the model was not statistically significant ($\chi^2=5,514$; $p=0,356$). Neither one of the examined parameters had influence on FSS ($b>0.05$). The model classification success was 75.5% and R^2 Nagelkerke 0,014.

Discussion

Smoking prevalence is still high all over the world (5). Recent investigations in Serbia have shown that more than one third of women smoke in pregnancy, which makes this prevalence up to three times higher than in most of industrialized countries (6). Although most women successfully quit smoking upon pregnancy recognition, a large number continue smoking during pregnancy (7). Women more likely smoke if their partner is a smoker, have more friends who smoke and are frequently exposed to environmental tobacco (1). Smoking cessation is higher among older, wealthier and better educated women (7). In the examined population, although the majority of women did not smoke, up to 20% of pregnant women did smoke during pregnancy and only 26% quit smoking due to pregnancy.

According to the some surveys, women who successfully quit smoking have better psychological well-being, than those who smoke during pre-

gnancy (7). However, the fact that women smoked during pregnancy, did not have any influence on HRQL of women examined in this study. Moreover, even the number of cigarettes smoked was not significant. This can be due to the fact that examined women do not completely understand the negative effect of smoking on pregnancy, and therefore do not value it appropriately. Women who smoke feel satisfied with their lifestyle, even though it is unhealthy. This might be also a reason for a relatively small percent of women who have quit smoking due to pregnancy. Actions must be made to decrease percent of smokers.

Smoking can have negative effect on depression level (8). This was verified in our study. The longer women smoke the depression score is higher. Still, it should be taken into consideration that the relationship is bilateral, so smoking can be both consequence and result of depression. Further studies should investigate this correlation.

Finding that women who smoked for a longer period of time physically functioned better during pregnancy was unexpected. This can be explained by the fact that long-time smokers are used to feeling more fatigue due to smoking related relative hypoxia. They tend to contribute all physical symptoms, even those that are caused by pregnancy, to smoking so they complain less on pregnancy.

Many women use alcohol in the early stages of pregnancy before they are aware they are pregnant and some continue throughout pregnancy (9). According to literature data, 34% of women reported having at least one alcoholic drink during gestation and 17% reported binge drinking (10). Although most women think that they should not drink alcohol at all during pregnancy, up to 21.4% think that it is permissible if limited to 2 drinks per week. Although majority agrees that alcohol can affect the unborn child, 16.2% did not know that the disabilities could be lifelong (11). Although most examined women in our study did not drink alcohol, the percent that consumed alcohol during pregnancy was similar to mentioned studies. Moreover, 13% drank every week and 2% drank every day. There were some who did not even consider wine and beer as alcohol. This emphasizes receiving formal information from medical professionals regarding alcohol consumption during pregnancy.

The impact of women's mental health on alcohol use may be particularly important to consider (10). Symptoms of depression and anxiety are prevalent during pregnancy and may influence women's health behaviors and increase risk for binge drinking during pregnancy. Associations were found between both elevated symptoms of depression and anxiety at 18 weeks' gestation and binge drinking at 32 weeks' gestation (10). Results of our study also prove that drinking alcohol increases depression and fatigue. Quite interesting is the fact that women who drink complain less on the symptom of pregnancy. It can be assumed that once analgesic effect of alcohol is achieved women do not feel symptoms that much anymore.

Data have shown that alcohol intake did not have any influence on SF36 scores University students (12). Drinking alcohol also had no significant impact on HRQoL of pregnant women. Apparently the majority of people do not properly understand the harmful effects of consuming alcohol. Therefore, it is up to medical practitioners to educate them.

Heavy exposure to cocaine as well as opiates, alcohol, and marijuana is associated with adverse neurobehavioral effects of both mother and child (13). Fortunately in the examined population there were no women who used drugs during pregnancy.

According to other studies recreation during pregnancy has various positive effects on pregnancy (3). Regular physical activity is associated with improved physiological, metabolic and psychological parameters, and with reduced risk of morbidity and mortality of both mother and child. On the other hand sedentary lifestyle during pregnancy may contribute to the development of certain disorders such as hypertension, maternal and childhood obesity and diabetes (14). Moderate intensity aerobic exercise is safe in pregnancy and therefore recommended for improving the health and well-being during pregnancy. Practicing yoga enhances overall well-being and quality of life (15). If precaution is taken to avoid blunt trauma and in consultation with their medical advisers, even trained athletes may continue to exercise sports at a higher level during pregnancy (3). Swimming is considered by many to be an ideal sport for pregnant women (16). Examined women in our population were doing both lighter recreational activities like yoga as well as physically more demanding sports.

Pre-pregnancy exercise was the strongest predictor of regular exercise during pregnancy (17). However, substantial proportion of women stops exercising after they confirm pregnancy (18). Therefore, up to 60% are inactive during pregnancy and less than 11% were defined as regular exercisers in the third trimester (14). Our results also confirm a low percent of women who do sport or heavy exercise during pregnancy (18%). On the other hand, numerous examined women performed mild recreational activities before and throughout pregnancy.

Leisure time physical activity is associated with better general health perceptions, vitality, physical functioning, social functioning and fewer limitations due to physical health problems (19). Even in the absence of regular exercise, relatively small amounts of routine physical activity within a normal lifestyle or slight increases in fitness are associated with a better health-related quality of life and mood (20). Short termed associations were found for physical whereas longitudinal associations were observed for mental components of HRQL (20). We confirmed that women doing sports before and during pregnancy have better social support. This is understandable as people tend to find numerous friends, with whom they share the love for sports, on trainings. Despite this, no further associations were present for other HRQL aspect investigated in the study.

The available evidence suggests that inactivity is associated with worse mood, while exercise and physical activity have beneficial effects on depression symptoms that are comparable to those of antidepressant treatments (21, 22). The results of our study were opposite to these usual findings. Fatigue was higher in women who were doing recreation and that caused even some depression. However, TQL, PHC and MHC were significantly higher in women doing recreation during pregnancy. Some other studies have similar findings like our investigation. From the 1st to the 2nd pregnancy trimester, physical HRQL dimensions scores decreased and mental component increased (23).

Other studies have also investigated variables such as alcohol and tobacco consumption, amount of exercise taken, quality of life and number of medical conditions from which respondent suffered

(1). The results showed that quality of life has a stronger correlation to health than to lifestyle. So, in effort to improve quality of life, prevention could be more effective than approach focused only on reducing the harmful lifestyle factors (1). Our study also proves that parameters of lifestyle did not affect the quality of life during pregnancy significantly.

Conclusion

Regarding the study results it can be concluded that different lifestyle habits and behaviors do not affect health related quality of life during pregnancy appreciably. Doing sports gives pregnant women better social support as well as a better quality of life during pregnancy. But only mild physical activity, that does not make women fatigue, can be recommended. On the other hand, there is a positive correlation between depression and smoking duration as well as drinking during pregnancy. Therefore obstetrician/gynecologist should encourage patients to continue with physical activities during pregnancy and to ensure that women abandon smoking and drinking at least while being pregnant.

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First aid knowledge level of high school students from a town in the west of Turkey

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Abstract

Aim: The present study aimed to determine the first aid knowledge level of high school students taking education at Sivrihisar town center.

Methods: A questionnaire form prepared by the researchers in light of the related literature was used in the present cross-sectional study which was carried out on students taking education in high schools providing education and training in Sivrihisar town center. The questionnaire included 41 questions regarding the students' first aid knowledge level in addition to the sociodemographic characteristics of them. Each correct answer was scored as 1 point. The first aid knowledge level was evaluated on the basis of scores obtained from the answers to knowledge-based questions. The scores of the students were divided into two clusters by K-Means clustering, followed by ROC Analysis based on these cluster features. A score of 19.5 or above in ROC analysis was classified as "adequate knowledge" about first aid.

Results: The scores of the students from knowledge component of the questionnaire ranged from 0 to 38 points, the mean score was 22.13 ± 6.89 points and 70.3% (n=751) of the students had an adequate level of first aid knowledge. The first aid knowledge was significantly more adequate in girls than boys. There were no differences between the age groups; however the students in the 12th class, those from nuclear families, those with an adequate income level, and the students whose paternal education level was at the secondary school level or above had a more adequate knowledge level.

Conclusion: The present study determined a fairly adequate level of first aid knowledge among the students. To maintain this knowledge level and to give accurate first aid information at an earlier age, it would be appropriate to provide training on first aid in the schools.

Key words: First aid, knowledge, high school children, school health

Introduction

First aid is defined as providing a life saving intervention to an ill or injured person, before the arrival of healthcare professionals (1,2). Annually, thousands of people encounter or witness a medical emergency case. Because people in the scene (family members, friends, bystanders etc.) usually intervene in case of an emergency, everyone should know basic first aid procedures for such interventions (3,5).

Ten to fifty percent of the deaths due to injuries occur in the first 5-10 minutes (6). On the other hand, inappropriate first aid interventions can cause further injuries that can result in permanent neurological deficits. Due to the lack of first aid knowledge and skill, 90% of the complications and organ insufficiencies occur immediately after the injury (7). Whereas, an efficient and appropriate first aid intervention can increase the chance of treatment success and can reduce the risk of death by 20% (8).

The present study was carried out to determine the first aid knowledge level of high school students taking education at different high schools in Sivrihisar town center.

Materials and methods

A descriptive design study was carried out between 1 September to 28 October 2010 among students taking education in high schools providing education and training in Sivrihisar town center.

Sivrihisar is the largest town of the province of Eskisehir for number of inhabitants and it is about 100 km far from the city center. The majority of residents of the town center mainly earn living by agriculture and animal husbandary. According to the Turkiye Istatistik Kurumu (TUIK) (Turkish

Statistical Institute), the total population in Sivrihisar town center is 9733 with 4761 (48.9%) males and 4972 (51.1%) females based on 2009 data (9).

There are a total of 8 high schools that provide education and training in Sivrihisar town center: Sivrihisar Girls Vocational High School, Fahri Keskin Anatolian High School, Sivrihisar Industry-Vocational High School, Sivrihisar Trade High School, Sivrihisar Eğitim Vakfı Muzaffer Demir Anatolian High School, Imam Cleric High School, Nurbiye Gülerce Health Professional High School, Sidika State High School. According to the data obtained from Sivrihisar Town National Education Directorate, the total number of students taking education in high schools was 1381.

A questionnaire form was prepared by the researchers in light of the related literature (2,10-16). The questionnaire included 41 items regarding certain factors related to the first aid knowledge level (whether there is a first aid kit at the house, whether he/she applied first aid previously and whether he/she was trained in first aid procedures) in addition to sociodemographical characteristics (school, class, age, gender, family type, income level, social insurance, and educational level and employment status of parents).

Before the collection of data, requisite consents were obtained from Sivrihisar Town National Education Directorate. The high schools included to the study were visited, approval was obtained from the director of the school and the time of the interview was determined. At the time of interview, researchers went to the school and the high school officials gathered the students in a classroom. All students were informed about the aim of the study and how they complete the questionnaire form. After obtaining informed verbal consent, the questionnaire forms were given to each student and they completed the form within 30-35 minutes under supervision.

A total of 313 (7.2%) students who was not present at the school at the time of the interview and who did not accept to participate to study were not included. The study sample included a total of 1068 (92.8%) students; of them 486 (45.5%) were boys and 582 (54.5%) were girls.

Total income level of the family was recorded as "poor", "moderate" and "well" according to the student's self-report. The parents were classified as employed (worker, government employee, far-

mer, self-employed etc.) or unemployed (out of job, retired, housewife etc.).

A score for the questionnaire was derived from the students' answers to the 41 knowledge questions regarding the first aid. Each correct answer was scored as 1 point, yielding a potential range of 0 to 41.

The first aid knowledge level of the students was evaluated on the basis of scores obtained from the knowledge component of the questionnaire. The scores of the students were divided into two clusters by K-Means clustering, followed by ROC Analysis based on these cluster features. A score of 19.5 or above in ROC analysis was classified as "adequate knowledge" about first aid (17).

All data were analyzed by using different statistical computer software (SPSS 15.0 and Minitab 15.0). Chi-square test was used for the statistical analysis. A value of $p < 0.05$ was considered to be significant.

Results

Of the 1068 students comprising the study sample, 582 (54.5%) were girls and 486 (45.5%) were boys. The mean age of the entire sample was 15.77 ± 11 years (range, 13-22 years).

Of the sample, 249 (23.3%) students were taking education in Endüstri Meslek Lisesi, 202 (18.9%) in Fahri Keskin Anatolian High School, 157 (14.7%) in Girls Vocational High School, 142 (13.3%) in Sivrihisar Eğitim Vakfı Muzaffer Demir Anatolian High School, 100 (9.4%) in Sidika State High School, 96 (9.0%) in Trade High School, 66 (6.2%) in Nurbiye Gülerce Health Professional High School and 56 (5.2%) in Imam Cleric High School.

Three-hundred eighty-five (36.0%) students were in the 9th, 270 (25.3%) were in the 10th, 266 (24.9%) were in the 11th and 147 (13.8%) were in the 12th class.

While 849 (79.5%) students were nuclear family members, there were 219 (20.5%) students from patriarchal families.

Total income level of the family was reported to be poor, moderate and well by 81 (7.6%), 553 (51.8%) and 434 (40.6%) students, respectively. There were 75 (7.0%) students without social insurance.

The most correctly answered question (by 1011 students; 94.6%) was the "emergency call number for ambulance service is 112". On the other

hand, most wrongly answered question (by 207 students; 19.4%) was “Drinking salty ayran is an effective method in the case of liquefied petroleum gas (LPG) poisoning”.

The distribution of correct and wrong answers to the questions related to “basic first aid knowledge, basic life support and first aid interventions in the case of injuries or foreign body obstructions” are shown in Table 1a; to those related to “first aid interventions in the case of unconsciousness, burns-sunstroke-frostbites or fracture-luxation-sprain” are shown in Table 1b; and to those related to “first aid interventions in the case of animal-insect bites, poisoning or bleeding” are shown in Table 1c.

The first aid knowledge scores of the students comprising the study sample ranged between 0

and 38, with a mean score of 22.13 ± 6.89 . In the present study, 70.3% (n=751) of the students had an adequate level of first aid knowledge. The sociodemographical characteristics of the students who had an adequate level of first aid knowledge and of those who had not are shown in Table 2.

There were 733 (68.6%) versus 407 (38.1%) students whose maternal and paternal education level, respectively, was at the primary school level or below. Eighty-seven (8.3%) versus 884 (82.8%) students stated that their mothers and fathers, respectively, are employed. The educational level and employment status of the parents of students who have adequate or inadequate level of first aid knowledge are shown in Table 3.

Table 1a. Answers of the students to the questions related to basic first aid knowledge, basic life support and first aid interventions in the case of injuries or foreign body obstructions

Basic first aid knowledge	Correct	Wrong	Not sure
	n (%)	n (%)	n (%)
*First aid can only be provided by a healthcare professional.	130 (12.2)	796 (74.5)	142 (13.3)
Emergency call number for ambulance service is 112.	1011 (94.6)	34 (3.2)	23 (2.2)
*The primary goal of first aid should be treatment.	267 (25.0)	643 (60.2)	158 (14.8)
*In the case of motor vehicle accidents, the first thing to do is checking for fractures/luxations	347 (32.5)	456 (42.7)	265 (24.8)
Basic life support			
Cardiac massage must be given on a hard surface.	583 (54.6)	173 (16.2)	312 (29.2)
*Respiratory arrest can be determined by the lack of chest wall movements.	151 (14.2)	688 (64.4)	229 (21.4)
The airway is maintained by the maneuver head-tilt chin-lift.	430 (40.3)	188 (17.6)	450 (42.1)
Cardiac massage is performed with putting hand on lower 1/3 of the sternum.	597 (55.9)	291 (27.2)	180 (16.9)
*Cardiac massage is not given to a person with cardiac arrest or spinal fracture.	392 (36.7)	277 (25.9)	399 (37.4)
* Cardiac massage is not given to an unconsciousness person.	169 (15.8)	581 (54.4)	318 (29.8)
Whether heart works or not is determined by checking the pulse.	871 (81.6)	77 (7.2)	120 (11.2)
First aid interventions in the case of injuries or foreign body obstructions			
A person with a suspected neck fracture must not be moved.	881 (82.5)	64 (6.0)	223 (11.5)
A bead that is wedged in the ear canal must not be removed by anything.	759 (71.1)	114 (10.6)	195 (18.3)
A chickpea that is wedged in the nose must be tried to remove by blowing the nose.	361 (33.8)	370 (34.6)	337 (31.6)
When a coin was aspirated into the trachea, “Heimlich maneuver” should be attempted.	717 (67.1)	114 (10.7)	237 (22.2)
Contaminated wounds caused by sharp-penetrating objects must be cleaned with plenty of water and soap.	407 (38.1)	375 (35.1)	286 (26.8)
* If a knife is stuck in someone’s abdominal region, it must be pulled out immediately.	156 (14.6)	666 (62.4)	246 (23.0)

*The questions answered as “wrong” and scored as “1 points”.

Table 1b. Answers of the students to the questions related to first aid interventions in the case of unconsciousness, burns-sunstroke-frostbites or fracture-luxation-sprain.

Unconsciousness	Correct	Wrong	Not sure
	n (%)	n (%)	n (%)
An unconscious person must be laid on his/her back and his/her head should be turned aside.	327 (30.6)	185 (17.3)	556 (52.1)
*In order to arouse a person having an epileptic seizure onion should be smelled him/her.	235 (22.0)	277 (25.9)	556 (52.1)
In children having convulsion caused by high fever, the first thing to do is to drop the fever.	792 (74.2)	87 (8.1)	189 (17.7)
Burns-sunstroke-frostbites			
When boiling water spilled on a child's arm, the burned arm must be put under cold water.	619 (57.9)	225 (21.1)	224 (21.0)
*Toothpaste or yogurt must be applied to the skin when hands are burned from touching a hot stove.	360 (33.7)	428 (40.1)	280 (26.2)
In the event of sunstroke, the person must be moved in a cool place.	686 (64.2)	116 (10.9)	266 (24.9)
A plenty of fluids must be given to the person with sunstroke.	589 (55.2)	107 (10.0)	372 (34.8)
*Analgesic ointments must be applied to the frozen region of the person who has frostbite on his/her nose.	188 (17.6)	393 (36.8)	487 (45.6)
Fracture-luxation-sprain			
The fractured arm of a person must not be moved.	853 (79.8)	84 (7.9)	131 (12.3)
*A person with a suspicious fracture or luxation must be taken to a bonesetter.	207 (19.4)	738 (69.1)	123 (11.5)
*A hot towel must be placed over the sprained-strained region.	334 (31.3)	265 (24.8)	469 (43.9)

* The questions answered as "wrong" and scored as "1 points".

Table 1c. Answers of the students to the questions related to first aid interventions in the case of animal-insect bites, poisoning or bleeding

Animal-insect bites	Correct	Wrong	Not sure
	n (%)	n (%)	n (%)
A dog bite wound must be immediately washed and cleaned with plenty of water and soap.	394 (36.9)	313 (29.3)	361 (33.8)
A snakebite wound must be bled out.	735 (68.8)	99 (9.3)	234 (21.9)
*Yogurt should be applied to the bee sting area.	606 (56.7)	219 (20.5)	243 (22.8)
In the case of tick bite, one must not do anything and the person must be taken immediately to a healthcare facility.	869 (81.4)	82 (7.6)	117 (11.0)
Poisoning			
*If a person ingested bleach, he/she must be vomited.	459 (43.0)	250 (23.4)	359 (33.6)
In the case of poisoning from gas water heater or from any other gases, the person should be moved quickly into an area with clean air.	805 (75.4)	75 (7.0)	188 (17.6)
*It is an effective method to make the person poisoned from LPG to drink ayran.	349 (32.7)	207 (19.4)	512 (47.9)
In the case of drug poisoning, the person must be taken to the healthcare facility with the drug packages.	769 (72.0)	108 (10.1)	191 (17.9)
Bleeding			
To stop the nosebleeds, one must keep the nose squeezed for about 5 minutes.	523 (49.0)	163 (15.3)	382 (35.7)
In the case of bleeding, the first thing to do is to compress the bleeding area.	613 (57.4)	118 (11.0)	337 (31.6)
Applying compression to great vessels can stop the bleeding.	403 (37.7)	179 (16.8)	486 (45.5)
A tourniquet can be used when the bleeding was not stopped at all.	628 (58.8)	114 (10.7)	326 (30.5)
*A copper wire or cable must be used as tourniquet.	150 (14.1)	530 (49.6)	388 (36.3)

* The questions answered as "wrong" and scored as "1 points".

Table 2. The sociodemographical characteristics of the student who had an adequate level of first aid knowledge and of those who had not

Sociodemographics	First aid knowledge level			Statistical analysis
	Inadequate n (%)*	Adequate n (%)*	Total n (%)**	X ² ; p value
Gender				
Boy	198 (40.7)	288 (59.3)	486 (45.5)	52.260; 0.000
Girl	119 (20.4)	463 (79.6)	582 (54.5)	
Age group				
14 and below	41 (34.2)	79 (65.8)	120 (11.2)	4.879; 0.181
15	112 (30.5)	69.5)	367 (34.4)	
16	90 (31.6)	195 (68.4)	285 (26.7)	
17 and over	74 (25.0)	222 (75.0)	296 (27.7)	
School type				
Girls Vocational High School	52 (33.1)	105 (66.9)	157 (14.7)	135.845; 0.000
Fahri Keskin Anatolian High school	20 (9.9)	182 (90.1)	202 (18.9)	
Industry-Vocational High School	134 (53.8)	115 (46.2)	249 (23.3)	
Trade High School	29 (30.2)	67 (69.8)	96 (9.0)	
Anatolian High School	18 (12.7)	124 (87.3)	142 (13.3)	
Imam-Cleric High School	22 (39.3)	34 (60.7)	56 (5.2)	
Health Professional High School	11 (16.7)	55 (83.3)	66 (6.2)	
Sidika State High School	31 (31.0)	69 (69.0)	100 (9.4)	
Class				
9	123 (31.9)	262 (68.1)	385 (36.0)	13.242; 0.004
10	91 (33.7)	179 (66.3)	270 (25.3)	
11	77 (28.9)	189 (71.1)	266 (24.9)	
12	26 (17.7)	121 (82.3)	147 (13.8)	
Family type				
Nuclear	239 (28.2)	610 (71.8)	849 (79.5)	4.649; 0.031
Patriarchal	78 (35.6)	141 (64.4)	219 (20.5)	
Family income status				
Poor	105 (24.2)	329 (75.8)	434 (40.6)	27.726; 0.000
Moderate	169 (30.6)	384 (69.4)	553 (51.8)	
Well	43 (53.1)	38 (46.9)	81 (7.6)	
Health insurance status				
Insured	292 (29.4)	701 (70.6)	993 (93.0)	0.344; 0.557
Uninsured	25 (33.3)	50 (66.7)	75 (7.0)	
Total	317 (29.7)	751 (70.3)	1068 (100.0)	

*Percent for the row.

**Percent for the column.

Of the students comprising the study sample, 923 (86.4%) had got information about first aid from any source previously, 222 (20.8%) had provided first aid to someone, 591 (55.3%) had watched first aid to someone and 297 (27.8%) had a first aid kit at the house. Certain factors related to the first aid knowledge level in students who have adequate or inadequate level of first aid knowledge are shown in Table 4.

Discussion

In the present study, 70.3% of the students had an adequate level of first aid knowledge. In a Kuwaiti study that assessed the dental first aid knowledge level of school children, the authors reported that 75% of children over the age of 10 had an adequate level of general first aid knowledge (18). Another Kuwaiti study conducted on university

Table 3. The educational level and employment status of the parents of students who have adequate or inadequate level of first aid knowledge

Educational level and employment status of the parents	First aid knowledge level			Statistical analysis
	Adequate n (%)*	Inadequate n (%)*	Total n (%)**	X ² ; p value
Mother's educational level				
Primary school or below	223 (30.4)	510 (69.6)	733 (68.6)	0.615; 0.433
Secondary school or over	94 (28.1)	241 (71.9)	335 (31.4)	
Father's educational level				
Primary school or below	137 (33.7)	270 (66.3)	407 (38.1)	4.989; 0.026
Secondary school or over	180 (27.2)	481 (72.8)	661 (61.9)	
Mother's employment status				
Unemployed	292 (29.8)	687 (70.2)	979 (91.7)	0.118; 0.731
Employed	25 (28.1)	64 (71.9)	89 (8.3)	
Father's employment status				
Unemployed	58 (31.5)	126 (68.5)	184 (17.2)	0.361; 0.548
Employed	259 (29.3)	625 (70.7)	884 (82.8)	
Total	317 (29.7)	751 (70.3)	1068 (100.0)	

*Percent for the row.

**Percent for the column.

Table 4. Certain factors related to the first aid knowledge level in students who have adequate or inadequate level of first aid knowledge

Factors related to the first aid knowledge level	First aid knowledge level			Statistical analysis
	Inadequate n (%)*	Adequate n (%)*	Total n (%)**	X ² ; p value
The status of getting information about first aid from any source previously				
No	73 (50.3)	72 (49.7)	145 (13.6)	34.322; 0.000
Yes	244 (26.4)	679 (73.6)	923 (86.4)	
The status of providing first aid to someone previously				
No	254 (30.0)	592 (70.0)	846 (79.2)	0.228; 0.633
Yes	63 (28.4)	159 (71.6)	222 (20.8)	
The status of watching first aid to someone				
No	159 (33.3)	318 (66.7)	477 (44.7)	5.507; 0.019
Yes	158 (26.7)	433 (73.3)	591 (55.3)	
The status of having a first aid kit at the house				
No	222 (28.8)	549 (71.2)	771 (72.2)	1.047; 0.306
Yes	95 (32.0)	202 (68.0)	297 (27.8)	
Total	317 (29.7)	751 (70.3)	1068 (100.0)	

*Percent for the row.

**Percent for the column.

students reported 121 (21.5%) students to have inadequate knowledge, 387 (68.8%) to have an average knowledge and 54 (9.6%) to have adequate knowledge (19). In the study from Karachi, the mean number of correct answers for whole sample was found to be 8.8 ± 3.92 , with a maximum possible score of 22 (20). In order to decrease

the early mortality and morbidity associated with emergencies, first aid training programs should be given at school and college levels (20).

In the present study, knowledge level scores of female students were significantly higher than that of males ($p < 0.05$). Although no difference was found between male and female high-school

students in New Zealand (15), females had higher mean knowledge scores than males in studies from Kuwait and Pakistan (19,20). The higher knowledge level found in the present study might be due to the fact that female students are more curious, more inquisitive and they read more than males in general. Accordingly, in the New Zealand study, female students were more interested in learning more about first aid than males (15).

There were no significant difference in first aid knowledge level scores between the age groups ($p>0.05$). In the Kuwaiti study conducted on school-children, the knowledge level of the young students was higher (18). However, no first aid lessons were integrated in the syllabus in any of the schools in the present study, which could explain why we find no difference when comparing the age groups. In a study on primary school students from the 6th and 8th classes in the city of Ankara, it was reported that first aid knowledge score was increased due to increasing hours of the "Traffic and First Aid" lesson when the lesson was given in the higher classes (19,21).

With regard to the adequacy level of first aid knowledge, advanced chi-square analysis showed no difference between the students from Fahri Keskin Anatolian High School, Sivrihisar Eğitim Vakfı Muzaffer Demir Anatolian High School and Nurbıye Gülerce Health Professional High School and between the students from Sivrihisar Girls Vocational High School, Sivrihisar Trade High School, Imam-Cleric High School and Sidika State High School. On the other hand, the students from Fahri Keskin Anatolian High School, Sivrihisar Eğitim Vakfı Muzaffer Demir Anatolian High School and Nurbıye Gülerce Health Professional High School had significantly higher level of first aid knowledge compared to those from other schools and the students from Sivrihisar Industry-Vocational High School had significantly lower level of first aid knowledge compared to those from other schools ($p<0.05$). These results may be attributed to the better socioeconomic status and higher parental education level of students taking education at the Anatolian High Schools and to the fact that students from Health Professional High School are already taking lessons about first aid.

In the present study, the 12th class students had a higher level of first aid knowledge than those from

other classes ($p<0.05$). Although we found no association with the age, the higher knowledge level in the students from 12th class possibly reflects the increased attention to certain topics among these students who are making the choice of their profession. In a study on primary school students from the 6th and 8th classes in the city of Ankara, it was reported that first aid knowledge score was increased due to increasing hours of the "Traffic and First Aid" lesson when the lesson was given in the higher classes. Another study on university students from Pakistan also emphasized that the mean knowledge level score of the students from 2nd class was higher than that of those from 1st class (20,21).

The first aid knowledge was more adequate among students from nuclear families compared to those from patriarchal families ($p<0.05$). This finding can be attributed to the low number of family members as well as to the relative easiness of sharing health knowledge and interest between parents and children in nuclear families.

The adequacy level of students' first aid knowledge increased with the increasing family income level ($p<0.05$). Income level is also a major determinant of the socioeconomic status, as is family type. Therefore, children with a relatively high family income level can also acquire knowledge more easily, which is possibly reflected as a higher level of knowledge in the present study.

There were no difference in the adequacy of first aid knowledge between students with and without social insurance ($p>0.05$). Social insurance allows easy access to healthcare services and when the easiness of accessing healthcare services increases, knowledge also can be acquired more easily. If we had found a difference, it could be attributed to the easy access to healthcare services in the presence of social insurance.

There were no differences in the level of first aid knowledge between students whose maternal education level was at the primary school level or below and those at the secondary school level or above ($p>0.05$). Many socioeconomic factors such as income, occupation, education and social status are known to affect the health and disease perception and attitude of individuals. In particular, maternal education level is suggested to affect children's attitudes to a healthy lifestyle and to improve their health status (22).

The first aid knowledge was more adequate in students whose paternal education level was at the secondary school level or above than those at primary school level or below ($p < 0.05$). In rural areas, the income of the family is generally derived from fathers' work and the socioeconomic level is determined by the paternal education level and occupation. Maternal educational level is usually low in families living in rural areas. Likewise, it was at the primary school level or below in 68.2% of students in the present study. Thus, paternal educational level was suggested to take over the maternal educational level.

There were no differences in the level of first aid knowledge between the students whose parents are employed or unemployed ($p > 0.05$ for both), which could be resulted from the low number of students whose fathers are unemployed.

The first aid knowledge was significantly more adequate in students who had got information about first aid from any source previously than those who had not ($p < 0.05$). Although the study conducted on the students from Police College reported no difference in the knowledge level between students who had got first aid information and those who had not got (13), the knowledge level among college students from Kuwait were found to be higher in those who had attended a first aid course (19). Similarly, the knowledge level scores of the students with first aid training were higher than those without first aid training in the study carried out at Karachi (20).

On the other hand, adequate level of first aid knowledge was not different between students who had provided first aid to someone previously and those who had not ($p > 0.05$). In a Zurich study comparing medical students with others, a higher knowledge level was found for those who had previous experience with first aid (getting information, providing first aid to someone or watching a first aid intervention) (23). Similarly, although the knowledge level was not different between students who had provided first aid to someone and those who had not, there was a significant difference between students who had watched a first aid intervention and those who had not. It might be more memorable to watch a first aid provided by professionals (healthcare professional, police, teacher etc.).

The first aid knowledge was more adequate in students who had watched a first aid intervention than those who had not ($p < 0.05$). It might be resulted from that this intervention was taught by a healthcare professional and it is not only a theoretical knowledge but also includes visual information. Accordingly, in a study conducted on housewives from Eskisehir, the first aid knowledge was more adequate in those who had watched a first aid intervention (24).

No difference was observed in the adequacy of first aid knowledge level between the students who have a first aid kit at the house and those who do not ($p > 0.05$). Educational level of the mother who constitutes the conditions of house is one of the factors that determine the importance of first aid kit; and the first aid knowledge level of students whose maternal education level was high was not different from those whose maternal education level was low. It is possible that we did not find any association between the presence of a first aid kit at the house and the adequacy of first aid knowledge level as a result of this finding. In the study conducted on housewives from Eskisehir, the knowledge was more adequate in those who have a first aid kit at the house (24). Information about the content of first aid kit is as important as the presence of it. In the study conducted on the students from Police College, it was reported that majority of them did not know the necessary items that should be present in the first aid kit (13). The importance of having a first aid kit at the house and the items that should be present in the first aid kit must be stressed in the training courses.

Conclusion and Suggestions

The percentage of students who have an adequate level of first aid knowledge was 70.3%. The knowledge was more adequate in students who had got information about first aid than those who had not. The results of the present study suggest that school lessons that include first aid training will be beneficial.

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The frequency and several effective factors on baby blues

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Abstract

Introduction: Baby blues is a transitory phenomenon of mood changes that may begin within 1-5 days after delivery and last from 1 day through twist week postpartum. It is reported in 50-80% of puerperal women and is a high risk condition for postpartum depression. The aim of this research is determining frequency and several effective factors on baby blues.

Method: In this study with 450 participations, Beck test and part of structured questionnaire completed in third trimester when prenatal visit and rest of it filled in first day after postpartum. Also Stein test was completed in 1,5,10 postpartum days.

Result: The prevalence of baby blues was 55/3%. The predictor factors of baby blue include economic status, parity, past admission in pregnancy, unwanted pregnancy, and mode of delivery, antenatal mood disorder and time of skin to skin contact.

Conclusion: The prevalence of baby blues was 55/3%. There were significant relation between baby blues and some of individual, obstetrical factors. Obstetricians and midwives have to consider it in strategies for prevention and management of postpartum depression.

Key words: Baby blues, postpartum depression, risk factor.

Introduction

There are some stages in during of life of any woman that effect on her life deeply, such as pregnancy and after that which accompanies with very important psychological and physiological changes (1). In fact, pregnancy and after childbirth has been known as times that cause mood

damages (2). The postpartum period is rapturous and stressful time because of birth of newborn and on the other hand due to physical, social and emotional variations, Women may be embroiled mood changes in this period (3).

The woman experiences highest amount of stress in the duration of after childbirth especially in the first month that psychological disorders are 18 times more current than pregnancy period and the stress due to birth of first child has been categorized as severe stresses in psycho-social stress tables and the mother needs to protection for spending these periods healthy (4). Mood disorders after childbirth cause functional and emotional disturbance and they can influence family depend on severity of problem (5).

"Baby Blues" is the most current mood disorder after childbirth that has outbreak from 30 to 85% and first time was explained by Lean and Polatin in 1950(6). Scientists represented "Baby Blues" as disturbed illness that occurs at the first 10 days of childbirth (5) and recommends the first weeks after childbirth as crisis for mothers and also he knows Baby Blues as the source of anxiety for mothers who need to learn new skills and its signs are transient mood, insomnia, confused and forget ness, exhaustion, worry, anxiety, lack of appetite and therefore he assumes it as a pathological problem (7).

The real reason of this disorder have been known yet but many Scientifics believe that a set of psychological ,endocrine and obstetrics' factors can be discussed as probable factors of mood disorders (8).

In the field of reasons and factors related to this disorder, it is related to quick endocrine changes, mental inconsistency after childbirth, perception and anxiety of increasing responsibility and

acceptance of motherhood role, worry of how protect of child, previous history of depression, lack of social protection, suspicion toward married life and hard childbirth (6,9,10). Recognition and protection of women who are in the risk of baby blues is an important and necessary matter because 20% of them would suffer from postpartum depression due to insufficient support (11, 12).

Few study proved that baby blues can effects on depression after one year of childbirth and moreover this disorder has bad effects on motherhood interest (13). And mothers who are suffered baby blues don't wish to lactate to their newborns until first week of birth (14). While the researches show that lactating at first and second days of birth is the effective factor on the period of lactating (4). Baby blues can cause privation of exclusive breastfeeding and its profits on growth and development, promotion immunity and mental useful effects in newborns.

In the survey of women with baby blues found out that they didn't wish to protect their newborns and moreover they had problems in establishing contact with their husbands (12). Lack of interest to care of newborn can be derived from her anxiety in accepting the new motherhood role, lactating and protecting of newborn. As a result it can cause that mother keeps away from her newborn and this defective cycle can be continued due to lack of sufficient education and protection, because 10.8% of mothers experienced baby blues more than a week (15).

Therefore in attention to the prevalence of baby blues, this phenomenon can lead to postpartum depression and occasionally can lead to suicide or killing the newborn by mothers. Identifying the factors that can be helpful in forecasting and recognizing this phenomenon is very important and it can be as an effective step in increasing mother's health.

Materials and methods

For 1 year, all pregnant women (481) who carried out prenatal care and delivered in Imam Ali hospital in Amol city were recruited for study. Study participations were arbitrary and they were sure that their information's will be secret. Pregnant women recruited on the third trimester and aims and procedure of the study had been explained for participations. 31 women were excluded from study. 16 parti-

cipants delivered in another hospital and 15 of them were excluded due to loss of follow up and have exclusion criteria. Exclusion criteria were birth of dead newborn, birth of the newborn with congenital malformations, birth of the newborn needs to intensive care, recognized psychological illness in mother, death of first grade family at 6 months ago, usage of alcohol and cigarette by mother.

Testing procedure

Pregnant women were first assessed with Beck test for to determine antenatal mood disorder in the third trimester at prenatal care visit then questionnaire containing demographic (age, marriage age, education level, home status, occupation, satisfaction of economic status), psycho-social factors (matrimony involvement, domestic protection, relation quality with husband family and woman feelings toward her husband) and factors related to pregnancy (history of abortion, stillbirth, and infertility unwanted pregnancy, parity, hospital admission during current pregnancy) fulfilled. Information's about childbirth and baby (method of delivery, length of labor, time of delivery, satisfaction of midwives and obstetrician, fear of pregnancy and delivery, gender of newborn, baby's weight, time of first skinny contact) completed at first day postpartum on their medical records and interview.

The mothers completed either translated Persian version the Stein test in the first, fifth or tenth postpartum days. Stein test is a special scale for measuring baby blues that study 13 symptoms. According to Stein scale the minimum score is zero and the maximum one is 26. The women whose scores were equal or more than 8 on Stein scale in at least one day after childbirth, were classified as cases of baby blues. The symptoms include depression, anxiety, calmness, restlessness, dreaming, exhaustion, headache, poor concentration, irritability, forgetfulness, and confusion. Scores of each item is 0, 1, and 2 (15). Because most studies have shown that baby blues start from first postpartum day, peak of baby blues is fifth day, and it remit tenth day, in this study baby blues was assessed in 1, 5, and 10 days after delivery. Baby blues was completed at postpartum ward in first day and because mothers were discharged 2 days after childbirth, we carried out telephone interview in 5 and 10th postpartum days for Stein test completion.

Results

Data showed that the mean of women's age was 23.78 ± 0.23 . 5.8% of women were occupying and rests of them were housekeeper. The average of their marriage age was 18.96 ± 0.91 and 56.4% had secondary school education.

Prevalence of the "baby blues" was 55.3% and its frequency at the first, fifth and tenth day was 30%, 34.4% and 11.3% respectively. Average score of baby blues at the first day 5.59 ± 0.19 , fifth day 5.86 ± 0.21 and tenth day was 2.43 ± 0.17 . The results show that 63% of mothers for one day, 27% of women for 2 days and 6% of them for 3 days suffered from "baby blues" disorder. Moreover the most current signs after childbirth at the first, fifth and tenth days were exhaustion, depression and anxiety respectively.

There wasn't any meaningful relationship between demographic characteristics and baby blues. Baby blues didn't show any meaningful relationship with psycho-social factors such as matrimony involvement, domestic protection, relation quality with husband family and woman feelings toward her husband.

The results showed that risk factors significantly with baby blues were unwanted pregnancy ($p=0.05$), private home ($p=0.05$), satisfaction of economic status ($p=0.00$), antenatal mood disorder ($p=0.00$), parity ($p=0.02$), past admission in duration of pregnancy ($p=0.01$), and the time of first skinny contact ($p=0.01$).

Surveying this disorder and factors related to pregnancy and childbirth denoted that the method of delivery effect on baby blues. Of course comparison between N.V.D and elective surgery childbirth didn't have meaningful difference but there was a difference between emergency surgery and any way of N.V.D and elective surgery childbirth (table 1).

Discussion

Prevalence of the "baby blues" was 55.3% at the study and the maximum of mean score was shown at fifth day and the minimum at tenth day. Also in Japan (4), Greece (14), Hong Kong (16), and in England (17) reported baby blues as 33.7%, 44.5%, 44.3% and 76% respectively. In the most studies, the rate of baby blues was about 40% to 60% (17). The difference in frequency baby blues in various countries proved this fact that baby blues is a phenomenon depended to culture. On the other hand, difference in method and instrument for measuring baby blues are another reasons for it. Some depression scales, such as the Zung Self Rating Depression scale, Beck Depressive Inventory, and Edinburgh Postnatal Depression Scale were used in some studies to determine baby blues, but there are 3 specifically scale for measuring the blues that include Pitt's Blues Rating Scale, Kennelly's Blues Questionnaire and the Stein test. Out of the 3, the baby blues is the most widely accepted across cultures (15). This phenomenon usually starts from 1 to 5 days after childbirth and maximizes at 4th or 5th day (7). It was proved that highest point of baby blues is 4 days after childbirth that at this time endocrine changes have highest level (17). Our findings showed a peaking on day 5. This is consistent with other studies.

There is a significant relationship between baby blues and unwanted pregnancy. In studies argued that unwanted pregnancy and lack of positive acceptance by mother related to baby blues and intensification of psychological signs (6,15). Ross and et al. found out that 50% of women who suffered from baby blues involved psychological problems in the duration of pregnancy and or trapped unwanted pregnancy and they hadn't positive acceptance from their pregnancy (8).

Baby blues was higher in mothers who didn't satisfy from their economic position. Max recommended the revenue below 40 thousands dollars as the

Table 1. Comparison method of delivery on baby blues

Groups Method Delivery	BB (%)	NBB (%)	p.Value
NVD ³ (1)	119(54.7)	129(51.8)	P(1,2)=0/27
Elective CS (2)	71(35.3)	66(26.5)	P(2,3)=0/001
Emergency CS (3)	20(10)	54(21.7)	P(1,3)=0/0004

1. BB: baby blues 2.NBB: non baby blues 3. NVD: normal vaginal delivery

other factors that lead to depression after childbirth (18). The newborn accounts as an economic burden for his/her parents and leads to difficult circumstances and places parents in a stressful position. Professional occupations have known effect on economic situation in family. In this study, 53.4% of husbands in baby blues group have official occupations. As a result, if official occupations didn't effect on baby blues directly, it could effect on family's economics. Anton found out that low social class and informal occupations are the important factors on baby blues (19).

In our findings Mothers, who lived separate from her or her husband's family, suffered from this disorder less. In some studies quality of couple's relationship and husband protection are other factors that effect on baby blues. Maybe separating from parents can reduce their interference and improve couple's relation.

Method of delivery and parity were effective on baby blues. In a study, cesarean was represented as the risk factor for BABY BLUES and believed that surgery stress is added to endocrine changes and psycho-social factors that effect on baby blues. According to it, anxiety and stress at childbirth are strong factors on baby blues (14). Also Hannah knew the surgery as important criteria on baby blues. According to Hannah's findings, there is a relationship between score of baby blues scale and stressful childbirth (20). It must be said that merely the kind of delivery don't lead to baby blues, maybe amount stress of childbirth is more effective. Few studies resulted that baby blues is more likely in primary pare women in comparison to multi pare women. (21,22). It seem inexperience primary pare mothers in protect infant and anxiety in acceptance new role as mother can influence on appearance of baby blues.

The most current reasons for hospitalizing mothers in study in duration of pregnancy were hyper emesis gravid arum and pyelonephritis. Some studies proved stress and lack of healthy mental in women with past history of hospitalization. Some medical problems such as severe infection, anemia and electrolytic imbalance had meaningful relation with developing mood disorders after childbirth. Prior history of hospitalization in duration of pregnancy as a predictive factor in developing the baby blues (15,21).

The time of first skinny contact between mother and newborn has a relation with suffering to baby blues. The earlier contact is the more effective on reducing phenomenon. Researches shown that the skinny contact is effective on motherhood behavior and feelings and it causes increasing willing to protect the newborn (23,24,4).some authors believed that the skinny contact between mother and infant reduced baby blues and when scores of baby blues is greater, attachment behaviors could be weaker and the anxiety increased (14,24, 25).

Researchers showed anxiety and depression during pregnancy have been introduced as an important risk factor for postpartum blues (14). And also poor emotional condition during pregnancy is associated with negative mood postpartum period (26). Adewuya resulted mood changes during pregnancy can affect mood of person in the postpartum period (15). Ian Broking ton also represented a history of psychiatric illness during pregnancy, stress during pregnancy and history neurotic disorders are effective in the incidence of postpartum blues (6).

Conclusion

In the light of results of the research and high prevalence of baby blues is suggested that with the contribution of hygienic employees especially midwives for identifying mothers who are in risk and protecting them and perfect education to mothers and family, we will increase health and mental hygiene level women and society.

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Differences in work motivation and job satisfaction between physicians and nurses

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Abstract

The aim of this study was to examine if there was a difference in job satisfaction and work motivation between physicians and nurses in the region of Central Serbia. This cross-sectional study was conducted in Central Serbia in 2010/2011. Physicians and nurses from three Health Centers and one General Hospital were included. All health facilities were randomly selected. Data collection was performed by anonymous questionnaires. In statistical analysis χ^2 , Student t-test, and Spearman's correlation coefficient test were used. The study included 226 physicians and 606 nurses. In relation to nurses, physicians were significantly more motivated by the following factors: achieving goals of the health facility (77.4% vs. 59.4%), recognition for good work performance (70.8% vs. 54.4%), good interpersonal relationships (81.4% vs. 65.8%), opportunities for promotion and advancement (60.2% vs. 44.4%), monthly income (63.7% vs. 35.3%), working conditions (65.9% vs. 49.2%), cooperative working atmosphere (74.8% vs. 55.3%), training opportunities (74.8% vs. 48.5%), job security (84.6% vs. 66.9%), support by superiors (76.1% vs. 62.4%), autonomy in the workplace (84.5% vs. 63.2%), current equipment (76.1% vs. 57.5%), and reward for excellent work performance (69.0% vs. 49.0%). Compared to nurses, physicians were significantly more satisfied with opportunities for continual improvement provided by their health facility (50.4% vs. 40.0%) and job security (56.7% vs. 46.3%). Physicians are significantly more motivated and satisfied with their job than nurses. In order to improve the quality of work in health facilities studies of work motivation and job satisfaction are necessary each year.

Key words: Nurses, Physicians, Work Motivation, Job Satisfaction.

Introduction

The quality of health care can be defined as “the degree of excellence achieved and documented in the process of diagnosis and therapy, based on the best knowledge and providing lowest population morbidity and mortality” (1). The immense importance of the quality of health care is demonstrated by the fact that one of the ten global objectives of the World Health Organization’s strategy: “Health-for-All Policy for the 21st Century” is the objective “advancing comprehensive, high quality health care” (1, 2). The quality of health care has been recognized as one of the most important characteristics in the delivery of health care system. Continuous quality improvement is a process of increasing work effectiveness and efficacy, as well as satisfaction of patients and health care providers (1).

Job satisfaction is defined as a positive emotional reaction and attitude toward one’s job (3). Job satisfaction factors are divided into two main categories: factors related to the organization and job performed, and factors related to personal characteristics of employees. Organizational factors of job satisfaction include reward systems, perceived quality control, decentralization of power, level of work and social stimulation, and pleasant working conditions. Personal factors of job satisfaction include personality features, position and status of employees, length of service, personal interests and general satisfaction with life (4). The above mentioned job satisfaction factors may not be generalized, since generalization always carries some risks, because there are different subjective factors and expectations in various professions important for job satisfaction of employees (5). Job satisfaction of health workers is an important element of the health care quality, and it affects both the productivity and the quality of work performed, and therefore the cost of health care as well (6).

Worldwide research has shown that many factors affect job satisfaction of health professionals, such as gender, age, education level, professional experience, organization of work, working conditions, financial compensation for the work done, working hours, workers' expectations regarding promotion and so on (7, 8).

Work motivation also affects job satisfaction a great deal. Motivation is a process that encourages human activity directing it towards achieving certain goals (9). In order to achieve effectiveness, efficacy and quality of health care, health care institutions must motivate their employees properly, take into account their wishes and needs, in order to become productive members of the institution, and thus achieve the ultimate goal of the institution through efficient and quality service provided to their customers (10).

The aim of this study was to evaluate if there was a difference in job satisfaction and work motivation between physicians and nurses in the region of Central Serbia.

Methods

This cross-sectional study was conducted during three months of 2010/2011 among physicians and nurses in Health Centers "Savski Venac" and "Voždovac" in Belgrade, Health Center "Valjevo" and in General Hospital "Valjevo". All health facilities were randomly selected. The study included 71.5% of all employees. The study included 226 physicians and 606 nurses. Data collection was performed through anonymous questionnaires, which were individually completed. The questionnaire consisted of three parts. The first part related to demographic characteristics of respondents, the second to work motivation factors of health professionals, and the third part assessed their job satisfaction.

In order to evaluate the significance of certain work motivation factors we identified 15 items using a modified Likert scale by descriptive rating from 1 = No (it does not motivate me); 2 = I am not sure; 3 = Yes (it motivates me).

The level of satisfaction by fulfillment of certain work motivation factors was also measured using a modified Likert scale by descriptive rating from 1 = No (I disagree); 2 = I am not sure; 3 = Yes (I agree).

Table 1. Gender distribution of physicians and nurses

Gender	Physicians		Nurses		Total	
	n	%	n	%	n	%
Male	45	19.9	59	9.7	104	17.3
Female	181	80.1	547	90.3	728	82.7
Total	226	100.0	606	100.0	832	100.0

$$\chi^2=15.58; p<0.001$$

Table 2. Age distribution of physicians and nurses

Age distribution (years)	Physicians		Nurses		Total	
	n	%	n	%	n	%
≤35	25	11.1	160	26.4	185	22.2
36 - 40	21	9.3	87	14.4	108	13.0
41 - 45	24	10.6	101	16.7	125	15.0
46 - 50	53	23.5	119	19.6	172	20.7
51 - 55	40	17.7	101	16.7	141	16.9
56 - 60	47	20.8	29	4.8	76	9.1
≥61	16	7.1	9	1.5	25	3.0
Total	226	100.0	606	100.0	832	100.0
min - max	28 - 65		20 - 65		20 - 65	
\bar{x}	48.6		42.5		44.2	

$$\chi^2=89.28; p<0.001$$

In statistical analysis χ^2 , Student t-test, and Spearman's correlation coefficient test were used.

Results

There were significantly more male examinees among the physicians than among nurses (Table 1.). Compared with nurses, physicians were significantly more in older age groups (46 years of age and above) (Table 2.).

In regard to nurses, physicians were significantly more motivated by the following factors of work motivation: achieving goals of the health institution (health promotion, disease prevention, early detection and therapy of the diseased) ($\chi^2=23.365$, $p<0.001$), recognition for good work performance ($\chi^2=18.167$, $p<0.001$), good interpersonal relationships ($\chi^2=19.657$, $p<0.001$), opportunities for promotion and advancement ($\chi^2=17.371$, $p<0.001$), monthly income ($\chi^2=54.185$, $p<0.001$), working conditions ($\chi^2=18.595$, $p<0.001$), cooperative working atmosphere ($\chi^2=26.517$, $p<0.001$), training opportunities ($\chi^2=46.094$, $p<0.001$), job security ($\chi^2=25.343$, $p<0.001$), support by superiors ($\chi^2=14.370$, $p<0.001$), autonomy in the workplace ($\chi^2=35.137$, $p<0.001$), current equipment ($\chi^2=24.608$, $p<0.001$), and reward for excellent work performance (verbal or written award, a day off, money reward and so on) ($\chi^2=31.863$, $p<0.001$) (Table 3.). Among the examined group of health workers there was no significant difference for the following factors of work motivation: personal qualities of the immediate supervisor ($\chi^2=1.493$, $p=0.474$), and professional supervision ($\chi^2=1.806$, $p=0.405$).

In relation to nurses, physicians were significantly more satisfied with opportunities for continuous improvement provided by their health institution ($\chi^2=7.43$, $p=0.024$) and job security ($\chi^2=8.01$, $p=0.018$) (Table 4.). Compared to physicians, nurses were more satisfied with the manager support, recognition by their employees, good interpersonal relationships, reward for excellent work performance, and professional supervision of their work. However, these differences were not statistically significant. In comparison with nurses, physicians were satisfied with the support given by their supervisors helping them to get a promotion or a better job, with good personal qualities of their supervisors, with immediate sup-

port at work, as well as independence in routine jobs, monthly income, good working conditions and current equipment.

Physicians were significantly more motivated than satisfied with their work concerning all factors of work motivation, except for professional supervision, whereas significant difference was not obtained only for one factor of work motivation – personal qualities of immediate supervisors (Table 5A). Physicians were less motivated by professional supervision, than by the level of its fulfillment by their institution. Moreover, the difference was not statistically significant. According to Spearman's correlation coefficient, it was evident that the level of work motivation of physicians was higher if the job satisfaction was higher, except for the level of monthly income, which showed neither correlation between the levels of work motivation nor job satisfaction. Nurses were significantly more motivated than satisfied with their job concerning all factors of work motivation, except for the recognition for good work performance, individual work opportunities, and professional supervision. However, statistically significant difference was not obtained only for two factors of work motivation: opportunities for advancement and promotion, and personal qualities of their immediate supervisor (Table 5B). Nurses were less motivated by the following factors of work motivation: recognition for good work performance, individual performance at work, and professional supervision in relation to their fulfillment by the health care institution, whereas a significant difference was obtained only for the factor – professional supervision. According to Spearman's correlation coefficient, the level of work motivation of nurses was higher if the level of fulfillment by the health institution was also higher.

Physicians and nurses with higher motivation levels were more job satisfied and vice versa.

Discussion

Our investigation shows that in relation to nurses, physicians are significantly more motivated by the following factors of motivation: achieving goals of the health institution (health promotion, disease prevention, early detection and treatment of the diseased), recognition for good work per-

Table 3. Distribution of physicians and nurses in terms of work motivation factors

Work motivation factors	I am motivated by	Physicians		Nurses		P
		n	%	n	%	
Achieving goals of the health institution	No	26	11.5	120	19.8	<0.001
	I am not sure	25	11.1	126	20.8	
	Yes	175	77.4	360	59.4	
Recognition for good work performance	No	44	19.5	186	30.7	<0.001
	I am not sure	22	9.7	90	14.9	
	Yes	160	70.8	330	54.4	
Good interpersonal relationships	No	28	12.4	122	20.1	<0.001
	I am not sure	14	6.2	85	14.0	
	Yes	184	81.4	399	65.8	
Opportunities for promotion and advancement	No	47	20.8	197	32.5	<0.001
	I am not sure	43	19.0	140	23.1	
	Yes	136	60.2	269	44.4	
Personal qualities of the immediate supervisor	No	35	15.5	111	18.3	0.474
	I am not sure	44	19.5	101	16.7	
	Yes	147	65.0	394	65.0	
Monthly income	No	66	29.2	318	52.5	<0.001
	I am not sure	16	7.1	74	12.2	
	Yes	144	63.7	214	35.3	
Working conditions	No	47	20.8	186	30.7	<0.001
	I am not sure	30	13.3	122	20.1	
	Yes	149	65.9	298	49.2	
Cooperative working atmosphere	No	24	10.6	127	21.0	<0.001
	I am not sure	33	14.6	144	23.8	
	Yes	169	74.8	335	55.3	
Training opportunities	No	34	15.0	178	29.4	<0.001
	I am not sure	23	10.2	134	22.1	
	Yes	169	74.8	294	48.5	
Job security	No	16	7.1	89	14.7	<0.001
	I am not sure	19	8.4	112	18.5	
	Yes	191	84.6	405	66.9	
Support by superiors	No	27	11.9	128	21.1	0.001
	I am not sure	27	11.9	100	16.5	
	Yes	172	76.1	378	62.4	
Autonomy in the workplace	No	15	6.6	107	17.7	<0.001
	I am not sure	20	8.8	116	19.1	
	Yes	191	84.5	383	63.2	
Current equipment	No	31	13.7	141	23.3	<0.001
	I am not sure	23	10.2	117	19.3	
	Yes	172	76.1	348	57.5	
Reward for excellent work performance	No	39	17.3	222	36.7	<0.001
	I am not sure	31	13.7	87	14.4	
	Yes	156	69.0	297	49.0	
Professional supervision	No	42	18.6	138	22.8	0.405
	I am not sure	57	25.2	151	24.9	
	Yes	127	56.2	317	52.3	

Table 4. Distribution of physicians and nurses in terms of job satisfaction

Claims related to the level of job satisfaction	I agree	Physicians		Nurses		P
		n	%	n	%	
The manager supports me to reach my professional goals	No	63	27.9	144	23.8	0.416
	I am not sure	40	17.7	123	20.3	
	Yes	123	54.4	339	56.0	
The manager gives me credit when it is necessary/appropriate	No	63	27.9	158	26.0	0.858
	I am not sure	50	22.1	134	22.1	
	Yes	113	50.0	314	51.8	
There are good interpersonal relationships in my institution	No	54	23.8	164	27.0	0.514
	I am not sure	63	27.9	149	24.6	
	Yes	109	48.2	293	48.4	
The manager supports my personal promotion	No	66	29.2	202	33.3	0.178
	I am not sure	54	23.9	163	26.9	
	Yes	106	46.9	241	39.8	
My immediate supervisor has good personal qualities	No	43	19.0	113	18.6	0.796
	I am not sure	39	17.3	117	19.3	
	Yes	144	63.8	376	62.0	
I am satisfied with my monthly income	No	163	72.1	457	75.4	0.310
	I am not sure	25	11.1	72	11.9	
	Yes	38	16.8	77	12.7	
My institution provides good working conditions	No	71	31.4	213	35.2	0.171
	I am not sure	50	22.1	155	25.6	
	Yes	105	46.5	238	39.3	
There is a cooperative working atmosphere in my institution	No	57	25.2	158	26.0	0.963
	I am not sure	71	31.4	186	30.7	
	Yes	98	43.4	262	43.4	
My institution provides me opportunities for continuous improvement	No	62	27.4	202	33.4	0.024
	I am not sure	50	22.1	162	26.7	
	Yes	114	50.4	242	40.0	
My institution guarantees job security to employees	No	40	17.7	153	25.3	0.018
	I am not sure	58	25.7	172	28.4	
	Yes	128	56.7	281	46.3	
The manager provides me constant support at work	No	48	21.2	147	24.2	0.658
	I am not sure	52	23.0	135	22.3	
	Yes	126	55.8	324	53.5	
The manager allows me independence at routine tasks	No	27	12.0	99	16.4	0.063
	I am not sure	32	14.2	111	18.3	
	Yes	167	73.9	396	65.3	
My institution provides current equipment	No	58	25.7	178	29.4	0.554
	I am not sure	56	24.8	138	22.8	
	Yes	112	49.6	290	47.8	
My institution rewards employees for excellent work performance	No	142	62.8	347	57.3	0.336
	I am not sure	42	18.6	134	22.1	
	Yes	42	18.6	125	20.7	
The manager is qualified for the supervision of my work	No	50	22.1	110	18.1	0.330
	I am not sure	37	16.4	118	19.5	
	Yes	139	61.5	378	62.3	

Table 5. Correlation between work motivation factors and the level of job satisfaction

A) Physicians

Work motivation factors for physicians	Mean ($\bar{X} \pm SD$)	Level of satisfaction ($\bar{X} \pm SD$)	t-test (p) ¹	Spearman ρ (p) ²
Achieving goals of the health institution	4.02±1.14	3.35±1.39	7.548 (<0.001)	0.401 (<0.001)
Recognition for good work performance	3.78±1.36	3.29±1.42	5.067 (<0.001)	0.414 (<0.001)
Good interpersonal relationships	4.08±1.16	3.27±1.20	9.749 (<0.001)	0.397 (<0.001)
Opportunities for promotion and advancement	3.58±1.35	3.15±1.34	4.546 (<0.001)	0.413 (<0.001)
Personal qualities of the immediate supervisor	3.70±1.22	3.67±1.34	0.337 (0.737)	0.506 (<0.001)
Monthly income	3.57±1.52	1.95±1.29	13.236 (<0.001)	0.081 (0.225)
Working conditions	3.63±1.36	3.13±1.33	5.266 (<0.001)	0.363 (<0.001)
Cooperative working atmosphere	3.93±1.12	3.18±1.17	9.993 (<0.001)	0.457 (<0.001)
Training opportunities	3.93±1.26	3.25±1.37	6.948 (<0.001)	0.325 (<0.001)
Job security	4.26±1.01	3.52±1.20	9.501 (<0.001)	0.339 (<0.001)
Support by superiors	3.95±1.16	3.45±1.27	6.732 (<0.001)	0.488 (<0.001)
Autonomy in the workplace	4.17±0.99	3.96±1.18	3.279 (0.001)	0.486 (<0.001)
Current equipment	3.93±1.22	3.25±1.34	8.178 (<0.001)	0.442 (<0.001)
Reward for excellent work performance	3.83±1.38	2.20±1.37	15.140 (<0.001)	0.293 (<0.001)
Professional supervision	3.48±1.27	3.58±1.32	1.071 (0.285)	0.423 (<0.001)

¹ Level of significance p for the Student t-test for associated samples² Level of significance p for Spearman's rank correlation coefficient

formance, good interpersonal relationships, opportunity for promotion and advancement, monthly income, working conditions, cooperative working atmosphere, training opportunities, job security, supervisor support, independence in work, current equipment, reward for excellent work performance (oral or written reward, a day off, money award and so on). These results are similar to those obtained by the Health Center in Tuzla (11). Training opportunities, independence in work, good interpersonal relationships are factors that motivate physicians of Health Center in Tuzla more than nurses (11). Con-

trary to our results, the research conducted in the Health Center in Tuzla, as well as the research of Dieleman and associates conducted in Mali, show that recognition for good work performance, opportunities for advancement and promotion, monthly income and job security, motivate nurses more than physicians (11, 12).

Many studies confirm the significance of work environment (working conditions and job security) in providing positive levels of satisfaction and health of employees (13, 14). Recent studies indicate that good communication in efficiently

B) Nurses

Work motivation factors for nurses	Mean ($\bar{X} \pm SD$)	Level of satisfaction ($\bar{X} \pm SD$)	t-test (p) ¹	Spearman ρ (p) ²
Achieving goals of the health institution	3.58±1.24	3.46±1.37	2.312 (0.021)	0.464 (<0.001)
Recognition for good work performance	3.32±1.47	3.33±1.44	0.172 (0.864)	0.504 (<0.001)
Good interpersonal relationships	3.69±1.37	3.26±1.33	8.047 (<0.001)	0.474 (<0.001)
Opportunities for promotion and advancement	3.11±1.44	3.01±1.40	1.655 (0.099)	0.467 (<0.001)
Personal qualities of the immediate supervisor	3.70±1.30	3.67±1.32	0.576 (0.565)	0.562 (<0.001)
Monthly income	2.68±1.64	1.80±1.19	13.548 (<0.001)	0.395 (<0.001)
Working conditions	3.24±1.38	2.96±1.33	5.450 (<0.001)	0.545 (<0.001)
Cooperative working atmosphere	3.47±1.26	3.17±1.22	6.608 (<0.001)	0.566 (<0.001)
Training opportunities	3.25±1.42	3.02±1.39	4.054 (<0.001)	0.506 (<0.001)
Job security	3.83±1.25	3.27±1.30	14.414 (<0.001)	0.516 (<0.001)
Support by superiors	3.62±1.36	3.38±1.34	5.221 (<0.001)	0.616 (<0.001)
Autonomy in the workplace	3.63±1.27	3.71±1.27	1.598 (0.111)	0.454 (<0.001)
Current equipment	3.46±1.36	3.17±1.36	5.947 (<0.001)	0.575 (<0.001)
Reward for excellent work performance	3.14±1.56	2.27±1.38	14.121 (<0.001)	0.460 (<0.001)
Professional supervision	3.40±1.31	3.69±1.34	5.490 (<0.001)	0.507 (<0.001)

¹ Level of significance p for the Student t-test for associated samples

² Level of significance p for Spearman's rank correlation coefficient

managed institutions and manager – physician relationship, are important factors of job satisfaction (15). According to numerous studies, positive levels of job satisfaction and health self-assessment depend on good professional relationships at work (16, 17), and communication with supervisors (15). Efficient management (active participation of employees in decision making, communication between the employees and the management, motivating and informing the employees, use of protocols and guidelines of good practice) and clinical autonomy are important factors of job

satisfaction in health professionals (18). Applied elements of good management impact physicians in the United States of America (USA) to experience higher levels of perception of work quality, therapeutic effects of using clinical guidelines and the impact of health workers on the management. They are also more satisfied with the possibility to implement efficient health care and meet the needs of their patients. More than half of physicians think that use of guidelines improves the quality of services provided to patients (19). Many investigations show that job satisfaction of health pro-

professionals directly depends on clinical autonomy (control of work activities, time and possibilities to meet patients' needs) (15, 20).

In our study, compared to nurses, physicians are significantly more satisfied with permanent training opportunities provided by their health institution, and job security. Similar to our results, the research of Chirdan and associates conducted in northeastern Nigeria shows that a significant difference between physicians and nurses was not obtained in the degree of agreement with the management related to helping them with promotion (21). The results of this study show that physicians are more satisfied with their income than nurses are which is in agreement with the results of our study. A study conducted in Jordan (22), contrary to our study, shows that contrary to physicians, nurses are dissatisfied with the support of their supervisors and availability of modern equipment. The investigation of Bodur, conducted in 21 health centers in Konya (Turkey), shows that working conditions and income are the most important factors of dissatisfaction among health workers (23). Physicians are more satisfied with interpersonal relationships, whereas nurses are more satisfied with recognition for good work performance, income, working conditions, job security, individual autonomy in work, and professional supervision (23). In the Health Center in Tuzla, in relation to nurses, physicians are more satisfied with the opportunity of advancement and promotion at work, income, possibility to do something they will feel good about themselves, autonomy at work, opportunities for improving their skills and knowledge, job security, training opportunities, to do something worthwhile at work and merit respect of their colleagues; nurses are more satisfied with recognition for good work performance and good interpersonal relationships (11).

Results of our research show that physicians are significantly more motivated than satisfied with their jobs concerning the following factors of work motivation: achieving goals of the health facility, recognition for good work performance, good interpersonal relationships, opportunities for advancement and promotion, monthly income, working conditions, cooperative working atmosphere, training opportunities, job security, manager support, independence in work, current

equipment and reward for excellent performance. The level of work motivation among physicians is higher if job satisfaction is higher, except for the factor of income, because no relationship was established between the level of motivation and the level of satisfaction. The studies of Janus and associates, conducted in Germany, from December 2004 to February 2005, and in USA, from October 2005 to March 2006, aimed to establish the importance of financial and nonfinancial factors of work motivation among physicians (24). The results of these studies showed that physicians were significantly more motivated by several factors of work motivation in regard to the level of their fulfillment by their health institutions. Gathered results showed that physicians in Germany were significantly more motivated by financial gain, participation in organization of work, cooperation with the management, continuous medical education, cooperation with nurses, opportunities for promotion, work atmosphere and job security in regard to the level of their fulfillment by their health facility. Physicians in the USA were significantly more motivated by financial gain, cooperation with the management, administrative activities, cooperation with nurses, work atmosphere, current equipment and participation in organization of work, than they were satisfied with fulfillment of these factors by their health facilities (24).

The researchers note that there is an emphasized collective sensitivity in health care institutions, especially of the managerial staff, associated with investigations involving employee attitudes and opinions about certain aspects of work and behavior, and that in practice there are numerous problems connected with the measurement of motivation and job satisfaction. The most common problem when examining motivation and job satisfaction of health professionals is the fear that by answering questions they may place themselves in an uncomfortable or unwanted position in the institution, or fear from possible consequences. Although researchers have attempted to dispel the fear from unwanted consequences, emphasizing the anonymity of questionnaires, suggesting that the results would be used for research purposes only, and that they will not be available to managers, they could not determine the level of honesty of respondents' responses (21). In our research, we also used an anonymous questionnaire, but we are confi-

dent that we did not quite get sincere answers, as the global position of the institution whose employees were examined in terms of work motivation and job satisfaction, may cause a conflict between the employees and their managers (25).

Conclusion

Physicians are significantly more motivated and satisfied with their job than nurses. In order to improve the quality of work in health care and increase customer satisfaction, it is necessary to continuous study factors of work motivation of all health workers and monitor their job satisfaction. This should be performed at least once a year on a representative sample from each medical institution, and then, in accordance with the obtained results, measures and actions should be taken for improving their work motivation and job satisfaction. These measures would increase the satisfaction of health care users as well. Ideally, the Ministry of Health, regardless of managerial management of health facilities, should perform these researches, in order to enable participants to express their sincere job satisfaction and work motivation.

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Biased view against biopsy among cancer patients and its reasons

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Abstract

Objective: Because the belief that biopsy causes spread of the disease, is a widely accepted opinion among the people in our region. The aim of this study is to assess the view of patients diagnosed with cancer about biopsies and evaluate the factors influencing this.

Material and Methods: Three hundred and twenty four patients who presented themselves to the Department of Medical Oncology between October 2009 and March 2010, were included in the study. Data were obtained from patient charts and evaluations of questionnaires.

Results: Among those patients with low level of education, the number of people who are thinking that biopsy is harmful, was significantly high ($p=0.001$). The gender of patients thinking that biopsy was harmful was more female ($p=0.065$). However, significantly elderly patients (76.8%, $n=99$) aged over 40 years, considered biopsy as harmful compared to those aged less than 40 years ($p=0.078$). Significant differences were found in biopsy perception of patients based on their economic status ($p=0.023$).

Conclusions: The education level of the patient should be taken into consideration in diagnosing cancer with biopsy and subsequent transition to treatment steps the consciousness level of the patient should be certainly increased as well.

Key words: Cancer, biopsy.

Introduction

In order to prove whether suspicious lesions are cancer, diagnostic needle biopsies (fine needle biopsies or core biopsies) and/or surgical open biopsies are considered compulsory. For a patient suspected to have cancer, presence of cancer disease should be first confirmed with cytology and/or histology. Fine needle aspiration, tru-cut, incision and excision biopsy techniques are used for this purpose. Although

biopsy has serious benefits in terms of diagnostic, it can also have some disadvantages. Seeding has been reported in a few tumors following biopsy. The actual incidence of spread of cancer cells is unknown. Detecting of this situation also can be rather difficult. Association of biopsy with tumor seeding has been investigated in various studies. In some tumors, malignant seeding after needle biopsy was reported (Boutin,1995; Herts, 1995). Risk of tumor spread with fine needle aspiration biopsies (FNAB) has been reported at very low rates such as 0.003% to 0.017% in pancreas tumors and 0.00% to 0.03% in other abdominal tumors (Stigliano,2005). Studies have reported higher rates like 0.5-1% and 2.7% of tumor spread following biopsies other than FNAB in patients with hepatocellular carcinoma (Smith,1991; Silva,2008). Also, in a review on evaluating the role of needle biopsies for tumor seeding in breast cancer, no significant risk was noted. However, theoretical risks of local recurrence and metastatic spread of biopsy are possible, but these risks are negligibly low and there are various procedures to prevent it (Wiksell,2010). It was not shown to constitute a difference in recurrence and survival, even if seeding (King,2001). When biopsy is generally evaluated, it should be considered as reliable, unless harms of core biopsies are confirmed with prospective studies (Liebens, 2009).

A major part of patients applying to oncology services in our region, come with advanced stage of diseases. In developed countries, it is known that a major part of cancers is detected at early stages. For example, breast cancer, in developed countries 86% of patients with breast cancer disease are diagnosed at an early stage and 14% at an advanced stage (Fisch,2005). In a study carried out in 2003 in our region, 48% of breast cancer patients were found to be at a metastatic and locally advanced stage their at first presentation, where as 52% were at operable stage (Isikdogan,2003). According to a study in Istanbul Medicine Faculty, ratio of breast

cancer at stage I, II was 83%, and this ratio is similar to ratio in western countries. In well developed cities of Turkey as Antalya and Izmir, early stage breast cancer ratio was over 50%. These regional differences can be explained with education level, economic reasons, and being more facilities for examination and mammography (<http://ukdk.org,2011>). While chance of healing the cancer is higher in early stages, there is almost no chance of healing in advanced stages. According 2002 data of World Health Organisation, 5-year survival ratio of breast cancer patients is 73% in developed countries at all stages. This ratio is reported as 53% in developing countries. According to Turkish Ministry of Health data, mortality rate in breast cancer is 40-50/100,000 in Eastern regions and 20/100,000 in Western regions(<http://ukdk.org,2011>). Among the reasons for this difference, there are low social, cultural, education and economic levels, inadequate screening programs, lack of treatment possibilities and wrong beliefs on biopsy. Furthermore, we have also noted that the disease was detected at a relatively early phase in a major part of our patients, biopsy and/or surgery was proposed, but this solution was not generally taken into consideration because of the belief that "it will spread if knife touches it". Therefore they have referred to our clinic months even years later with symptomatic metastases. We observed that a major part of patients reporting at our clinic was at advanced stages.

We observed that patients reporting with advanced or metastatic stages have delayed their biopsies due to a wrong belief toward biopsies. There are no studies carried out in our country regarding the belief that biopsy is harmful.

The aim of this study is to investigate whether the patients followed by our clinic with the diagnosis of cancer, consider biopsy as harmful in relation with factors such as age and gender; marital status, economic status, educational status, educational status of family members, type of cancer and stage at diagnosis. In this study we planned to evaluate the view of patients diagnosed with cancer about biopsy by using questionnaires and discussing the factors influencing their point of view.

Materials and methods

This study was carried out on patients who were diagnosed with cancer and who then referred for treatment to the Dicle University Medicine Faculty Medical Oncology Department between October 2009 and March 2010. Data were obtained from patient files and by evaluating the questionnaires. Because some patients were illiterate, questionnaires were filled out during interviewing with the patients in person.

To assess this, patients were analyzed in terms of age, gender, marital status, educational status, educational status in family, economic status, social security status, type and stage of the disease, presence or absence of cancer patients in close relatives. Patients were inquired about belief that biopsy ("taking out a piece") has a negative contribution to the disease. Data were analyzed using SPSS 11.5 program. Chi-square and Fisher test were used for comparisons. Statistical significance was accepted as $p < 0.05$.

Results

The median age of 324 patients was 48 years (range, 16-85) and 89.2% ($n=289$) of patients were married and 10.8% ($n=35$) were single. Significantly greater number of patients (76.7%, $n=99$) aged over 40 years considered as biopsy harmful, compared to those aged less than 40 years ($p=0.078$) (Table 1).

When all patients are evaluated, the number of patients thinking that biopsy is harmful thus cause the disease spread further was 129 (39.8%). Those with opposite opinion were (60.2%). Among the patients thinking that biopsy is harmful, 59.7% ($n=77$) were female and 40.3% ($n=52$) were male. The gender of patients thinking that biopsy was harmful was more female ($p=0.065$). Among the patients who think that biopsy was harmful, 91.5% ($n=118$) was married and 8.5% ($n=11$) was single. Among patients who thinking that biopsy was harmless, 87.7% ($n=171$) was married, and 12.3% ($n=24$) was single. No difference was found in biopsy perception according to marital status ($p=0.28$).

Regarding the education levels of participating patients, we found out that 15.7% were in the group of second school graduate and over, 84.3% were in

Table 1. Comparison of groups believing biopsy is harmful vs. harmless

Characteristics	Those considering biopsy harmful n (%)	Those considering biopsy harmless n (%)	P Value
General population	129 (39.8)	195 (60.2)	
Gender			
Male	52 (40.3)	99 (50.8)	0.065
Female	77 (59.7)	96 (49.2)	
Age Group			
<40 years	30 (23.3)	63 (32.3)	0.078
>40 years	99 (76.7)	132 (67.7)	
Economic Status			
Good	7(5.4)	6 (3.1)	0.023
Easy living	42 (32.6)	89 (45.6)	
Difficult living	36 (27.9)	59 (30.3)	
Depend on others	44 (34.1)	41 (21.0)	
Educational background			
Primary school graduate and below	119(92.2)	154(79.0)	0.001
Second school graduate and over	10(7.8)	41(21.0)	
Educational status in family			
High school graduate	42 (32.6)	66 (33.8)	0.152
University graduate	41(31.8)	44(22.6)	
Below high school	46(35.7)	85(43.6)	
Stage			
Local-Advanced	63(48.8)	110(56.4)	0.181
Metastatic	66(51.2)	85(43.6)	
Duration of Diagnosis			
Less than 6 month	91(70.5)	121(62.1)	0.116
More than 6 month	38(29.5)	74(37.9)	
Classification of diseases			
Breast cancer	38 (29.5)	51 (26.2)	0.466
Lung cancer	19 (14.7)	19 (9.7)	
Gastrointestinal cancer	29 (22.5)	46 (23.6)	
Lymphoma	13 (10.1)	19 (9.7)	
Other(Gynecologic,Urinary,etc)	30 (23.3)	60 (30.8)	

the group of primary school graduate and below. Among the patients with low education level, the number of patients thinking that biopsy is harmful was significantly higher ($p=0.001$). As education level increases, the number of individuals thinking that biopsy can make the disease spread further decreased. As the number of educated family members decreased, the number of those thinking that biopsy is harmful increased ($p=0.152$). Number of individuals who believed that biopsy is harmful was also high among patients with low economic status ($p=0.023$). Among the patients who thought biopsy was harmful, 51.9% had green cards for

free healthcare, 32.6% had health insurance from social securities institution, 10.9% from the retirement fund, 4.7% from occupational pension fund. Significant differences were found in biopsy perception of patients based on their social security type ($p=0.027$). Nearly half of the patients with green card, which is due to their low economic status, have appreciated biopsy as harmful.

When it comes to the influence of presence of cancer disease among family members and relatives on the perception of biopsy; among the 99 patients with relatives with cancer disease, 36.4% thought that biopsy was harmful, 63.6% thought

biopsy was not harmful, and among the 225 patients whose relatives did not have cancer, 41.3% thought that biopsy was harmful and 58.7% thought it was not harmful. Presence of other patient with cancer within family or relatives, decreased negative perception about biopsy, though this difference is not significant ($p=0.4$).

When biopsy perception and disease stage is evaluated: 51.2% ($n=66$) of patients who accepted biopsy as harmful was found at metastatic stage, 48.8% ($n=63$) at local-advanced stage, however in patients who accepted biopsy as harmless, 43.6% ($n=85$) of them was at metastatic stage and 56.4% ($n=110$) of them at local-advanced stage ($p=0.181$).

There was no significant correlation between many parameters like age, gender, marital status, stage of the disease, type of cancer, presence of cancer patients in close acquaintances and the perception that biopsy causes disease progress ($p>0.05$).

Discussion

Reasons and types of cancer vary among geographic regions. Furthermore, stages at diagnosis also vary among regions. Causes for this may be many factors like low socioeconomic level of the population, inadequate screening programs, difficult access to diagnostic tools and wrong views on the procedure of biopsy. In low-educated populations it can be seen that patients are non-compliant to diagnostic interventions due to fear of disease progress possibly secondary to intervention. It is known that the level of education is lower in the eastern part of our country than the west. Due to the lower education level, wrong points of view may develop about the cancer disease. We frequently encounter people in this region who believe that cancer spreads if it is touched by a knife. Therefore, we aimed to evaluate perception of the cancer patients on biopsy and the factors influencing this in our region.

The results of the study have shown a higher rate of believing that biopsy is harmful in younger patients, patients with low education and economic status, those at metastatic stage of the disease and with low education levels in the family. Thus, the patients with family members who graduated from high school or university believed at a less degree that biopsy harmed their disease. According to 2010 data of Turkish Statistical Institution, 5.2% of men

and 22.8% of women were illiterate in the province of Diyarbakir (<http://tuikapp.tuik.gov.tr,2011>). As the rate of illiteracy is higher in women, the belief that biopsy is harmful may have been found at a higher rate in women. Higher rate of considering biopsy is harmful in elderly patients may result from the low education level of elderly people.

The rate of believing that biopsy is harmful in patients with metastatic disease was higher than the patient with local advanced stage. This wrong belief can be resulted from prejudice about biopsy. Since in our study, disease groups were heterogeneous group, a relation between the disease stage and perception on biopsy is not clear.

As with all diseases, these results show that also in cancer education about the disease will contribute to early diagnosis and increase in overall survival. Since there is no study carried out in our country on the point of view of cancer patients on biopsy, we did not have the opportunity to compare our study with another study. When similar studies are carried out in other parts of our country on the perception of cancer patients we will have the possibility of making a comparison.

The results of our study are determinative in demonstrating the importance of education in cancer patients. The education level of the patient should be taken into consideration in diagnosing cancer with biopsy and subsequently treating it and consciousness level of the patient should be absolutely increased.

In conclusion, we found in this study that a significant part of cancer patients in our region think that diagnostic biopsies are harmful. As the education level of cancer patients in our region increased, the number of individuals who thought that biopsy was harmful and had a progressive effect on the disease decreased.

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Effect of carbamazepin, valproic acid and primidone on Thyroid function in epileptic children

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Abstract

Objective: Antiepileptic drugs (AEDs) may affect serum thyroid hormone concentrations. three classic (Carbamazepine, valproic acid and Primidone) are effective for treating many types of epilepsy. Although they are well tolerated, many effects on endocrine function have been reported. In the present study, changes in serum thyroid hormones levels during CBZ, VPA and Primidone therapy were analyzed

Methods: This was a prospective interventional study which was conducted at the Department of Pediatrics, University College of Mazandaran University of Medical Sciences, Bu Ali Sina Hospital, Sari, Iran between April 2010 and August 2011. 150 patients were enrolled.

All children suffered from different types of epilepsy according to clinical manifestation and EEG. According to their medical history and physical examination, all patients were judged to be in good health, except for having epilepsy. At the first visit we evaluated the thyroid enzyme levels and as it mentioned above children with abnormal levels of thyroid hormone levels were excluded from the study. At last a total of 150 patients enrolled the study. Carbamazepine, Valproate or Primidone were prescribed in two divided dose and no other drugs were prescribed and the patients were evaluated every 6 months in 3 visits for thyroid hormone levels (0, 6, 12 months after initiation of treatment).

Thyroxine, FT4, T3, and TSH were determined in serum by electrochemiluminescence immunoassay. Data were expressed as mean (SD) values and were analyzed using SPSS 16.0. A P Value 0.05 was considered statistically significant.

Results: A total of 150 patients 53% (79) girls with mean age of 5.78 y/o enrolled the study and we entered 50 patients in each treatment groups who were clinically and paraclinically euthyroid at the beginning.

In our study 105 patients (70%) had Generalized tonic Clonic Seizure (GTCS), 24 (16%) had (CPS) Complex Partial Seizure, 12(8%) had Atonic seizure and in 7(5%) had myoclonic and 2(1%) had mixed type. There was no significant difference between Mean age, sex, body mass index between groups. ($p > 0.05$). At the 6th month FT3 (mean \pm SD) was 0.49 ± 0.24 ng/ml in CBZ, 1.17 ± 0.18 ng/ml in VLP and 0.3 ± 0.08 in primidone group these values were as follows at the end of study (at 12th month) 0.37 ± 0.56 ng/ml in CBZ 0.24 ± 0.23 in VLP and 0.18 ± 0.43 in Primidone group. There was no significant difference in each group between 6th and 12th month of treatment. FT4 (mean \pm SD) was 0.89 ± 0.64 ng/ml in CBZ, 0.98 ± 0.45 ng/ml in VLP and 1.56 ± 0.55 in primidone group at the 12th month they were 0.32 ± 0.25 ng/ml in CBZ, 0.85 ± 0.32 ng/ml in VLP and 1.02 ± 0.85 in primidone. there was a significant difference between the values of FT4 in the 6th month and 12th month in group CBZ and PRM. ($P = 0.015$, $P = 0.006$ respectively) And 6 months after the study TSH (mean \pm SD) there was just a significant difference between the 6th and 12th month of treatment in primidone group ($P = 0.036$).

Conclusions: In our study, the levels of T4 were Decreased in patients received CBZ and Primidone while it was unchanged in VPA treated patients. The level of FT3 in primidone treated children were diminished but it was not significantly different from the base line values while it was normal in 2 other groups. TSH were decreased in Primidone and were normal in all other patients.

Key words: Epilepsy, thyroid, sodium valproate, carbamazepine, antiepileptic drugs (AEDs).

Introduction

Epilepsy is the most common neurological disorder of childhood with an annual incidence of 5-7 per 10 000 in the age group of 0-15. (1,2) Since the nature of epilepsy requires long-term administration of antiepileptic drugs and sometimes life-long treatment mostly applied as polytherapy, occurrence of several adverse effects is inevitable. among these alteration in thyroid hormone levels is well known.(3) In a European multi-center study, at least one drug-related adverse effect has been reported in 88% of the patients (2,4). Carbamazepine (CBZ) is considered the drug of first choice for the treatment of partial and secondarily generalized seizures (2,5,6,7). Valproic acid (VPA) has also been found to be an effective antiepileptic drug (AED) in many types of epilepsy (8,9). Endocrine disorders are of major concern for clinicians who treat patients with epilepsy (10). AEDs lead to several degrees of impairment in thyroid hormone homeostasis by changing its biosynthesis, secretion, transport, metabolism and excretion (11). Disturbances in thyroid hormone homeostasis associated with AEDs have been reported for the first time in 1961 by (12). Since then, contradictory results have been reported, and the effects of AED on thyroid functions, particularly in children, have become a subject of debate for the clinicians (13,14,15). Although there are several studies reporting an increase in TSH levels (16,17) in the vast majority of studies, a decrease in serum T4 (14,18,19) free thyroxine (fT4), T3, and/or free triiodothyronine (fT3, and unchanged TSH levels have been reported in children using CBZ, PB and/or OXC (14,16,18,19). Many of the studies also reported altered thyroid functions during treatment with VPA, however the results are controversial since normal or elevated serum levels of thyroid hormones and thyroid stimulating hormone (TSH) have been reported (14,16,18,19,20,21,22,23,24).

In the present study, changes in serum thyroid hormones levels during CBZ and VPA therapy were analyzed.

Material and methods

This was a prospective interventional study which was conducted at the Department of Pediatrics, University College of Mazandaran University of Medical Sciences, Bu Ali Sina Hospital, Sari, Iran, between April 2010 and August 2011. The study protocol was approved by the hospital ethical committee, and written informed consent was provided by parents or caregivers before the children were enrolled the study. Because our hospital was a referral pediatric neurology hospital in the north of Iran we collected all our study population during 6 months. And finally 150 patients were enrolled.

All children suffered from different types of epilepsy according to clinical manifestation and EEG was followed-up through the Department of Pediatrics at the Medical University of Mazandaran in I.R.IRAN. According to their medical history and physical examination, all patients were judged to be in good health, except for having epilepsy. All children undertook normal daily activities. The main criteria for exclusion from the study were as follows: abnormal neurologic examination; thyroid, liver, or kidney disease; chronic metabolic disease; Growth and development disorder; thyroid disease in family; endocrinopathies; and chromosomal abnormalities.

At the first visit we evaluated the thyroid enzyme levels and as it mentioned above children with abnormal levels of thyroid hormone levels were excluded from the study. At last a total of 150 patients enrolled the study. (50 patients were receiving valproate and 50 patients receiving carbamazepine, and 50 receiving Primidone aged 1-14 years).

Carbamazepine, Valproate or Primidone were prescribed in two divided dose and no other drugs were prescribed and the patients were evaluated every 6 months in 3 visits for thyroid hormone levels(0,6,12months after initiation of treatment) and each group were compared with itself(before and after). A blood sample (10 cc) was obtained after 12-hour fasting in early morning, between 7.30 and 11:00 AM. Samples were frozen to 70 degree of centigrade until analysis, which was performed within 12 months after collection of samples. Thyroxine, FT4, T3, and TSH were determined in serum by electrochemiluminescence immunoassay (kawoshyar kits CII.a). All tests

were performed according to the manufacturer's instructions. Data were expressed as mean (SD) values and were analyzed using SPSS 16.0. A P Value 0.05 was considered statistically significant.

Results

A total of 150 patients enrolled the study and we entered 50 patients in each treatment groups. At the beginning of the study all of our patients were clinically and paraclinically euthyroid. 50 patients received carbamazepine, 50 valproate and 50 primidone. Of patients, 53% (79) were girls and 47% were boys the age range was 1 to 14 years with mean age of 5.78 years old. In our study 105 patients(70%) suffered of having Generalized tonic Clonic Seizure (GTCS), 24 (16%) of them had (CPS) Complex Partial Seizure, 12(8%) patients had Atonic seizure and in 7(5%) patients there was myoclonic and 2(1%) patient had mixed type. Relationship between type of seizure and TFT levels is demonstrated in table 1. Mean age, sex, body mass index were similar in all groups and there was no significant difference between these values between groups ($p>0.05$) ($P=.24$) ($P=.73$) ($p=0.5$). At the 6th month Ft3 (mean \pm SD) was 0.49 ± 0.24 ng/ml in CBZ, 1.17 ± 1.18 ng/ml in VLP and 0.3 ± 0.08 in primidone group these values were as follows at the end of study (at 12th month) 0.37 ± 0.56 ng/ml in CBZ 0.24 ± 0.23 in VLP

and 0.18 ± 0.43 in Primidone group. There was no significant difference in each group between 6th and 12th month of treatment. FT4 (mean \pm SD) was 0.89 ± 0.64 ng/ml in CBZ, 0.98 ± 0.45 ng/ml in VLP and 1.56 ± 0.55 in primidone group at the 12th month they were 0.32 ± 0.25 ng/ml in CBZ, 0.85 ± 0.32 ng/ml in VLP and 1.02 ± 0.85 in primidone .there was a significant difference between the values of FT4 in the 6th month and 12th month in group CBZ and PRM ($P=0.015$, $P=0.006$ respectively). And 6 months after the study TSH (mean \pm SD) was 3.03 ± 0.82 ng/ml in CBZ, 4.20 ± 1.19 ng/ml in VLP and 3.23 ± 1.75 in primidone group and these levels were 3.89 ± 0.54 ng/ml in CBZ, 4.39 ± 1.33 ng/ml in VLP and 2.67 ± 1.66 in primidone group at 6th month.there was just a significant difference between the 6th and 12th month of treatment in primidone group ($P=0.036$). The thyroid hormone levels in study subjects before and after prevention is shown in table 2.

Discussion

The aim of the present study was to investigate the effect of single-drug treatment with three "classic" antiepileptic drugs (carbamazepine, valproate and Primidone) on thyroid function.

As the brain is a target and important organ for thyroid hormones, it is demonstrated in some studies (25, 26) that even minor changes in thyroid

Table 1. Relationship between type of seizure and TFT levels

Type of seizure TFT	CPS	GTCS	Atonic	Myoclonic	P-Value
T3	2.06 ± 0.26	2.15 ± 0.81	2.41 ± 1.06	2.94 ± 0.24	0.215
T4	166.06 ± 53.29	170.09 ± 57.08	214.37 ± 71.21	214.37 ± 71.21	0.153
TSH	3.88 ± 0.53	4.01 ± 0.51	4.25 ± 0.76	4.06 ± 0.5	0.597

Table 2. Thyroid Hormone Levels before and after intervention

	Time	TSH(micU/l)	FT3ng/dl	T4ng/dL
CBZ	Before intervention	2.12 ± 2.02	$0.64\pm.24$	1.33 ± 0.83
	After 6 months	3.03 ± 0.82	0.49 ± 0.24	0.89 ± 0.64
	After 12 months	3.89 ± 0.54	0.37 ± 0.24	0.32 ± 0.25
VLP	Before intervention	3.93 ± 2.7	0.5 ± 0.43	1.02 ± 0.47
	After 6 months	4.20 ± 1.19	0.36 ± 0.64	0.98 ± 0.45
	After 12 months	4.39 ± 1.33	0.24 ± 0.23	0.85 ± 0.32
PRM	Before intervention	4.53 ± 1.9	0.64 ± 0.43	1.87 ± 0.43
	After 6 months	3.23 ± 1.75	0.3 ± 0.08	1.56 ± 0.55
	After 12 months	2.67 ± 1.66	0.18 ± 0.43	1.02 ± 0.85

hormones in the cases of subclinical hypothyroidism may cause somatic symptoms in children. (27) In our study, the levels of T4 were decreased in patients received CBZ and Primidone while it was unchanged in VPA treated patients. The level of FT3 in primidone treated children were diminished but it was not significantly different from the base line values while it was normal in 2 other groups. TSH was decreased in Primidone and were normal in all other patients. There are not significant relationship between age and gender and level of thyroid function test ($P=.24$) ($p=0.5$).

The finding of low serum T4 and FT4 concentrations in epilepsy patients receiving CBZ or Primidone is consistent with some studies (20, 23, 11). A decrease in serum T4, fT4 levels at 3rd, 6th and 12th months was observed in patients treated with CBZ and Primidone, whereas, there was no significant difference in T3, fT3 and TSH levels in CBZ group but in Primidone there was also decreasing in TSH levels. It was also a decrease in T3 levels which was not significantly different in Primidone group.

Carbamazepine as an antiepileptic drug is demonstrated in many studies that can decrease serum T4 and T3 with no significant change in TSH (28, 19, 11, 20) which will limit the ability of thyroid to relief suboptimal thyroid hormones (11). It seems that the effects of CBZ on thyroid function is more complex than it can be attributed to a single action of the drug. Apart from a direct effect(s) on thyroid gland suggested by De Luca et al. (24) it has been postulated that the serum T4 and FT4 levels are low in epileptic patients receiving CBZ because of accelerated metabolism of thyroid hormones in the liver (29, 30, 31). These data can be explained by hepatic enzyme induction that is probably slight in VPA-treated patients. Furthermore, an increased peripheral conversion of T4 to T3 during CBZ has also been suggested (29) as an explanation for the only slightly changed or unchanged serum T3 levels. The possibility of the competitive binding of CBZ on thyroxine-binding globulin has also been raised (30, 32, 33). The results of the present study indirectly support the hypothesis that increased degradation of thyroid hormones is the main reason for decreased T4 and FT4 serum levels. CBZ is a well-known stimulant of the microsomal enzyme system of the

liver-metabolizing thyroid hormones (34), whereas VPA does not seem to have a similar enzyme-inducing effect (35, 36).

The results of thyroid hormone levels in patients received Valproate was in normal level and we concluded that valproate has not significant effect on thyroid hormone levels. Our findings were similar to some recent studies (37) but the studies are controversial. Normal or increased levels of thyroid hormones both are reported in some studies. In study of Vainionpää LK et al (19) slightly increasing in TSH with normal levels of T4 and T3 was reported., although István et al. (36) and Bentsen et al. (28) reported decreases in T4 and free T4, and Eiris-Puñal et al. (39) reported decreases in T4, T3, free T4, and thyroxine-binding globulin. Primidone is an anticonvulsant which is metabolized by CYP2C9/19 to phenobarbital and phenylethylmalonamide (PEMA). Both of these metabolites have anticonvulsant activities. However, it is generally believed that the pharmacological action of primidone is due mainly to the minor metabolite, phenobarbital. Thus, primidone is much less potent/toxic than phenobarbital since most of the drug is rapidly degraded to the less potent metabolite, PEMA. (40)

In primidone-treated patients there were significantly decreased serum concentrations of T4 and TSH levels which was similar to some other studies (39, 10, 20) in some other studies it is demonstrated that the effect of primidone on thyroid hormones is relatively mild (10-20). In our patients the levels of T3 were not significantly different from the baseline levels. Which was different from the study of Tanaka et al in 1987 in which they demonstrated reduction of T3 after 6 years of Phenobarbital use (42) Because Phenobarbital is known to be an inducer synthesis of the microsomal drug-metabolizing enzyme system in the liver, this can cause an increased turnover of T4 which results in a decreased serum concentration of total and free T4 finally. (43) It seems possible that there is a balance in serum concentration of thyroid hormones on a lower level. Normal euthyroid state may be presumed, if T4-secretion raises, but there is no clue for an increased pituitary response. In contrast to the normal group in primidone-treated children the baseline serum TSH values are decreased. It is supposed that another effect of Primidone is responsible

for this fact. There may be an influence of Primidone treatment on hypothalamic pituitary axis. Our findings do not indicate clearly a hypothyroid state in primidone-treated patients; further investigations should give an answer to the question, if side effects as tiredness, decreased impetus and constipation are not partly caused by alterations in thyroid hormone system. It has been reported that the effect of AEDs on thyroid hormones would be disappear after termination of treatment (14,18) but although this may be true but the exact effect of these changes on thyroid hormones it is not clearly known during childhood (12,19) And it seems there is a need for long-term prospective studies on further evaluation of adverse effects of these drugs on thyroid hormones. Our study has several limitations we could not study the adverse effects of these drugs long term and also after discontinuation of the study.

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Primary cutaneous diffuse large B-cell lymphoma, leg type with Central Nervous System involvement

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Abstract

Introduction: Primary cutaneous diffuse large B-cell lymphoma, leg type is a new entity of actual World Health Organization (WHO) classification of lymphoid neoplasms with distinctive clinical, morphological and immunophenotypic features. This very rare subtype of lymphoma is characterized by the primary occurrence in the skin of the lower extremities, an aggressive clinical course and high relapse rate under different therapeutic regimens.

Case report: A 71-year-old female patient presented with bluish-red multicentric in part ulcerated nodular skin tumors of the left leg, with 2-5 cm in diameter. She noticed tumor-related changes two months earlier. The excision biopsy of a tumor was performed. The diagnosis of primary cutaneous diffuse large B-cell lymphoma, leg type was obtained on review of the hematoxylin and eosin slides and immunophenotypic data. Treatment with 8 cycles of rituximab combined with doxorubicin, cyclophosphamide, vincristine, and prednisone, resulted in partial remission. Five months later she developed neurological symptoms, and PCR analysis confirmed the presence of monoclonal B-lymphoid population in the peripheral blood, bone marrow, and cerebrospinal fluid. Therapy for CNS lymphoma localisation remained without effect. She died 16 months after initial diagnosis.

Conclusion: Leptomeningeal central nervous system involvement as extracutaneous dissemination is a relatively uncommon for primary cutaneous diffuse large B-cell lymphoma, leg type. An aggressive course of this rare subtype of non-Hodgkin lymphoma often requires the use of combined modality treatment, with ongoing testing of some of them.

Key words: Primary non-Hodgkin lymphoma leg type, skin, CNS involvement, therapeutic modalities.

Introduction

Primary cutaneous B-cell lymphomas (PCBCLs) are a distinct group of B-cell non-Hodgkin lymphomas (NHL) which present exclusively in the skin and have different characteristics than their nodal counterparts (1,2). Primary cutaneous diffuse large B-cell lymphoma, leg type (PC-DLBCL-LT) represents approximately 5–10% of all primary cutaneous B-cell lymphoma. This type of lymphoma is characterized by a predilection for the leg, a high proportion of Bcl-2 expression (85%) (3), an advanced age at onset (mean age, 76 years). It is more frequent in women with M:F ratio of 1:3-4. This rare subtype of lymphoma is characterized by an aggressive clinical course and high relapse rate with dissemination to extracutaneous sites (1,4). The typical clinical presentation of PC-DLBCL-LT is a solitary red or bluish-red rapidly growing nodule, frequently ulcerated, most commonly arising in the lower extremities. Histopathologically, PC-DLBCL-LT is primarily defined on the basis of morphological features, i. e. the presence of diffuse, non-epidermotropic infiltrate of confluent sheets of large cells with round nuclei representing centroblasts and immunoblasts. The exclusion of a systemic non-Hodgkin diffuse large B-cell lymphoma at the time of initial diagnosis is essential for the diagnosis (3). The presence of multiple skin lesions, according to experience of Italian Study Group for Cutaneous Lymphoma, has been found to be an unfavourable prognostic factor. The overall 5-year survival is about 41% (5).

The clinical course and the prognosis of diffuse large B-cell lymphoma (DLBCLs) of the skin clearly distinguish them from nodal lymphomas with similar morphological aspects, thus underlying the need for different treatment modalities (4,5). Given the rarity of PC-DLBCL-LT, prospective randomized therapeutic trials are lacking. We present a case of PC-DLBCL-LT with secondary central nervous system (CNS) involvement 15 months after diagnosis.

Case report

In Februar 2005, a 71 year-old woman was referred by dermatologist for evaluation of a skin nodules of her left leg. Increased sweating and the appearance of rapidly growing skin nodules at left leg, she had noticed 3 months before. Family and personal history was negative for skin and lymphoproliferative diseases.

Physical examination revealed a number of individual painless, red-purple colored nodules, with 2-4,5 cm in diameter, located on the back-central and inferior part of the left leg. Some of them are ulcerated (Figure 1). The circumference of the left leg was slightly higher in the whole volume than the right. There were no palpable lymph nodes. Computed tomography of chest and abdomen as well as bone marrow aspiration were unconvincing. In laboratory studies to moderate elevated serum lactate dehydrogenase (LDH) 1081 U/L and intermediate grade anemia (with Hb 102 g/L). The staging procedures excluded an extra-cutaneous involvement of the disease.

The sample of skin infiltrate was analyzed by standard histological (hematoxylin-eosin) and immunohistochemical (Dako LSAB 2 HRP) procedures. Histologic examination showed preserved epidermis, with no tumor infiltrate (Figure 2). Histologically, there were numerous diffuse and irregular nodular tumor lymphoid infiltrates in the dermis and subcutaneous tissue. Tumor tissue was composed of large lymphoid cells with immunoblast morphology with round or slightly irregular nuclei, with prominent single nucleoli (Figure 3). Immunohistochemistry demonstrated positivity for CD20 (Figure 4), Bcl-2 (Figure 5) and IRF4/MUM1 (Figure 6). The proliferation rate was high - Ki67 was positive in 80% of tu-

mor cells. Based upon the clinical and immunohistological features a diagnosis of PC-DLBCL, LT was obtained.

Treatment with 8 cycles of rituximab combined with doxorubicin, cyclophosphamide, vincristine and prednisone (R-CHOP), resulted in partial remission. Five months later she was admitted to the hospital with headache, intermittent diplopia, right side ptosis, and multiple skin lesions of the left leg. A magnetic resonance image of the brain showed no abnormalities. However, examination of the bone marrow, peripheral blood and cerebrospinal fluid revealed the presence of neoplastic CD20 positive B-cells. B-cell clonality assessment was based on PCR amplification of the hypervariable region of IgH genes with the following oligonucleotide primers: FRIII/FRIV:5-CTGTCGACACGGCCGTGTATTACTG-3,5-ACTGCAGAGGAGACGGTGACC-3. PCR products were considered to be monoclonal if only one discrete band within the expected size range of 100–150 bp was observed on the gel after electrophoresis.

The patient developed leptomeningeal CNS involvement 15 months after diagnosis and died 1 month later despite therapy for CNS lymphoma localisation.



Figure 1. Rapid growing tumor with spontaneous ulceration on the left leg

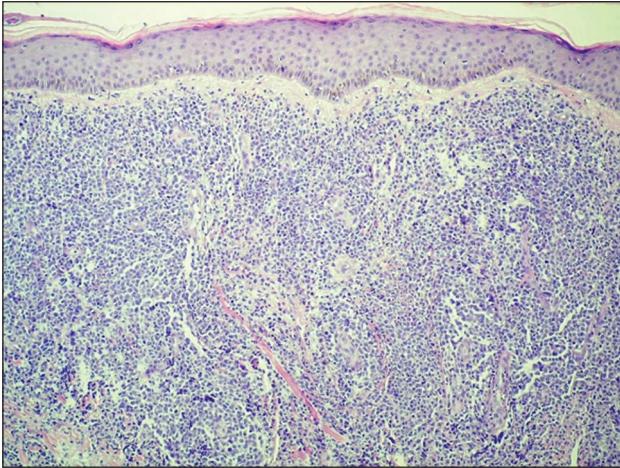


Figure 2. Diffuse lymphoid infiltrate in the reticular dermis area with preserved skin epidermis. (H&E staining; original magnification, x100)

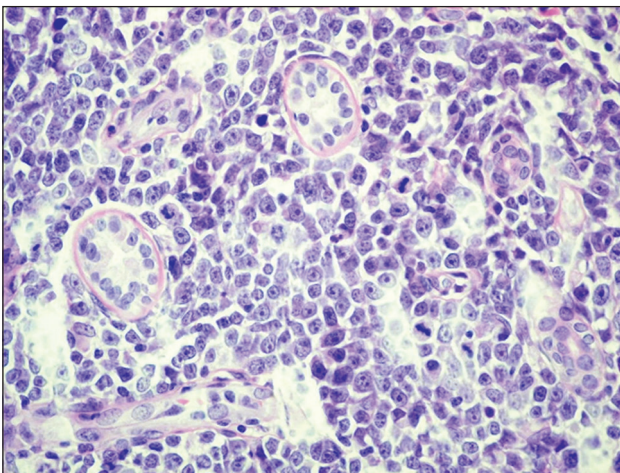


Figure 3. Tumor tissue composed of large lymphoid cells with immunoblast morphology. (H&E staining; original magnification, x100)

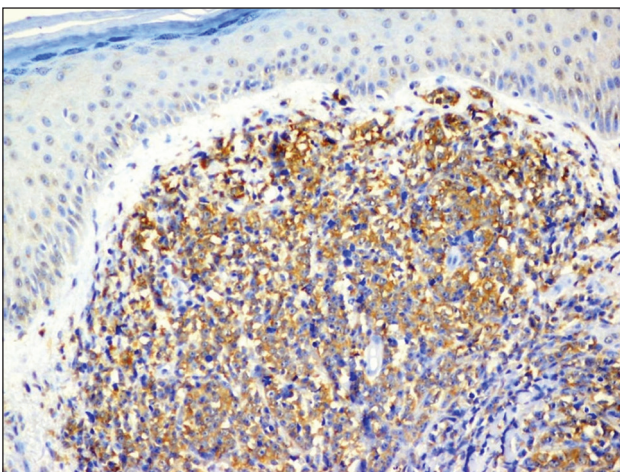


Figure 4. Large tumor cells are CD20 positive (Immunoperoxidase, CD20; original magnification, x100)

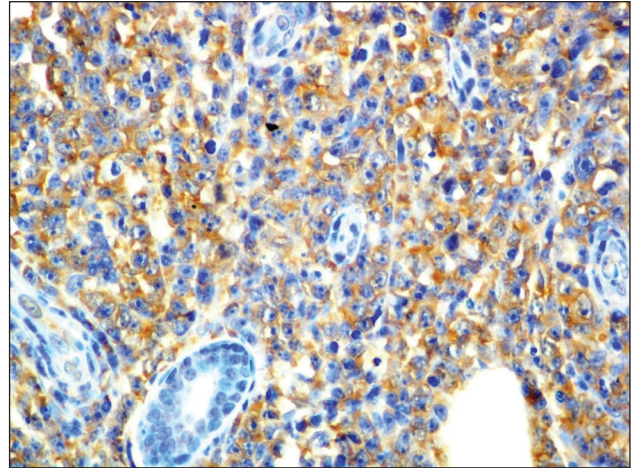


Figure 5. The neoplastic cells strongly express Bcl-2 (Immunoperoxidase, Bcl-2; original magnification, x400)

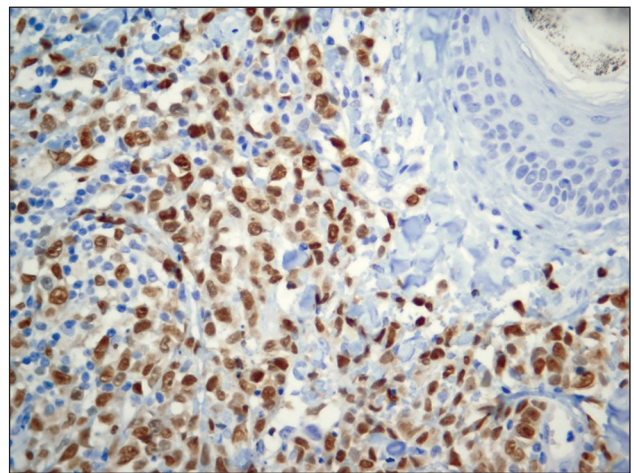


Figure 6. The neoplastic cells express MUM1 (Immunoperoxidase, MUM1; original magnification, x400)

Discussion

PCBCL with its main subtypes follicle centre cell lymphoma (FCL) and marginal zone lymphoma (MZL) according to the WHO-EORTC consensus classification is generally characterized by an indolent biological behaviour and an favorable prognosis (1,3). PC-DLBCL, LT, first reported in 1996 (6) has often progressing clinical course with a tendency of recurrence and extracutaneous dissemination. The majority of PC-DLBCL,LT demonstrate IRF4/MUM1 and especially strong Bcl-2 expression which is considered one of the causes of resistance towards various therapeutic strategies (7).

Survival analysis revealed a clear correlation between homozygous loss in chromosome 9p21.3

and reduced survival. Patients without homozygous loss in this region had an actuarial 5-year disease-specific survival of 68%, whereas patients with loss of at least one probe in this region had a 5-year survival of 39% (8).

Careful clinical and pathologic correlation was critical in confirming a diagnosis in our patient. Reports about PC-DLBCL, LT relapse in CNS are extremely rare (9), and therefore this case is worth our attention. Results of the study Bekkenka and associates showed that only 2% of PCBCLs can be complicated by the infiltration of the CNS (10). The secondary CNS involvement was an important cause of death in those studies, and in our patient too.

There is no known best treatment strategy for this often aggressive type of PCBCL. For the last fifteen years period as a first line therapy has accepted a combination of rituximab with CHOP protocol is standard in the treatment of PC-DLBCL (11).

Some case series of PC-DLBCL, LT illustrates that CHOP in combination with rituximab (R-CHOP) achieves objective clinical success (12). Immunochemotherapy with R-CHOP currently represents the most useful, but not as much as effective treatment. However, after a favorable therapeutic response achieved with R-CHOP combination, the disease shows a propensity towards relapses (13). On relapse, the same regimen with R-CHOP or different antineoplastic strategies (dermatologic radiation, immunotherapy with interleukin 2, gene therapy) were applied (14). Several retrospective series shows autologous stem cell transplantation as a useful therapeutic procedure in case of aggressive, relapsing PCLBCL, LT (15). The combination of ¹³¹I-tositumomab therapeutic regimen with BEAM and Autologo stem cell transplant, according to Vose and colleagues contributes to the overall three-year survival of 81%, without increasing toxicity (16).

Radioimmunotherapy (RIT) is a newer modality of target therapy in the treatment of B-cell NHL. Lower toxicity and ambulatory applications are the benefits of this therapeutic modality in the elderly and patients with comorbidity. Germany Study Group published in 2008. the promising results of applying ⁹⁰Y-ibritumomab tiuxetan as an effective treatment relapsing FCL and PC-DLBCL, LT (17). This study group recommends further research in controlled randomized clinical study. Aggravating

factor is that the PC-DLBCL, LT is a rare disease and cooperative study groups, in particular, individual centers have a limited number of patients who might be carried out in clinical studies. That the low incidence of CNS involvement there is no indication for prophylactic CNS chemotherapy at diagnosis PC-DLBCL, LT (9).

Conclusion

Patients with PCLBCL, LT lymphomas showed tendency of recurrence. But, these lymphomas rare develop CNS involvement, which contributes to poor prognosis, as shown in our patient. The treatment PC-DLBCL, LT is the use of numerous therapeutic modalities, because prospective randomized therapeutic trials are lacking. Solutions for relapsing forms and extracutaneous dissemination do not yet exist. The development of effective therapeutic modalities that these patients in elders age well tolerated, is underway.

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Iranian health new financial management reform: strengths, weaknesses and implications for future

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Abstract

Background: In this research, we conclude and analyze the most important strong and weak points of new financial health system in the units covered by universities of medical sciences from the point of view of authorities for executing it in two medium and operational levels.

Method: This qualitative research conducted on 15 of the most active trainers of the new health financial system were selected among universities of medical sciences for participation in expert panels, And 8 financial managers of different universities of medical sciences and member of technical committee of financial managers of MOHME were interviewed in deep and semi- structured way. Data analysis process was performed by Krueger method. In order to ensure accuracy of the obtained finding, peer check method was used and there was high agreement between the obtained themes and validity of the finding.

Results: Results deriving from individual interviews and expert panels, lead to present 7 main themes about weaknesses and other 7 main themes about strengths of the Iranian health new financial management reform, each contains some important sub themes.

Conclusion: It is suggested to take action regarding formation of specialized workgroup composed of senior, middle managers and operational personnel employed in universities of medical sciences for agreement and presentation of strategy for exclusion of weaknesses, increase of strengths and conversion of weaknesses to strengths with regard to weaknesses resulting from limitations of information system in software and hardware aspect,

structural limitations, establishments, communication, payment system and bureaucracy, financial limitations, process limitations and the proposed strategies are tested as pilot method after prioritization and channelization before settlement of the second phase of reforms in the country and achievements shall be used for elevation of the entire health financial new reform in universities and faculties of medical sciences covered by MOHME.

Key words: Ministry of Health and Medical Education (MOHME), Iranian health new financial management reform, accrual accounting, strenght, weakness.

Introduction

Ministry of Health and Medical Education as a main trustee of society health, is an institution which shall explain orientations, policies and strategies, effectiveness on behavior of the actors inside and outside the sections, general supervision, direction of efforts and development of national health actions (1), while the World Health Organization (WHO) believes that ministries of health in the developing countries have less effective and bureaucratic and centralistic governmental administrative systems (2).

In order to remove these limitations, reforms of financial management and accountability in governmental section in the world started before 2000 in Australia and change of accounting approach from cash to accrual approach was considered as the main part of financial management reforms in governmental section (3). In Iran, special problems of health and therapeutic section caused reform as an example of governmental sections such as cash

registration and financial confiscation of the receivables and payables, registration of properties and assets purchase in the cost statements, weak preparation of financial reports, failure to prepare financial statements and ambiguous performance of the budget (4). Necessity for attention to credit at time of creating cost or accrual, execution of local effective controls, integration and standardization of the processes, budgeting on the basis of activity, budget control and analysis of deviation from the plan, reform of organizational structure and homogenization of data are regarded as the most important priorities of health section in order to achieve optimal financial management system (5,6).

In addition to what was said before, the said ministry in Iran sustained heavy costs which were imposed due to governmental and private credits in each year and covers major costs of health and treatment which necessitated reforms and optimal financial management in this ministry and its subsets (3).

On the other hand, due to lack of strong relationship in Information world and weak decision on the basis of information and due to the fact that human resources, logistic, financial and budget information and the available financial systems in health and therapeutic section of the island (7), reform of financial system of health and medical education section and execution of modern financial system in universities of medical sciences and therapeutic services covered by Ministry of Health and Medical Education after discussion and pilot execution and culture building during 4 phases in order to remove the said limitations since 2005 were regarded as priorities of the respective ministry.

The first phase of this system is establishment of accrual accounting system instead of cash accounting. Governmental units of the country and universities of medical sciences and subset of Ministry of Health and Medical Education before 2005 used cash accounting basis in order to record financial events. Cash accounting records receivables and payables and cash balances at time of cash exchange. Therefore, financial statements based on cash accounting traditionally show sources for receiving cash fund and allocation to cash expenses and compare it with budgeted expenses while it is not proper to use this system for execution of the related plans of the government due to effective use of public sources (8).

Different studies have been done on preference of accrual accounting in cash method for example Mellor believes that reporting based on accrual provides the government and large public institutes with opportunity to reform management of assets and debts (9). Deloitte also believes that it seems to be more desirable to use accrual accounting in comparison with traditional cash accounting because the incurred expenses are compared with performance goals not the budgets which have been agreed before (10). In addition, IFAC 2000 standard emphasizes on use of accrual basis and use of cash basis decreases ability of the applicants to assess responsibility to answer the government regarding the available sources because this system doesn't give any information about management of assets and debts of the government (11).

The second phase is the cost accounting which is very important means available to management to calculate cost price of the products with use of cost accounting and control costs of material, wage and other production costs. Use of this method is not only related to production section and banks, insurance companies, wholesale, transportation companies, aviation companies, universities and hospitals for more effectiveness (12). Since cost accounting considers details of indirect costs for the specified activities, it can be used as valuable means for financial decision making (13).

The third phase of the financial health system implementation is operational budgeting. Operational budgeting is a kind of planning, budgeting and assessment system which emphasizes on relation of the paid budget and the expected results. Increase of accountability based on the results, improvement of performance management and improvement of allocation are the most important advantages of this budgeting method (14) and finally the last financial new system execution phase, cost management and productivity which is regarded as final phase of this system and will give optimal decision-making model to the senior and middle managers and policymakers and decision makers after clarifying financial information.

With regard to problems of traditional system and with regard to emphasis of superior documents such as development fourth plan and financial and transaction bylaw of the universities and faculties of Medical Sciences across the country, state

public calculation law, civil services management law and board of trustees law, necessity of new financial system was realized in health system. At present, this system was executed in the first phase in the universities and faculties of medical sciences across the country. Although there is need for analysis of executive potentials of weak and strong points in order to remove probable deficiencies in the next phases, in this research, we conclude and analyze the most important strong and weak points of new financial health system in the units covered by universities of medical sciences from the point of view of authorities for executing it in two medium and operational levels.

Method

Goal of this qualitative research is to achieve round view of the financial authorities and experts of Ministry of Health and Medical Education in operational and middle level in order to find the most important weak and strong points of health financial system in universities of medical sciences as subset of Ministry of Health and Medical Education. In order to achieve points of view of these key informants, goal oriented or purposive sampling method was used. The reason for selection of this sampling method was that goal oriented or purposive sampling causes to search for nature and different dimensions of phenomenon (15). For this purpose, 15 of the most active trainers of the new health financial system were selected among universities of medical sciences for participation in expert panels. The inclusion criteria were having formal notification as educational trainer of new health financial system, execution of new health financial system in universities of medical sciences and working experience of 5 years above, formal or contractual employment and interests in discussions. In addition, 8 financial managers of different universities of medical sciences and member of technical committee of financial managers of Ministry of Health and Medical Education were interviewed in deep and semi-structured way.

The present research was designed in such a manner that a brainstorming session was held in presence of researchers and trainers in order to create common language and mental framework. Goal of this session was to define strong and

weak points of the new health financial system. After brainstorming session, each one of the trainers extracted unlimited list of weak and strong points of this plan by holding teams comprised of financial experts. Afterward, Topic guide form included two main questions and 6 sub questions was prepared by the researchers with use of financial experts' views of the performance budget and survey center of Ministry of Health and Medical Education and the all trainers were interviewed and discussed in two separate expert panels.

The said Topic guide form which was used in both stages of expert sessions and individual interviews was given to three educational trainers and two financial managers who were not among the selected interviewees after preparation in order to ensure validity and significance of the questions from the points of view of the respondents and its validity coefficient was 0.81.

In order to hold expert panels, necessary arrangements were made with universities and trainers one week before each session. These sessions were held in a quiet educational place far from worry of workplace. Term of these sessions was averagely 180 minutes. Each session was managed by three researchers so that one of them was supervisor, another one was coordinator and the third one was note taker who recorded all views and verbal and nonverbal reactions of the participants. In addition, all sessions of the panels were recorded by electronic systems after permission of the attendants.

Since one of the most fundamental and the best methods of gathering information which cause the persons to express their views about the subject of research (16) is individual interview and with regard to the fact that nonstructural and semi-structured nature of this interview increases cooperation of the persons during interview due to lack of specified barriers (17), 8 senior managers of different universities who were interested in discussion were interviewed in deep and semi-structured way in the second phase of the present research.

In order to increase quality and efficiency of work, interview sessions were predetermined before and the participants were coordinated. During this coordination, the persons were told that confidentiality of data and anonymity of the interviewees will be completely kept and the participants were allowed to withdraw from cooperation

as they want to do in spite of primary agreement at any time of interview and written consent form was filled out and signed by the interviewees in the next phase for all persons who were ready for cooperation consciously and voluntarily. In order to increase issues relating to authenticity, accuracy and keep confidentiality of the interviews, we tried to define a tranquil place far from worry of the workplace for interview so that entrance and exit of the clients and telephone ring don't bother the interviewees and disorder the session. The interview took between 45 and 55 minutes and all sessions times were recorded by two electronic systems in order to prevent potential problems.

Panel sessions and individual interviews were implemented and written on the paper after two times listening to each recorded file right at the end of each session so that one can know similarity and closeness of the persons to achieve data saturation and interview sessions were stopped after reaching this level. In order to ensure authenticity of the rewritten conversation, the said texts were revised and confirmed by the interviewees.

Data analysis process was performed by Krueger method (18). At first, the notes were reviewed and the unrelated subjects were deleted by one researcher who had no conflict of interests and was not among staff of the health new financial management reform by comparing notes and referring to audio files. In addition, all audio files and texts were dated and coded and arranged on the basis of goal of the study and themes and sub themes were extracted from it. After selecting sub themes, frequency of each one of them was specified and reported as number/percentage.

In addition, in order to ensure accuracy of the obtained finding, peer check method was used so that some rewritten texts were given to two authorities anonymously for qualitative research to be recoded and clustered and there was high agreement between the obtained themes and validity of the finding.

Finding

Finding of the texts and content analysis obtained from expert panels and individual interviews with trainers of new reform and financial managers of the universities covered by Ministry of Health

and Medical Education regarding weaknesses and strengths led to presentation of main and sub themes regarding strengths and weaknesses as follows:

First axis: strengths of health new financial management reform

Table 1 gives the most important strengths of new financial management reform with help of trainers and financial managers as seven main themes.

I Ability of human resources

Human resources are one of the most important potential abilities of each organization and work unit in all levels of operational forces to middle and senior managers. 22 out of total present interviewees (23) believe that specialized and committed staff of financial section in universities of medical sciences is regarded as the most important strengths of new health financial reform (96% of the respondents). For example: "execution of new financial reform caused many educated persons to enter the system while the number of educated financial staff especially those with financial and accounting education was low in the past. On the other hand, new health financial reform caused to have a set of staff in different units with high synergy and this is a key to success of the plan execution" (P8)¹. The participants regarded staff with low expectation who worked in financial units of the universities as the important strength in execution of this reform. Presence of the ready authorities was another strength which had role in successful execution of new financial reform.

II Effective educations

Many respondents (20 persons/87%) regarded role of educational courses effective on promotion of knowledge and attitude of the staff involved in execution of new financial reform. One of the participants says that: "many educational courses as workshop or workgroup for financial reform trainers and managers was held since execution of the plan up to now which played important role in creation of knowledge and improvement of the persons' attitude toward this reform" (P13). In addition, technical committee composed of financial and budget managers and in presence of health section

¹ Participant number 8

auditors in universities and faculties of medical sciences and holding national and international synergic conferences for exchange of views and discussion especially in presence of managers were other strengths which participants mentioned.

III Integrated information system

Most of the participants (21 persons/91%) believed that health new financial management reform has integrated information system. For instance: “the point about software is that integrated software in most universities for execution of accrual accounting and other given phases is suitable and integrated software which has been predetermined in access level of the managers and staff to the classified information”(P18). In addition, 20 interviewees (87%) believed that health new financial management reform has systematic information system. “This software is suitable database which helps analyze data and retrieve information” (P5). In addition to other participants, other important factors such as information system critical process, reliability of the obtained information and speed of data transfer and the produced information as the most important sub themes of the information systems strengths.

IV Culture and dynamic relations

Many interviewees (19 persons /83%) referred to work culture, sound competition and team making as the important strengths of new financial system execution. Some authorities referred to innovation culture as strength. “...Due to expansive execution of new financial system in the country, the fact that the managers were allowed to settle and domesticate this system is regarded as an important strength.” (P18).

V Structural suitability

Most participants (20 persons /87%) defined suitable structure in terms of number and combination of financial forces and departments in financial new reform executive stages instructions and structured and suitable local bylaw and instructions as strengths.

VI Efficiency and effectiveness

Comments of the authorities show that suitable and timely control levers of financial services and organization of financial information and equal

coding and application of theories, standards and new financial classifications as indices effective on efficiency and effectiveness of the provided services are regarded as the most important subtles of financial new reform strenghts.

VII Suitable equipments

18 interviewees (78%) referred to financial resources and enough equipment as strength in execution of financial new system. Some other believed that many resources are spent for training of trainers, managers and users of financial new system and because these trainings were cost effective, they are regarded as another strong point.

Second axis: weaknesses of financial new reform

Similarly, the most important weaknesses of financial new system have been summarized in seven main themes (table 2).

I Limitations of the staff

Most interviewees (20 persons /87%) believed that the number of specialized force employed in financial field is not enough. In spite of employment of the new personnel, the number of present personnel for execution of financial new reform is low due to retirement of some personnel.”... In addition to shortage of financial personnel, the number of the experts who are proficient in computer skills is low” (P11). Moreover, low satisfaction of the personnel with common payment system and high working volume and low job security feeling are other factors which 17 interviewees (74%) believe are regarded as limitations and weaknesses of the staff.

In this regard, one of the other authorities believes that “age gap between the employed forces causes a right skewness in normal distribution curve of the staff employed in financial units of the universities that is most staff has experience of 10 years below or between 20 and 30 years and this can be a limitation...” (P21).

II Limitations of the managers

Most of the participants in this research (20 persons /87%) believe that senior managers are not fully aware of financial new reform advantages or they don't know importance of financial field and budget and its key role in decision making. For

example.” the senior managers don’t know what information they need and how they can have access to this information. In addition, they don’t know what advantages this plan has for their system” (P20) or “... some senior managers see therapeutic section as the main section and pay less attention to their support sections” (P7). In addition, changes in rank of the senior managers and sometimes middle managers are other axes agreed by the participants as “...average changes of managers are so high that average management age of each middle manager in about 1.5-2 years and these changes can prevent work progress” (P2).

Weakness of suitable performance tools besides weakness of managers accountability system for performance and weakness of the managers’ attitude to changes were among the other factors which were classified as sub themes of managers limitations.

III Limitations of information systems

Most interviewees believed that information substructure system and hardware system face some limitations while only middle managers declared in software that complexity of the system is high and this makes software problematic but the trainers didn’t agree on this subject. For example, one of the managers declared that: “ it is not possible to edit software in universities and for some sections such as warehouse , meanwhile work process with software is not clear and has been composed of many stages causing need for more manpower “(P20).

IV Inefficient subcultures

Most managers and trainers (21 persons /91%) believe that resistance against system changes is one of the most important cultural barriers and inefficient subcultures. “...Many are afraid of changes and resist against them” (P3) or “many of the personnel and managers think that this system change from cash to accrual approach is temporary and are not durable...”(P2) . In addition, some subcultures such as routine work among the personnel, weak criticism and weakness of meritocracy and worry with convention in supervisory authorities are among the other cases which were mentioned in this regard.

V Structural limitations

Problems of payment system are the most important factors which more than 85% of the interviewees admitted. “Unfortunately, reward is given without regard to performance of the persons and their efficiency and special evaluation system is not available for this work...” (P19). On the other hand, “asymmetry of continual and non-continual benefits of staff personnel with guild units based on the duties assigned to them and failure to predict technical allowance items in actions of financial staff are the important problems of system” (P1). Weakness of establishment structure was one of the other cases as “there are no establishment structures and special establishment tools for health financial new system and it is necessary that they be merged with each other by creating an establishment”(P21) thought or “... role of financial managers shall be different from that of other managers in establishment structure reform...” (P20).

VI Process limitations

Most of the interviewees (19 persons, 82.6%) believe that delay in execution of accrual system process which leads to parallel cash and accrual system and time consuming process of access to end product of the health financial system is one of the process limitations for execution of this plan. for example, “...there is duplication feeling in personnel and it seems to be necessary that processes be reformed and improved continually...” (P21). In addition, no feedback about financial new system execution and outputs of the project, lack of annual operational and executive plan and lack of a formal process of strategy formulation were among other cases which were agreed in this subset.

VII Financial limitations

Lack of suitable and special budget for execution of financial new system and unjust distribution of the required equipment were the cases which were emphasized by trainers and managers.

Discussion and conclusion

Different studies mentioned many advantages of using accrual accounting which are increase of efficiency and productivity, clarification, increase

of internal controls, assessment of performance and measurement of stocks accounting, receiving accurate, speedy and timely reports, optimal use of resources and equipments, showing sizes and values and prevention from misuses (19-20).

In health system of Islamic Republic of Iran, change of accounting approach from cash to accrual one started since 2005 as the first phase of reforms and was established in all universities and faculties of medical sciences. With regard to the fact that the said system is ready to enter the second phase i.e. cost accounting after 6 years, it is necessary that we can use the obtained experience for more success of reforms in the next phases while being aware of all aspects, potentials and weaknesses and strengths.

In this regard, finding of the present study indicated that presence of young, committed and educated workers, sympathy and responsibility of the authorities and support of the managers, cost effective educations based on needs of the staff and managers, work culture, competition, creativity and team participation, local bylaws and instructions, financial sources and equipments are regarded as the most important strengths of the new financial management reform and it is evident that major policies shall be adopted to employ and keep these human resources and elevate them as priorities of Ministry of Health and Medical Education. On the other hand, with regard to the fact that other studies emphasize on positive and significant correlation between creativity, teamwork, risk management, and supportive leadership and performance and productivity of staff (21). Having the above strengths can help the universities covered by Ministry of Health do reforms as a desirable advantage.

In addition to speed of data transfer, reliability of data, systematic and process-oriented information system and integration of this system are regarded as other strengths of financial management reform. In this regard, other studies indicate that accounting information systems which are reliable and accessible help the organization accept and keep a strategic position and have access to optimal decision making points (22).

In spite of the mentioned strengths, the participants in this study classified weaknesses of financial management reform and it is evident that effort to remove them and planning for conversion

of these weaknesses to strengths through practical mechanisms shall be included in agenda of the decision makers and planners of the minister.

For example, what is classified as limitations of staff and managers is necessity of state survey study on the factors effective on satisfaction of the personnel, factors effective on weakness of awareness and attitude of managers toward financial management reform, reasons for changes in managerial ranks, etc and it is evident that results obtained from the future studies will help adopt executive policies to remove these weaknesses.

One of the other weaknesses mentioned in this research are insufficient number of specialized personnel in financial field. In this regard, studies of other countries indicate that the number of experienced accountants employed in public section is lower than the available need and investment has been suggested through training of new technical issues to the available personnel (23).

Holding group sessions between senior managers, middle managers and even operational staff can lead to creation of motivation and their positive attitude multilateral settlement of this system and increase of their obligation leads to their cooperation in terms of cultural limitations and unsuitable subcultures.

In order to decrease resistance of personnel and managers, we can use different methods of information and increase of the persons' awareness to reduce fear with the unknown. Other studies indicate that resistance against change is one of common barriers and problems in accrual accounting settlement and execution process in public section and information reduces resistance against changes (24).

In addition to what was said, it is suggested to take action regarding formation of specialized workgroup composed of senior, middle managers and operational personnel employed in universities of medical sciences for agreement and presentation of strategy for exclusion of weaknesses, increase of strengths and conversion of weaknesses to strengths with regard to weaknesses resulting from limitations of information system in software and hardware aspect, structural limitations, establishments, communication, payment system and bureaucracy, financial limitations and process limitations and the proposed strategies are tested as pilot method after prioritization and channelization before settlement

of the second phase of reforms in the country and achievements shall be used for elevation of the entire health financial new reform in universities and faculties of medical sciences covered by Ministry of Health and Medical Education.

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Factors effecting mortality in abdominal major vascular injuries

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Abstract

Background and Aim: Despite recent advancements of medical facilities and improvements in surgical techniques, traumatic abdominal major vascular injuries still has high morbidity and mortality rates. Our objective in this study is to investigate the factors effecting mortality in patients who had surgery due to abdominal major vascular injury.

Methods: Seventeen patients who had emergent surgery for abdominal major vascular injury were analyzed retrospectively. Age, gender, cause of injury, existence of additional organ injuries, vascular repair technique, blood replacement, mortality and duration of hospital stay are evaluated.

Results: The study group consisted of 16 male and 1 female patients. Average age was 28.4 ± 8.3 . Cause of injury was firearms for 15 patients (88.2 %), cutter for 1 patient (5.9 %) and traffic accident in vehicle for 1 patient (5.9 %). Iliac veins, iliac arteries and vena cava inferior were the most injured vessels. Elapsed time between injury and operation was 140.0 ± 18.2 minutes for patients who have died, 97.3 ± 16.1 minutes for the other patients ($p=0.003$). For patients who had additional organ injury accompanying vessel injury, mortality rate was higher ($p=0.028$). Four patients have died (23,5 %).

Conclusion: Successful surgical results in abdominal vascular injuries depend on well knowledge of abdominal vascular anatomy, experience in vascular repair techniques, less additional organ injury and surgical intervention without delay.

Key words: Trauma, abdominal vascular injuries, mortality.

Introduction

Major vessel injury is seen in 5-25 % patients admitting to emergency service for abdominal trauma (1). Despite recent advancements of medical facilities and improvements in surgical tech-

niques, traumatic abdominal major vascular injuries still has high morbidity and mortality rates (2). Hypovolemic shock due to excessive blood loss (acidose, hypothermia, coagulopathy and cardiac dysrhythmias may develop secondarily), additional organ injuries accompanying vessel injuries and prolongation of time between injury and operation are to be shown as main reasons for high mortality rate (3). The first objective has to be controlling intensive hemorrhage (4). Successful surgical results in abdominal vascular injuries depend on well knowledge of abdominal vascular anatomy, experience in vascular repair techniques, and surgical intervention without delay (5). Our objective in this study to investigate the factors effecting mortality in patients who had surgery due to rare but major abdominal vascular injury and results of surgical intervention.

Materials and method

17 patients were included to the study, who had surgery due to abdominal major vascular injury at Dicle University, Medicine Faculty, General Surgery Department between 2006 January and 2011 January. Patient files are analyzed retrospectively. Age, gender, cause of injury, existence of additional organ injuries, vascular repair technique, blood replacement, mortality and duration of hospital stay are evaluated. Following first treatments applied during transportation to hospital, treatments for metabolic disturbances have been started at emergency service. For adjustment of volume deficiency, rapid implementation of intravenous fluid, blood and blood products replacement have been started. Then these patients were given suitable antibiotic prophylaxis and had emergent operation. All patients had tetanus prophylaxis at emergency service.

Statistical analysis

In the evaluation of the study results, SPSS (Statistical Package for Social Sciences) Windows 11.5 program was used for statistical analysis. The quantitative data were indicated as mean \pm standard deviation. Kolmogorov-Smirnov test was utilized for the compatibility of normal distributed data. In comparison of the groups, Mann Whitney-U test was used in analysis of non-parametric data, while Chi-square test was used in the analysis of categorical data. P values < 0.05 were accepted to be significant for all variables.

Results

The study group consisted of 16 male (94 %) and 1 female patients (6 %). Average age was 28.4 ± 8.3 (17-45). Cause of injury was firearms for 15 patients (88.2 %), cutter for 1 patient (5.9 %) and traffic accident in vehicle for 1 patient (5.9 %). Injured vascular structures were external

iliac vein in 3 cases, vena cava inferior in 4 cases, common iliac vein in 5 cases, external iliac vein in 2 cases and lumbar branches of aorta in 1 case. All patients had additional organ injuries. There was intestinal injury in 6 patients (35,3 %), besides intestines, colon was injured also in 9 patients (52,9 %) and in two patients (11,8 %) liver, stomach and spleen injury was coexistent. Average time passing between injury and operation was 107.3 ± 24.6 (80-160) minutes. An average of 8.6 ± 4.0 (3-16) units of blood transfusion was made. Surgical procedures applied to patients were as follows; primary repair for 13 patients (76,5 %), end-to-end anastomosis for impaired vessel integrity of 2 patients (11,7 %) who had external iliac artery injury, internal iliac vein ligation for 1 patient (5,9 %) and artery ligation for 1 patient (5,9 %) who had hemorrhage at lumbar branches of aorta. 4 of the patients died (23,5 %). Average hospitalization days were 8.7 ± 5.0 (1-18). Age, blood transfusion quantity, and kind of injury

Table 1. Demographic characteristics of patients and factors effecting mortality

	Paitents died n (%)	Patients survived n (%)	p	n (%) or mean \pm SD
Age	29.0 \pm 4.5	28.2 \pm 9.3	0.703	28.4 \pm 8.3 (17-45)
Gender			0.567	
Male	4 (25)	12 (75)		16 (94,1)
Female		1 (100)		1 (5,9)
Etioloji			0.706	
Firearms	4 (26,7)	11 (73,3)		15 (88,2)
Cutter		1 (100)		1 (5,9)
Traffic accident		1 (100)		1 (5,9)
İnjured vascular structure			0.255	
Iliac veins	1 (10)	9 (90)		10 (58,8)
Iliac arteries	1 (50)	1 (50)		2 (11,8)
Vena cava	2 (50)	2 (50)		4 (23,5)
Lomber branch of aorta		1 (100)		1 (5,9)
Additional organ injury			0.028	
Intestine	5 (83,3)	1 (16,7)		6 (35,3)
Intestine +colon	5 (55,6)	4 (44,4)		9 (52,9)
Liver+spleen+stomach	2 (100)			2 (11,8)
Blood transfusion (unit)	10.7 \pm 3.3	8.0 \pm 4.1	0.202	8.6 \pm 4.0 (3-16)
Time till operation (minutes)	140.0 \pm 18.2	97.3 \pm 16.1	0.003	107.3 \pm 24.6 (80-160)
Applied surgical procedure				
Primary repair				13 (76,4)
Anastomose				2 (11,8)
Ligation				2 (11,8)
Hospital stay (days)	1 \pm 0	11.0 \pm 2.9	0.001	8.7 \pm 5.0 (1-18)

red vessel had no significant effect on mortality ($p>0.05$). Time passing between injury and operation was 140.0 ± 18.2 minutes for patients who have died, 97.3 ± 16.1 minute for the other patients and the difference was statistically significant ($p=0.003$). For patients who had additional organ injury accompanying vessel injury, mortality rate was higher ($p=0.028$). There was not a significant correlation between gender and etiology of injury ($p>0.05$). Demographic characteristics and factors effecting mortality is shown in Table 1.

Discussion

The condition likely to be the most common reason of deaths due to obtuse or penetrating abdominal trauma is major abdominal vessel injuries (6). This situation continues to be a problem for trauma surgeons because of high mortality and morbidity rates. In scientific literature, mortality rates due to abdominal major vessel injuries differ in range of 30-60 % (7). In our study, mortality rate was 23.5 %. Studies showed 80-95 % of abdominal major vessel injuries are result of penetrating trauma (8). This rate was 94.1 % in our study. Thanks to advances in pre-hospitalization services, patients who have life threatening conditions are arriving hospitals earlier. A study conducted by Kashuk et al. reported that average time passing between injury and operation is 67 minutes (9). This period is reported as 99 minutes by Bedirli et al. (10). In our study it was calculated as 107 minutes. In patients who had abdominal trauma and vessel injury, priority is to stop hemorrhage and to obtain visceral blood flow rapidly (11). This indicates the importance of time passing between injury and operation. In our study, time passing between injury and operation was 140.0 minutes for patients who died, 97.3 minutes for the other patients and the difference was statistically significant ($p=0.003$). Tyburski et al. conducted a study with 470 patients in which 210 (45 %) patients have died. High mortality rates (57 %) were found among patients injured by obtuse trauma and firearms while cutter injuries had lower mortality rate (30%) (7). All of 4 patients who have died in our study have had firearm injuries. Ekbom et al. have observed 20 % mortality in patients who had only vessel injury. In the same study, when vessel injury is accompanied by 5 or more organ injuries,

mortality rate becomes 100 % (12). In a study conducted by Bozdağ et al. average of injured organ number was 2.4 in the dead patients', while in the ones who lived it was 1.7 (13). In our cases, average injured organ number was 1.3 in the group of patients who lived, and 3.2 in the ones who died, and the difference was significant ($p=0.028$). To prevent the damage which may be caused by massive blood transfusion and insufficient surgical intervention during bleeding control, planned re-operations are talked about recently in literature. In that case, the patient is taken to definitive surgery in 24-48 hours, only after bleeding is controlled and blood flow for visceral organs is obtained, hypothermia, coagulopathy and acidose is corrected (11). Even though we didn't perform any planned re-operation for patients, we believe that in necessary cases it would be a life saving method.

Conclusion

As a result, despite recent improvements in surgical techniques and fast resuscitation facilities, abdominal major vascular injuries still has high mortality rates. Successful surgical results in abdominal vascular injuries depend on well knowledge of abdominal vascular anatomy, experience in vascular repair techniques, less additional organ injury and surgical intervention without delay.

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Developing critical thinking disposition in the students of nursing and midwifery through collaborative and individual methods of learning

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Abstract

Introduction: With regard to importance of ideal critical thinker in education and learning and improvement of Critical thinking Disposition, this study was carried out to provide an answer to the question: “If collaborative learning is used, will it develop critical thinking disposition in nursing and midwifery students?”

Methods and material: The Pretest and posttest equivalent-groups of quasi –experimental design was carried out on 115 nursing and midwifery students, they was divided in two groups of learning (collaborative and individual) as Experimental and control groups randomly. The California Critical Thinking Disposition Inventory (CCTDI) was utilized to gather the data. This tool is consisted an overall score on one’s Critical Thinking Disposition and seven sub- scales such as CT- Confidence, Truth- seeking, Analytical, Inquisitiveness, Systematicity, Maturity, and open- minded .

Findings: 83.3 % vs. 84.3% of participants in experimental and control groups were female, as well as 57.2% vs. 57.6% of experimental and control groups were Second year and the rest of them were third year grade, respectively. There were no significant differences between two groups in Total score and sub- scales (except inquisitiveness) of critical thinking disposition.

Conclusion: This study showed that critical thinking disposition does not improve in a short time by using active strategies. It seems critical thinking should be considered as a component that is infused in all courses so that students are exposed to experiences that facilitate development of high order thinking skill that can be applied to across disciplines.

Key word: Critical thinking disposition, nursing and midwifery students, Kermanshah, Iran.

Introduction

The concepts of critical thinking and critical thinking disposition have become increasingly important in nursing as well as midwifery (1). There is an assumption that critical thinking is essential to expert clinical decision-making and competent professional practice (2-4). Critical thinking is described as thinking that assesses itself (2,4,5). As well as, Critical thinking was defined in a Delphi report as a process of purposeful, self-regulatory judgment which results in interpretation, analysis, evaluation and inference (6). The report gives the following description of an ideal critical thinker: The ideal critical thinker is habitually inquisitive, well-informed, trustful of reason, open-minded in evaluation, honest in facing personal biases, prudent in making judgments, willing to reconsider, clear about issues, orderly in complex matters, diligent in seeking relevant information, reasonable in the selection of criteria, focused in inquiry and persistent in seeking results which are as precise as the subject and the circumstances of inquiry permit (7). There are important distinctions between critical thinking skills and critical thinking dispositions. The former pertains to thinking applications; the latter to character tendencies to think and act critically (8). The critical thinking dispositions or habits of mind explored are based on character attributes as suggested by Facione, Giancarlo, Facione, and Gainen (9). The critical thinking disposition consists of truth seeking, open-mindedness, analyticity, systematicity, critical thinking self-confidence, inquisitiveness, and maturity in judgment. (7) Paul (10) Facione et al., (6) and Norris (11) believe that the education of good critical thinkers includes the fostering of critical thinking dispositions, as well as the development

of critical thinking skills. Critical thinking disposition is also believed to be essential for students, primarily to ensure they use critical thinking skills in the classroom and later when they enter the workforce (12). The need for critical thinking in nursing as well as midwifery has been accentuated in response to the rapidly changing health care environment. Nurses and midwives must think critically to provide effective care whilst coping with the expansion in role associated with the complexities of current health care systems. The process of critical thinking will enhance the ability of nurses to identify clinical indicators, assess their significance and discuss areas for improvement.

Since many believe that in order to develop critical thinking skills, the disposition to think critically must be nurtured as well, and the most studies in Iran have been carried out on critical thinking of nursing and /or midwifery students not disposition of them as well as its development (13,14). This study was conducted to provide an answer to the question: "If collaborative learning is used, will it develop critical thinking disposition in nursing and midwifery students in Kermanshah?

Methods & materials

The present study is the Pretest and posttest equivalent-groups of quasi –experimental design. The population for this study consisted of under graduate third and fourth year students of nursing and midwifery of Kermanshah University of Medical sciences. 115 students took part in the study that was divided in two groups of learning randomly (Experimental and control group). There were 56 students in collaborative learning (Experimental group), and were used in a group size of 6. Thus, there were 9 groups of 6 students and 1 group of 5 students. Also, there were 59 students in the individual learning (control group). 18 out of 115 participants were males, and 49 of them were the third year students. In the present study, there were not significant differences between two groups by sex and class level. Tool of the present study was the California Critical Thinking Disposition Inventory (CCTDI) which was provided from California press. It is the most developed and used critical thinking disposition assessment instrument and consists of 75 "agree-disagree" Likert scale items and a

6 point response scale. This tool is consisted of 75 items which provide information on eight scores: an overall score on one's Critical Thinking Disposition and seven sub- scales. These seven scales are composed of nine to twelve items, (CT- Confidence, Truth- seeking, Analytical, Inquisitiveness, Systematicity, Maturity, and open- minded comprise 9, 12, 11, 10, 11, 10, 12 items respectively) and are interspersed through the instrument. Respondents are invited to express the extent to which they agree or disagree with each of total of 75 item statements. Responses record, using a six-point Likert scale ranging from "strongly agree" to "strongly disagree" with each item prompt. Each item takes 1 up to 6 points and there is no middle choice. It should be taken about 15 to 25 minutes to respond to the 75 items. Each scale score ranges from 10 up to 66 and total scores range from 70 up to 420. Scale scores ranging from 30 down to 10 indicate a more intensely negative disposition, scale scores from 40 to 60 indicate an increasing positive disposition. Scale scores between 30 and 40 indicate ambivalence toward the disposition i.e. no clear expression of either a positive or a negative disposition. An overall CCTDI total score of less than 280 could be used as a cut-off indicator of overall deficiency in the disposition toward critical thinking. Scores below 210 indicate a significant opposition toward critical thinking. Similarly an overall score of 350 or more could be used as a general indication of across the board strength in the disposition toward critical thinking. Table 1 expresses the categorization of scores. To ascertain the content validity, the draft version of the CCTDI was given to experts in the field of English language and psychology and Farsi language. A few items of CCTDI tool were needed to revise based on experts' opinion. After confirming the Farsi version of CCTDI, it was distributed to 198 nursing students requested to complete the CCTDI instrument. Cronbach's Alpha coefficients were applied to determine the reliability for total and sub-scales scores. The most coefficient belonged to total score which obtained 0.792 and at least coefficient belonged to Open-mindedness 0.419 and Cronbach's Alpha coefficients other sub-scales consisted of Truth-seeking, Analyticity, Systematicity, CT-Confidence, Inquisitiveness and Maturity were 0.55, 0.54, 0.5, 0.71, 0.5 and 0.42 respectively. The researcher first obtained permission from

Kermanshah University of Medical Sciences for administering the tests and took up a research topic workshop. Instructional material included teaching material and work sheet and solution sheet. This design compared the status of a group that received an experimental treatment with one that did not. Pretest was administered before the application of the experimental and control treatments and posttest at the end of the treatment period. All participants had never taken part in the critical thinking course. The treatment comprised of two parts: Lecture and work sheet. Initially the researcher took up the Farsi version of California Critical Thinking Disposition Inventory as the pretest of both the experimental and control groups. After the pretest a common lecture was delivered simultaneously to both groups (individual and collaborative method of learning) to prevent the effect of any extraneous variable such as time of day, day of work, lighting of room and other things. The lecture was taken for 50 minutes. After lecture, the work sheet was distributed among participants. Then, the task was explained; group's members pulled chairs in to close circles and started working on the work sheet. The work sheet included 9 questions which were designed in essay type of questions. They were given 30 minutes to discuss the questions within the group and come to a consensus. At the end of 30 minutes, the solution sheet was distributed. The participants dis-

cussed their answers within groups for 15 minutes. In control group, the students worked on the worksheet by themselves. They were given 30 minutes to work on it. At the end of 30 minutes, they were given a sheet with answers to check their answers on the work sheet. At the end of session the posttest was distributed among students to collect data. The gathered data were analyzed by descriptive (frequency, percent) and inferential statistics (X^2 , T test and Fisher's Exact test)

Findings

The results showed that 83.3% VS. 84.4% of experimental and control groups were female, respectively and there were no significant differences between two groups in sex of participants. 55.6 of participants were midwifery and the rest of them were nursing students. 42.85 Vs. 42.4% Of experimental and control groups were third year which there was not significant different between two groups. 42.2% of midwifery students and 29.4% of nursing students were ambivalence in total of critical thinking disposition, which were not significant differences in critical thinking disposition and sub-scales between midwifery and nursing students., as well as there were no significant differences in pre and posttest between midwifery and nursing students.

Table 1. Categorization of sub-scales and total scores of the critical thinking disposition

Scales	Negative	Deficiency	Ambivalence	Positive
Critical thinking				
Sub scales	10-30	-----	30-40	40-60
Total	<210	210-280	280-350	>350

Table 2. The distribution of total of critical thinking disposition and sub-scales scores

Score	Experimental		Control		Experimental		Control	
	pretest		P value		posttest		P Value	
	M±SD	M±SD			M±SD	M±SD		
Truth-seeking	30.5±7.05	30.2±5.9	N.S		32.05±5.2	30.8±6.1	N.S	
Open-mindedness	38.9±4	37.1±4.5	N.S		38.3±4.6	37.9±4.6	N.S	
Analyticity	47.7±5.3	47±4.4	N.S		45.4±5.5	45.4±5.1	N.S	
Systematicity	41.02±6.2	42.1±6.6	N.S		41.5±6.1	40.9±6.1	N.S	
CT-Confidence	48.8±6.8	47.6±5.4	N.S		46.2±7.5	40.7±5.7	N.S	
Maturity	38.2±7.6	37.3±6.6	N.S		38±6.7	37.5±7.4	N.S	
Inquisitiveness	44.2±6.5	42.4±5.5	N.S		43.9±5.6	41.8±5.3	<0.004	
Total	289±25.5	284±22.8	N.S		286.2±23.3	281.1±22.6	N.S	

Table 3. The posttest of total of critical thinking disposition and sub-scales

<div>Groups</div> <div>Scales</div>	Experimental			Control			PV
	Negative	Ambivalence	Positive	Negative	Ambivalence	Positive	
	N (%)			N (%)			
Truth-seeking	24(42.9)	32(57.1)	0(0)	26(44.1)	33(55.9)	0(0)	NS
Open-mindedness	0(0)	40(71.4)	16(28.6)	0(0)	43(72.9)	16(27.1)	NS
Analyticity	0(0)	11(19.6)	45(80.4)	0(0)	12(20.3)	47(79.8)	NS
Systematicity	0(0)	26(46.4)	30(53.6)	0(0)	27(45.8)	32(54.2)	NS
CT-Confidence	0(0)	14(25)	42(75)	0(0)	8(13.6)	51(86.4)	NS
Maturity	6(10.7)	27(48.2)	23(41.1)	11(18.6)	28(47.5)	20(33.9)	NS
Inquisitiveness	0(0)	13(23.2)	43(76.8)	0(0)	25(42.4)	34(57.6)	NS
Total	Deficient 27(48.2)	29(51.8)	0(0)	Deficient 28(47.5)	31(52.5)	0(0)	NS

Table 4. The pretest and post test scales of total of critical thinking disposition with respect to the sex

sex \ scales	Female N(P)	Male N(P)	Female N(P)	Male n(P)
	pretest		posttest	
Deficient	36(37.5)	7(38.9)	45(46.9)	9(50)
Ambivalence	60(62.5)	11(61.1)	51(50.5)	9(50)
Total	96(100)	18(100)	96(100)	18(100)
	N.S		N.S	

Table 5. The pretest and post test scales of total of critical thinking disposition with respect to the to the class level

sex \ scales	Second N(P)	Third N(P)	Second N(P)	Third n(P)
	pretest		posttest	
Deficient	25(37.9)	19(38.8)	31(47)	24(49)
Ambivalence	41(40.7)	30(61.2)	35(53)	25(51)
Total	66(100)	49(100)	66(100)	49(100)
	N.S		N.S	

Table 2 show the pretest and posttest scores of experimental and control groups. There were no significant differences between two groups in critical thinking disposition and sub-scales pretest except of inquisitiveness, which was significant different (<0.004). Table 3 show the post test of total of critical thinking and sub-scales. Tables 4 and 5 show the total of critical thinking disposition scales with respect to class level and sex. In pretest 37.5% vs. 38.9% and in posttest 46.9% vs. 50% were female and male that they attained efficient as well as 37.9% vs. 38.8% and in 47% vs. 49% were second and third class level that they attained efficient in critical thinking disposition respectively.

Discussion

The findings of the study showed that there was no difference between experimental and control groups toward critical thinking disposition and 6 of sub-scales, but two groups were different in the posttest scores of inquisitiveness; experimental group has scored more than control group. It is evident that, those students who participated in collaborative learning had performed significantly better on the critical thinking test than students who studied individually (Cooper, 1995 170 / id; Totten, 1991 171 / id). Not only that but, it looks that group diversity in terms of knowledge and experiences contributes positively to the le-

arning process, since in the present study all participants were homogeneous in knowledge and experiences about the taught topic, there was no opportunity that they discuss deeply the questions. On the other hand, dispositions are attitudinal in nature and develop over time. They are influenced by significant adults, peers and environment factors. Dispositions are strong precursors of critical thinking and although they can be changed, they change slowly overtime. It seems that CCTDI gives no over the course of a session (which in this study was done) nor does it suggest instruction method or materials that might lead to a change in a student's critical thinking disposition. It seems students' behavioral dispositions do not change in a short time but cognitive skills can be developed over a relatively short period of time (7). In contrast to behavioral disposition the critical thinking skills can be measurably changed in weeks. Besides, Regardless of the methods used to promote critical thinking, care must be taken to consider the many factors that may inhibit a student from thinking critically. It is clear that without critical thinking people would be more easily exploited not only politically but economically, the experts say critical thinking is fundamental to, if not essential for, a rational and democratic society; also the lack of these skills can keep people from being particularly effective in a democratic society. For liberal education level educators must commit to sharpening student's cognitive skills as well as strengthening their disposition toward critical thinking. Nurturing these skills and disposition facilitates students, recognition of opportunities to use thinking to resolve problems as well as inclines students toward doing so (7). Furthermore, experts argue that critical thinking requires an integration of cognitive and affective domains. Content in any discipline should be viewed and taught as a mode of thinking (17). After considering the above, based on researcher opinion, lack critical thinking knowledge, consequently lack of critical thinking disposition among students; also lack of course curriculum based on critical thinking strategies in the nursing school might results to acquire the findings of this study. As an educator it is our duty to do our best to improve the critical thinking among our students. It can develop with practice and evaluation overtime using multiple

strategies; Educators can use various instructional methods to promote critical thinking and problem solving. Teachers need to become more tolerant of conflict or confrontation in the classroom. They need to raise issues which create dissonance and refrain from expressing their own bias, letting the students debate and resolve problems. A curriculum which provides students with the opportunity to develop thinking skill must be in place. Furthermore Critical thinking skill must be learned by the students themselves working cooperatively or individually. As it is mentioned above, in the study Inquisitiveness disposition changed and improved in experimental group. It looks, when the students were interacting; the new topic of lesson was a motivator to make them curious and inquisitive in experimental group.

In this study, the findings showed that there was no difference between two groups with respect to gender toward critical thinking disposition. Giancarlo et al in their study found that there was no significant difference in scores for males and females toward total of critical thinking but females tended to be more Open-mindedness and have more mature judgments than males, also some researcher have found there was no significant difference toward critical thinking among females and males (18). After considering above the question of gender difference in critical thinking remains a topic of controversy among scholars. All teachers who see their responsibility to improve critical thinking among students should consider the following tip: both female and males need to be similarly encouraged in developing their abilities to think critically. Instructors should avoid untested assumptions about which students are most ready to improve their abilities to think critically.

In the present study, as well as, there was no difference between two groups toward critical thinking disposition with respect to class level. Mirmolaei et al., (14) showed no significant difference between class levels toward critical thinking among students. Today, it is believed that critical thinking has become an essential element in all levels of education. Above all, these findings emphasize on learning critical thinking which needs a long time and they are same as human development, should be improved gradually and continuously.

As a whole, this study showed that critical thinking disposition does not improve in a short time by using active strategies. It seems critical thinking should be considered as a component that is infused in all courses so that students are exposed to experiences that facilitate development of high order thinking skill that can be applied to across disciplines; on the other hand, learning environments that encourage critical thinking promote active learning through frequent questions and provide enough support to allow students to challenge their current conceptions of knowledge and interact with other students.

Acknowledgement

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The role of the palatal obturator in feeding a newborn with isolated cleft of secondary palate

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Abstract

Introduction: Isolated cleft of secondary palate is a common maxillofacial defect (0.1-1.1 per 1000 live infants). It is more common in female newborns. One of the most important problems occurring in babies born with such cleft palate type is feeding malfunction. Due to a cleft and communication between oral and nasal cavity, newborns are incapable of creating negative pressure indispensable for sucking. To eliminate the nasal-gastric probe and achieve better nutrition before the surgery, it is advisable to use RBJ obturator, which is unique in terms of construction, for it excludes the presence of extra-oral fixation, and basically consists of a perfectly precise palate and alveolar ridge impression.

Case study: A female baby born in February 2008 with a completely defected hard and soft palate and well-defined nasal septum in the middle of it. Due to feeding malfunction, the newborn was admitted to the Nis Dental Clinic.

Conclusion: RBJ obturator enables smooth feeding; it decreases the time of food intake and increases the quantity of milk taken. As a matter of fact, it adds to better newborn nutrition in general, which is highly important during pre-surgical preparations. The use of RJB obturator is thus recommended for feeding of newborns with isolated cleft of secondary palate. The therapy has to be administered as soon as possible.

Key words: Cleft palate, obturator, feeding.

Introduction

Isolated cleft of the secondary palate is a defect that typically occurs in maxillofacial area (1,2). It is common in our region (3,4). The seriousness of

situation is enhanced by the fact that the defect has direct influence on lives of newborns from the moment of birth. The priority is to provide nutrition needed for newborn's growth and development. Furthermore, nutrition is important for optimal weight gain, to prepare a newborn for the corrective surgery. Negative pressure in the oral cavity is fundamental for sucking function to be performed. Yet, due to a wide communication between nasal and oral cavity, the creation of vacuum is disabled (5). Trying to suck thus creates a series of problems that frustrate newborns, as well as their parents. Each effort to perform sucking means a sequence of unpleasant events that can even imperil a newborn's life. What is meant by that, is nasal recruitment in the first place, then excessive air swallowing (6), hiccupping, coughing, vomiting, difficulty swallowing, aspiration of milk into lungs, and cyanosis. Newborns are thus exposed to prolonged feeding which is not continuous, but intersected by constant pauses. It usually exhausts them, so they fall asleep during breastfeeding. As a result, weight gain is decreased (7).

As a result of feeding malfunction, tongue position becomes adverse, and later on affects speaking (8,9).

The role of pre-surgical obturator in closing the communication between nasal and oral cavity is crucial in resetting the function of feeding of newborns with isolated cleft of the secondary palate (1,10,11). The obturator alleviates the feeding problem, decreases the feeding time and increases the growth of the upper jaw before any kind of surgery. Many agree that it should be introduced as soon as possible.

The paper describes the making of RBJ obturator without extra-oral fixation.

Case study

The Dental Clinic in Nis, the Department of Orthodontics has had a long history of treating newborns with various types of clefts by using early orthodontic therapy, including RBJ simulators. Immediately after the birth, these devices' priority role is to help babies feed physiologically (nasogastric probe is not needed).

A girl born in 2008, 2500g of body weight, 45cm long, was taken to the Dental Clinic in Nis to have an obturator. She was born in a family with no cleft record. After a detailed examination, a defect of secondary palate was diagnosed (Figure 1).



a)



b)

Figure 1. a) Face of the patient with isolated cleft of secondary palate,
b) an intraoral display of the cleft of secondary palate

The first step in RBJ obturator making is to take the impression of the newborn's upper jaw. Several hours after birth, a basic impression is

taken by impression mass (Muler-Omikron Dental-Germany). Principle impression consists of basic and corrective impression. Impression taking requires expertise of the doctor- orthodontic specialist, and what is special about this method is the fact that there is no endotracheal anesthesia, since it carries many risks. Premedication, a part of endotracheal anesthesia can cause prolonged sedation in newborns; they can slip into a sleeping disorder, even for 15 days after its application (2). Some babies cannot have intubation performed at once, and a mucous membrane can be mechanically defected. Moreover, a significant part of otherwise small oral cavity is occupied by it, thus, taking impression is made difficult.

For proper making of RBJ obturator, it is necessary to have a perfect impression with all anatomical details.

The position of a baby is horizontal or slightly slanting, while lying, with its left arm leaning on nurse's arm, whereas the doctor is in front of the baby. The position of a baby is not crucial. Much more important is the level of binding of impression mass at the moment of coming inside the baby's mouth, as well as the fact that baby needs to be awake.

We consider the position of a doctor in front of, not behind the baby (supported by Sabarinath) to be more correct because of the possibility to follow baby's reactions, and because of the ability to perform additional movements that add to precision (12). The first impression is taken with impression mass based on C silicon, i.e. condensed silicon (Alpha putty soft, Muller Omicron dental) - Figure 2.

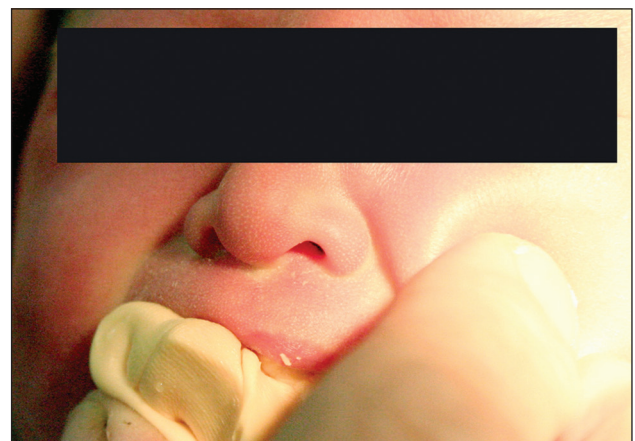
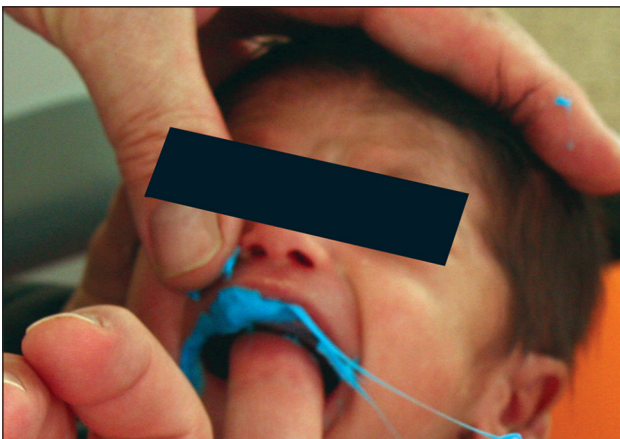


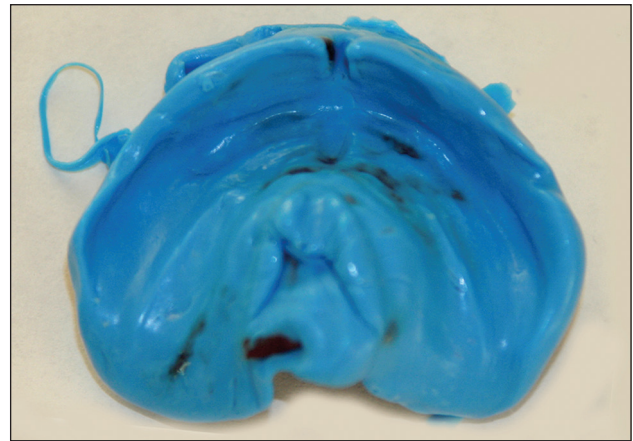
Figure 2. Taking the C silicon-based impression

Based on the first impression, an individual spoon is being made in laboratory, and will be used for corrective impression.

Taking the corrective impression is the most delicate phase. It is carried out with the appropriate individual spoon. It should be longer than alveolar ridges to encompass maxillary tubers, and have transversal dimension, large enough to cover lateral segments completely. These are all conditions needed to enable good reproduction of mucobuccal fold. Moreover, viscose impression mass has to be abundant. When doctor applies the pressure, the impression mass is deeply impressed into all areas. Since the anatomy and function of all sphincters participating in parting alimentary and respiratory system are disrupted, managing the moves of impression mass is completely impossible. The mass spreads upwards through cleft nasal cavities and maxillary sinus, and at the back through widely open upper and middle layer of pharynx. Some authors lay cotton packet in the cleft just before taking the impression, to decrease retraction of impression mass deeply into the cleft area (13). The influx of impression mass can cause a complex condition in babies, followed by vomiting reflex, suffocation, disgust and scrambling. Doctors have to be extremely serene, since premature individual spoon withdrawal with unbound impression mass increases the risk to be torn or aspirated by the baby. After certain amount of time, necessary for the impression to bind (the quantity of activator, catalyst and time necessary for mixing are also important factors), the individual spoon is taken out of baby's mouth in one piece together with the excessive impression mass (Figure 3).



a)



b)

Figure 3. a) Taking the corrective impression, b) corrective impression

Based on the impression, a study model is built (Figure 4).



Figure 4. Study model

A study model should clearly show all the anatomical details: alveolar ridges consisting of two parts: labio-buccal and lingual (the outer part is yet to differentiate and grow, which should be considered when making the obturator, to avoid growth prevention), gingival crest, dental crest, lateral sulcus and transverse crest (Figure 5).

The next phase in obturator making is closing the cleft (of secondary palate) with pink wax, after which the RBJ obturator is to be made (Figure 6).

Before the application of BRJ obturator in the newborn's mouth, it is necessary to polish all its surfaces to prevent irritation of the mucous membrane. A newborn adapts to obturator really well and performs sucking smoothly (Figure 7).

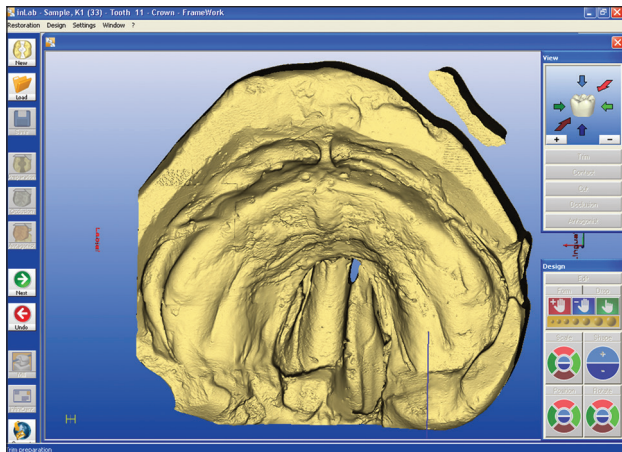
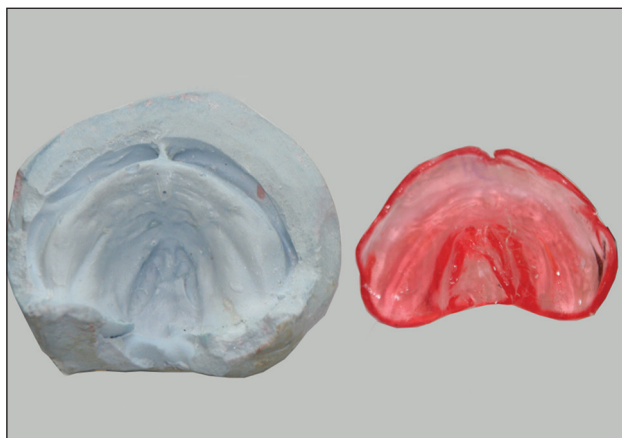


Figure 5. Three-dimensional digitized and reconstructed surface of the upper jaw of a patient with cleft of secondary palate.



a)



b)

Figure 6. Study model and RBJ obturator



Figure 7. Feeding a baby with RBJ stimulator

Discussion

Modern therapy of cleft lip and palate is based on the existence of a multidisciplinary team that involves the coordinated activities of a number of specialist doctors: orthodontist, maxillofacial surgeon, plastic surgeon, neonatologist, otorhinolaryngologist (14). In Europe in 2000, 54% of 201 centres that treat clefts introduced orthodontist therapy as compulsory medical treatment (15). Although no unique attitude about the indispensability of its usage has been adopted yet, one thing is sure- without it, there is no adequate nutrition of newborns, regardless of the cleft type (7,10).

Even tiny defects of the soft palate, as well as sub-mucous clefts that are very often hidden, may cause feeding problems (16). Basic principle is that it should be applied as soon as possible, within few hours after birth, since unsuccessful feeding causes frustration in both newborns and parents (17,18).

Literature describes numerous obturators. What they have in common is obturated hard palate and alveolar ridges. Yet, bearing in mind the fact that alveolar ridges are toothless, the biggest problem has been to achieve the adequate level of retention. Some of them proposed widening the nasal cavity (19), others widened distally until the contact with the back larynx wall was made (1), finally there was a modification of obturator made of solid and soft acrylic with visibly enlarged back part, thus soft palate was physically lifted and connected to larynx (7). Again, they all had extra-oral fixation within obturator. All obturators, from the first obturator (20), to the last one (15), displayed minimal changes in extra-oral fixation

(wire wing-shaped elements used to connect obturator with the newborn's cap). This was uncomfortable for newborns, caused ulcerations, and had adverse effects on environment (21).

The one we use at the Dental Clinic has no extra-oral fixation. Therefore, its manufacturing and application are based on an absolutely precise newborn's alveolar ridge and palate impression. Some other authors have noticed that the crucial step for creation of stimulators is impression taking (12,22). The most common problems during impression taking were: reversible breathing cessation, difficulties while removing the impression from undermined area, tearing of it while taking it out, or newborns with cyanosis, which sometimes lead to asphyxia.

Literature describes various techniques and material types. There are differences when it comes to position of newborns during impression taking: face down (23), face up (24), horizontal position with doctor's hand behind newborn's head (25), lying position, on their parents' laps, with head placed on a parent's knee or lower, depending on baby's legs (12), even upside-down (26). We opine that the position of a baby and doctor who takes the impression like we have described, is more proper than other authors' solutions, because of the lack of any anaesthesia or premedication of a newborn (it is obligatory that the baby is completely awake, crying is desirable). The position in which a doctor is in front of a newborn allows us to monitor "characteristics" of baby cry that can give us insight into baby's condition during this delicate activity, and prompt our reactions. The study of Sabarinatha (12) concurs with such observation. Besides, what is special about our method is that impression taking is never performed in the presence of parents, especially mothers, for it is performed shortly after the delivery. They do not have sufficient time to recover from it, and at the time, they are highly sensitive. Her presence would intensify baby's feeling of being threatened, and the feeling of guilt would be increased so much, that it would remain there for life.

The second phase is making of RBJ obturator that excludes any additional retention. Retention is achieved exclusively by a proper valve ridge and clearly impressed anatomical details, and the experience of orthodontist and dental technicians largely influence obturator stability.

The obturator height is the border for mobile-immobile mucous membrane. Posterior line stands for a transition from hard to soft palate, extremely difficult to establish, considering the defected morphology of a palate.

Posterior line is yet another factor influencing the obturator stability. It has to be extended enough at the back to enable retention, yet not excessively, because it could prompt the vomiting reaction in a newborn. Some authors set the border by making a longer obturator. Then it is shortened and tried out in newborn's mouth. The moment the baby loses this vomiting reflex, is the moment one knows a posterior line is well established (21). We consider such method complicated and imprecise.

The experience of dental technicians influences the making of RBJ obturator, which, after polishing becomes thin, glassy, with smooth surfaces and edges; it is then well accepted by newborns, moreover, the function of feeding is performed regularly. In practice, we have not yet noticed complications with newborns (a fact pointed out by another authors), such as: irritation during swallowing and difficult adaptation (27), decubitus, defects of nasal septum, mucous ulcerations, bleeding, yeast infections (21).

European market disposes with numerous commercial pharmaceutical companies offering a large series of different nipples, soft and rigid bottles, as well as specialised brochures on feeding principles for cleft-born babies. It all creates great confusion among parents, who after all have to take care of obturator not to fall out, infant comfort, etc.

The use of obturator rules out the use of special nipples and bottles.

Conclusion

Taking the alveolar ridge and palate impression by usage of the described method is precise, comfortable for newborns and offers great basis for adequate making of RBJ obturator. Due to its form, RBJ obturator is simple to carry, what is more, newborns can be fed easily, their weight is regulated, parents' feeling of satisfaction grows, and it is invisible to others.

Because of all listed characteristics, it is highly recommended for newborns with isolated cleft of secondary palate to be given an early orthodontic therapy, including RBJ obturator.

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Primary care staff vaccination for influenza is higher than university hospital staff

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Abstract

Background: Influenza vaccination has proven clinical and epidemiological benefits. However, its uptake is still suboptimal amongst the health staff.

Objective: The objective of this study was to compare primary care health professionals' properties regarding influenza immunization with university hospital staff.

Methods: Primary care health professionals of Kayseri and Erciyes University hospital staff were enrolled in the study. Of the 672 primary care health professionals in Kayseri, %82 (552) completed a questionnaire comprised of 19 questions. The university hospital staffs who were involved in the study were 731. The study was performed following a campaign of the Ministry of Health of Turkey for the influenza vaccination of healthcare workers.

Results: Overall, 76.1% (420) of the Family Health Center (FHC) staff and 49.7% (364) of the university hospital staff were vaccinated ($p < 0.001$). Of the FHC professionals, 74.3% (275) of women and 79.7% (145) of men were vaccinated and both were statistically significant when compared with the university hospital staff ($p < 0.001$). Vaccination rates were higher in FHC staff both for married and single staff ($p < 0.001$). Vaccination status was statistically significantly higher in FHC's at all jobs other than clerks and x-ray technicians. Of the staff with no chronic disease vaccination was higher in FHC staff ($p < 0.001$). The rate of being previously vaccinated was higher in FHC staff (22.7% vs. 8.5%) ($p < 0.001$). Adverse effects; fever, headache and weakness were reported significantly higher at university hospital staff (38.5% vs. 25.3%, %41.1 vs. %27.0 and %39.7 vs. %27.7 respectively) ($p < 0.05$).

Conclusion: Our study demonstrated that FHC staff in our study group has been vaccinated with influenza vaccine significantly higher than university hospital staff. There is necessity to encourage university hospital staff more than primary care staff.

Key words: Influenza vaccination, primary care, health professionals.

Introduction

Influenza is a febrile disease, which may cause huge number of deaths each year (1-3).

Vaccination is necessary for the primary protection from influenza (4,5). Health professionals are a target group for influenza vaccination because of their increased risk. Vaccination of health care workers has been shown to be associated with a significant decrease in patient mortality (6).

There are some studies on the vaccination rates of health professionals for influenza. These studies indicate that efforts are still needed to increase the vaccination rates (7-9). The change in health professionals' attitudes may also help increase the number of high risk patients vaccinated.

The aim of this study was; (1) to compare primary care health professionals' properties regarding influenza immunization with university hospital staff, (2) to see the differences between institutions and (3) to find the affecting factors.

Methods

Subjects

Primary care health professionals of Kayseri were included in the study. Of the 672 primary care health professionals in Kayseri, 82% (552) have completed a questionnaire. In order to make a comparison, 731 university hospital staff was included in the study. The study was performed in March 2007 following a campaign of the Ministry of Health of Turkey for the influenza vaccination of health care workers.

The healthcare professionals consist of doctors, nurses, midwives, health clerks, laboratory technicians, x-ray technicians and other clerks (secretaries and drivers).

Erciyes University Medical Faculty Ethical Committee has approved this study.

Questionnaire

A questionnaire comprised of 19 questions has been administered to health professionals.

The comprehensive standardized questionnaire, which was designed to evaluate vaccination status of diabetes mellitus patients by Wahid et al., was used [10]. Our data collected by direct questioning included age, gender, marital status, occupation, level of education, family's monthly income and presence of chronic diseases. Present season's vaccination status and previous years' vaccination status was asked. The reasons for being a non vaccinee were categorized as; not knowing the necessity of the vaccine, do not think that the vaccine is useful, afraid of adverse effects, do not have time to get the vaccine, no one suggest me to get the vaccine, use other methods for influenza and 'others'.

The reasons for next seasons' vaccination desire were categorized as the suggestion of; themselves, doctors, nurses, pharmacists, friends-family, television/newspaper (media) and 'others'.

The presence of vaccination at the last five years and the suggestions for this, the source of the vaccine (from the pharmacy or delivered by health authority), the presence and type of the adverse effects were the other questions of the questionnaire.

The questionnaire was validated for Turkish. A pilot study was performed before commencement of the study.

Vaccines

The vaccines used in the campaign were Vaxigrip (Sanofi Pasteur) which included Influenza virus A/New Caledonia/20/99 (H_1N_1) like strain IVR-116 15 mcg, Influenza virus A California/7/2004 (H_3N_2) (NYMC X-157 derived from A/New York/55/2004) 15 mcg, and Influenza virus B/Shanghai/361/2002 like strain B/Jiangsu/10/2003 15mcg. The vaccines that were available at the pharmacies were Vaxigrip (Sanofi Pasteur) and Fluarix (GlaxoSmithKline) which included Influenza virus A/New Caledonia/20/99 (H_1N_1) 15 mcg, Influenza virus A Wisconsin/67/2005 (H_3N_2) like strain 15 mcg, and Influenza virus B/Malaysia/2506/2004 like strain 15mcg.

Statistical analysis

Chi-squared test (exact method) and Student-T test was used to define the significance of the data

of the health professionals and getting vaccinated for influenza. Univariate and multivariate binary logistic regression analysis was performed to see the predictors of vaccine uptake. $P < 0.05$ was considered statistically significant.

Results

Health professionals' characteristics

Five hundred and fifty-two FHC professionals and 731 university hospital staff were enrolled in the study. The differences in the demographic properties of FHC professionals and university hospital workers are listed at Table 1. There was statistically significant difference between the ages of FHC workers and university hospital staff (the mean age \pm SD was 33 ± 5 vs. 31 ± 6) ($p < 0.001$). Married staff was higher at the FHC ($p < 0.001$). The distributions of the professions are statistically significantly different except the male nurses and the laboratory technicians ($p < 0.001$). There were also statistically significant differences at education level and income ($p < 0.001$). There was significant difference at the distributions of kidney disease and liver disease, whereas there was no difference at the other diseases.

Vaccination status

The differences in the healthcare workers demographic properties according to vaccination status are presented at Table 2.

Overall, 76.1% (420) (95% confidence interval (CI) = (72.3-79.5) FHC staff and 49.7% (364) (95% confidence interval (CI) = (45.3-52.6) of the university hospital staff reported influenza vaccine uptake. All of the demographic data showed statistically significant difference according to vaccination status except age, being midwife, being clerk and x-ray technician, being primary school graduate, and being at lowest income level, having lung disease, cardiovascular disease and liver disease (Table 2).

Of the non vaccinees, 22.7% (30) of the FHC staff and 8.5% (30) of the university hospital staff reported that they had got influenza vaccine at the previous seasons ($p < 0.001$). Also, of the non vaccines 25.4% (33) of the FHC staff and 23.5% (82) of the university hospital staff reported that they would like to get the influenza vaccine the next season and there was no difference in this topic.

Table 1. Demographic properties of University Staff and FHC, and statistical significances

	University	FHC*	p
	n (%)	n (%)	
Age	31.13±6.93	33.90±5.24	<0.001
Gender			
Male	463 (63.3)	370 (67.0)	0.170
Female	268 (36.7)	182 (33.0)	
Marital Status			
Married	463 (63.3)	492 (89.1)	<0.001
Single	268 (36.7)	60 (10.9)	
Job			
Doctor	210 (28.7)	108 (19.6)	<0.001
Nurse	257 (35.2)	87 (15.8)	
Midwife	4 (0.5)	217 (39.3)	
Male nurse	87 (11.9)	74 (13.4)	
Lab.technician	11 (1.5)	47 (8.5)	
Clerk	153 (20.9)	14 (2.5)	
X-ray technician	9 (1.2)	5 (0.9)	
Education			
Primary School	21 (2.9)	3 (0.5)	<0.001
High School	20 (1.7)	4 (0.7)	
Lycee	139 (19.0)	203 (36.8)	
University	551 (75.4)	342 (62.0)	
Income			
222 Euros or less	74 (10.1)	3 (0.5)	<0.001
222-388 Euros	119 (16.3)	32 (5.8)	
389-833 Euros	258 (35.3)	251 (45.5)	
834 and more Euros	280 (38.3)	266 (48.2)	
Chronic Disease			
No Chronic Disease	678 (95.0)	487 (90.5)	0.004
Diabetes mellitus	14 (2.0)	9 (1.7)	
Lung Disease	16 (2.2)	17 (3.2)	
CVD**	4 (0.6)	10 (1.9)	
Kidney Disease	-	5 (0.9)	
Liver Disease	2 (0.3)	9 (1.7)	
Stroke	-	1 (0.2)	

*FHC= Family Health Center, **CVD= Cardiovascular disease

The most common reason for being a non vaccinee was 'do not think that the vaccine is useful' where 43.4% (63) of the FHC staff and 38.3% (119) of the university hospital staff stated this. The factors for being a non vaccinee were not different for the two groups except fear of adverse effects and the item 'others'. Fear of adverse effects was stated by 26.9% (39) of the FHC staff and 17.0% (53) of the university hospital staff ($p<0.05$). Other reasons were stated by 13.5% (42) of the university hospital staff and this topic was

not stated by the FHC staff ($p<0.001$). The use of other methods for influenza was stated by 20.7% (30) of the FHC staff and by 15.4% (48) of the university hospital staff.

In total 36.9% (204) of the FHC staff and 14.5% (106) of the university hospital staff were suggested to get their influenza vaccine next season ($p<0.001$). Decision of vaccination by themselves was the most common suggestion in both groups, where 60.3% (123) at FHC and 54.7% (58) at the university hospital decided to get vaccinated on their own.

Table 2. Vaccination status and statistical significances according to demographic properties

		Vaccined n (%)	Non vaccinee n (%)	p
Age	University	30.81±7.17	31.44±6.69	0.225
	FHC*	33.98±5.25	33.64±5.21	0.517
Gender				
Male	University	129 (48.1)	139 (51.9)	<0.001
	FHC	145 (79.7)	37 (20.3)	
Female	University	235 (50.8)	228 (49.2)	<0.001
	FHC	275 (74.3)	95 (35.7)	
Marital Status				
Married	University	231(49.9)	232 (50.1)	<0.001
	FHC	375 (76.2)	117 (23.8)	
Single	University	133 (49.6)	135 (50.4)	0.001
	FHC	45 (75.0)	15 (25.0)	
Job				
Doctor	University	85 (40.5)	125 (59.5)	<0.001
	FHC	81 (75.0)	27 (25.0)	
Nurse	University	147 (57.2)	110 (42.8)	0.015
	FHC	63 (72.4)	24 (27.6)	
Midwife	University	4 (100)	0 (0)	0.574
	FHC	162 (74.7)	55 (25.3)	
Male nurse	University	58 (66.7)	29(33.3)	0.030
	FHC	61 (82.4)	13 (17.6)	
Lab.technician**	University	4 (36.4)	7 (63.6)	0.002
	FHC	40 (85.1)	7 (14.9)	
Clerk	University	64 (41.8)	89 (58.2)	0.158
	FHC	9 (64.3)	5 (35.7)	
X-ray technician	University	2 (22.2)	7 (77.7)	0.091
	FHC	4 (80.0)	1 (20.0)	
Education				
Primary School	University	13 (61.9)	8 (38.1)	0.550
	FHC	1 (33.3)	2 (66.7)	
High School	University	7 (35.0)	13 (65.0)	0.031
	FHC	4 (100.0)	0 (0.0)	
Lycee	University	79 (56.8)	60 (43.2)	<0.001
	FHC	155 (76.4)	48 (23.6)	
University	University	265 (48.1)	286 (51.9)	<0.001
	FHC	260 (76.0)	82 (24.0)	
Income				
222 Euros or less	University	40 (54.1)	34 (45.9)	1.000
	FHC	2 (66.7)	1 (33.3)	
222-388 Euros	University	65 (54.6)	54 (45.4)	0.001
	FHC	27 (84.4)	5 (15.6)	
389-833 Euros	University	127 (49.2)	131 (50.8)	<0.001
	FHC	195 (77.7)	56 (22.3)	
834 and more Euros	University	132 (47.1)	148 (52.9)	<0.001
	FHC	196 (73.7)	70 26.3)	

*FHC= Family Health Center; **Lab. Technician= Laboratory technician

Deciding to get vaccinated by the suggestion of doctor was significantly higher at FHC staff (31.9% (65) vs. 10.4% (11) ($p<0.001$). Vaccine uptake by the suggestion of nurses was significantly higher at the university hospital staff (9.4% (19) vs. 1.0% (2) ($p=0.001$). 'Other' sources for vaccination suggestion was statistically more at the university hospital (12.3% (13) vs. 3.2% (6) ($p<0.05$).

Getting vaccinated once during the last five years was statistically higher at the university hospital staff (83.7% (318) vs. 45.2% (202) ($p<0.001$). However, when once, twice (8.9% (34) vs. 40.1% (179) ($p<0.001$) and three or more times vaccination (7.4% (28) vs. 18.7% (65) ($p<0.001$) was considered altogether for the last five years, this rate was significantly higher at the FHC staff (51.9% (380) vs. 80.7% (446) ($p<0.001$).

The vaccines were supplied; by the local health authority free of charge 88.7% (394) at FHC and 87.3% (330) at the university hospital and by themselves from the pharmacy 11.3% (50) at FHC

and 12.7% (48) at the university hospital.

The reported adverse effects were 26.8% (148) at FHC and 19.9% (146) ($p<0.05$). Adverse effects; fever, headache and weakness were reported significantly higher at university hospital staff (38.5% vs. 25.3%, 41.1% vs. 27.0% and 39.7% vs. 27.7% respectively) ($p<0.05$) (Table 3).

Univariate and multivariate binary logistic regression revealed no predictors of vaccine uptake when the demographic data of all of the FHC and university hospital staff was considered except being a FHC staff (odds = 2.979 (CI of odds 2.192-4.049). This showed that FHC staff vaccine uptake was 3 times more than university hospital staff.

Discussion

This study is the first study comparing the attitude and behavior of primary care staff and university hospital staff. Our study demonstrated that a vaccination campaign sponsored by the Ministry

Table 3. Adverse effects and statistical significances according to workplace

Adverse effect		University n=146	FHC n=148	p
Fever	No	109 (74.7)	91 (61.5)	0.018
	Yes	37 (25.3)	57 (38.5)	
Muscle pain	No	79 (54.1)	89 (60.1)	0.346
	Yes	67 (45.9)	59 (39.9)	
Joint pain	No	95 (65.1)	108 (73.0)	0.166
	Yes	51 (34.9)	40 (27.0)	
Appetite loss	No	126 (86.3)	132 (89.2)	0.481
	Yes	20 (13.7)	16 (10.8)	
Headache	No	86 (58.9)	108 (73.0)	0.014
	Yes	60 (41.1)	40 (27.0)	
Cough	No	120 (82.2)	119 (80.4)	0.765
	Yes	26 (17.8)	29 (19.6)	
Malaise	No	57 (39.0)	72 (48.6)	0.102
	Yes	89 (61.0)	76 (51.4)	
Weakness	No	88 (60.3)	107 (72.3)	0.036
	Yes	58 (39.7)	41 (27.7)	
Stuffiness	No	89 (61.0)	99 (66.9)	0.331
	Yes	57 (39.0)	49 (33.1)	
Sneeze	No	102 (69.9)	95 (64.2)	0.323
	Yes	44 (30.1)	53 (35.8)	
Sore throat	No	105 (71.9)	116 (78.4)	0.225
	Yes	41 (28.1)	32 (21.6)	
Others	No	119 (81.5)	134 (90.5)	0.029
	Yes	27 (18.5)	14 (9.5)	

of Health has been more effective amongst primary care workers who are directed by it, but less effective at university hospital staff who are primarily at a different status of administration.

Influenza vaccination has proven clinical and epidemiological benefits. However, its uptake in the general population and among health care workers has generally been suboptimal. The reported rates of vaccination among healthcare workers at some studies were; 24%, 26%, 34%, 41% and 61% (11-15). The influenza vaccination rate of 76.1% of FHC and 49.7% at university hospital staff in our study was reasonably high when compared with the previous studies regarding influenza vaccination in health professionals. The lower rate of vaccination at the university hospital indicates the necessity of novel measures in order to increase the vaccination uptake.

There are various reasons for not accepting the vaccine uptake. One study found that the most frequently cited reasons for non-acceptance were fear of side effects (35%), avoidance of medications (33%), reaction to vaccine in the past (24%), impression of low risk of acquiring influenza (18%), and dislike of shots (18%) (16). In our study, of the non vaccinees, the commonest reason cited for not having had an influenza vaccine was 'the vaccine is not useful'. This demonstrates that training on influenza vaccination should focus on the data including the benefits of healthcare workers' vaccination.

It was found that the predictors of acceptance were prior receipt of influenza vaccine, age of at least 50 years, and knowledge that vaccine does not cause influenza (16). Another study found that advancing age, prior absenteeism, higher socioeconomic status (salary level), and marriage were associated with increased vaccine uptake in various target groups (17). In our study the predictor of vaccine uptake was being a FHC staff. Although the vaccination was not mandatory, vaccine supply and campaign directly by the administration of the FHC was probably the reason for higher uptake of the vaccine at the FHC.

In a study performed on the influenza vaccination of health workers, subjects said they would be persuaded to take up vaccination in future by easier access (36%), more information about personal benefit and risk (34%) and more information about

effects on staff absence (24%) (18). In this study, the threat of a pandemic in the near future and the easy access supplied by the campaign has provided a high percentage of vaccination at FHC staff.

Conclusion

Our study demonstrated that FHC staff in our study group has been vaccinated with influenza vaccine significantly higher than university hospital staff. The data of this study suggests that campaigns for the influenza vaccination of health professionals should be repeated every year in order to achieve high levels of health professional vaccination. There is necessity to encourage university hospital staff more than primary care staff.

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Generalized Acquired Retarded ejaculation in a young man with opium dependency: A rare case report

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Abstract

Introduction: Retarded ejaculation (RE) especially acquired RE is a non common sexual dysfunction in men with some complications and there is low data for treatment. In this case report we introduce a opium addict patient with generalized acquired RE that presented as late onset hypogonadism.

Case report: The patient was a 35 year-old married emigrant worker. His chief complaint was decrease of libido and RE without previous history. He was addicted to opium. He was bored, his weight increased and had sleep disturbance. Physical examination was normal and laboratory tests show hypogonadism (High level of LH and low Testosterone level). Treatment started with diagnosis of late onset hypogonadism by Testosterone decanoate (25mg weekly IM) but the results was not satisfying. Because he did not want to discontinue opium use, we prescribed him Bupropion (75 mg/daily PO) and the patient treated successfully.

Discussion: Among acquired causes of RE , opium and opiate addiction is lesser investigated. Consequently there is not a coherent instruction for treatment. Discontinuation of opium is difficult and sometimes leads to premature ejaculation. Bupropion may be useful to decrease RE but it did not assessed in opium induced RE. We treated a case of this problem by oral Bupropion 75mg/daily.

Conclusion: In conclusion it seems that Bupropion (75mg/daily PO) is effective in patients with acquired RE who are addicted to opium and have no desire to discontinue it. A clinical trial is necessary to assess this finding.

Key words: Retarded ejaculation, opium dependency.

Introduction

Retarded ejaculation (RE) is defined as “a persistent or recurrent delay in, or absence of, orgasm in a male following a normal sexual excitement phase during sexual activity that the clinician, taking into account the person’s age, judges to be adequate in focus, intensity, and duration”(1).

The prevalence of this disorder estimated less than 3% in general population .Somatic, Medication and psychologic factors are explained to play a role in its etiology. More severe types of RE are found in disease like diabetes neuropathy and use of drugs like SSRIs (2, 3). RE causes lower level of relationship satisfaction and higher level of distress and health-related problems in men and their partner (4). Because this disorder has low prevalence there is not enough information and instruction about its treatment. Techniques like vibratory stimulation assessed and seem to be effective(5) but it is not applicable in all patients. Then it is important to find and treat the cause. In men who use opiate this disorder is more common and discontinue of opiate can lead to premature ejaculation (6). But there is limited information for treatment of this disorder in opium addicted persons. We introduce a case of generalized acquired retarded ejaculation that was addict to opium and presented with symptoms of hypogonadism and treated successfully by medication without discontinuation of opium.

Case presentation

The patient was a 35 year-old emigrant worker from Afghanistan living in Rafsanjan, Iran. His wife was 29 years old and they have been married 9 years ago and had 2 children.

His complaint was decreased libido. Intervals between intercours were more than 3 months.

Moreover he had delayed ejaculation even if his wife was orgasmed and his penis was in full erection, consequently he had no desire to intercourse and masturbates after it for long time to orgasm. Finally, the couple was not satisfied of their coitus. In addition his other complaint was lack of concentration and intrusive thoughts during intercourse. His problems were gradually started of about 5 years ago with no previous history. He was bored, his weight increased and had sleep disturbance (somnolence). In clinical examination the genitalia was in normal shape and size but in laboratory tests the serum level of luteinizing hormone (LH) was higher 12.5(4-10ng/ml) and Testosterone 1.25(2.5-10ng/ml) lower than normal rates. Other biochemical and hormonal factors were in normal range. He had no history of trauma or surgery. He has smoked opium since seven years ago, by variable dosage (0.5-2 g) daily.

In attention to boring, sleep disturbance and weight gain, late onset hypogonadism diagnosed (Fatigue, somnolence and weight gain plus high level of serum LH and low level of testosterone). Testosterone decanoate 25 mg weekly intra muscular (IM) prescribed. After 3 weeks, libido increased but delayed ejaculation wasn't resolved. According to available data and the role of dopamine in sexual desire and orgasm, we prescribed Bupropion tablet 75 mg daily for patient (7, 8). He had no desire to quit opium addiction. After 3 weeks we visited the patient again and he was satisfied of treatment, delayed ejaculation decreased and his libido increased more than before. But despite our efforts he did not recourse to visit more than this.

Discussion

Ejaculation and orgasm are two concurrent processes in men despite ejaculation is occurs in genitalia but orgasmic sensation is related to genitalia and brain. (1) Then retarded ejaculation (RE) results to failure of orgasm. If the RE is present in all situations and all sexual activities it named "Generalize Retarded Ejaculation". (1) In our case we presented a man with generalized acquired retarded ejaculation. It was acquired because he had no history of previous ejaculatory problem.

As our knowledge the causes of RE are in two categories, psychological (as lack of sexual stimu-

lation by partner) and somatic causes like androgen deficiency, traumatic or surgical spinal injuries, diseases like multiple sclerosis, diabetes mellitus and some drugs like SSRIs, alcohol, opiate.

In the beginning we treated patient with testosterone decanoate (25mg/weekly IM) as late onset hypogonadism was first diagnosis (9). But despite of increasing libido the RE was permanent after 3 weeks. In a pilot study by Modell and colleagues it is concluded that Bupropion-SR 150 mg/daily may be useful to decrease orgasmic delay and inhibition, and possibly disorders of sexual arousal in non-depressed patients (5) and in a study by Abdel-Hamid and colleagues it is concluded that Bupropion-SR 150 mg/daily to be of limited benefit in lifelong Delayed Ejaculation. We decided to prescribe Bupropion but in 75 mg/daily empirically as it was available.

Our patient ignored to discontinue opium smoking. There is data that show endogenous Opioids inhibit sexual function and spinal generator for ejaculation in animal models (10, 11). Also Opioids has alpha adrenergic blocking properties then retarded ejaculation is one of their effects (6, 12) to the extent, that in cases of chronic opium use who discontinue it, premature ejaculation is one of common complaints. In a study by Moshtaghi-Kashanian and colleagues it is showed that opium use in human decrease the FSH and LH level while increase prolactin level. But in our case prolactin and FSH were in normal reference range, LH was higher than normal 12.5 (4-10ng/ml) and Testosterone lower than normal 1.25(2.5-10ng/ml). The high level of LH is a controversy with available data and no reason is obvious.(13) Mendelsom and colleagues show intravenous injection of cocaine can increase LH level but the Testosterone level did not changed (14). Celani and colleagues results showed that mean basal values of LH biological activity, and immunoreactive LH in heroin addicts were similar to control group but serum levels of free testosterone were significantly reduced in heroin addicts (15).

Our case missed for long term follow up but the short term results were satisfying. It is suggested to design a case-control study among addicted and non addicted patients with acquired RE and treat them with Bupropion to compare the efficacy of this treatment.

Conclusion

In conclusion it seems that Bupropion (75mg/daily PO) is effective in patients with acquired RE who are addicted to opium and have no desire to discontinue it. A clinical trial is necessary to assess this finding and its pathophysiology.

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Chlamydia, Chlamydophila and Mycoplasma: "Atypical" organisms extending beyond their "typical" periods in childhood lower respiratory infections

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Abstract

In this study, which was carried out in Ankara, Turkey, *Chlamydophila pneumoniae*, *Chlamydia trachomatis* and *Mycoplasma pneumoniae* antigens were detected in 18 (6.5%), 11 (4.4%) and 9 (3.2%) patients respectively among 295 nasopharyngeal aspiration samples. Atypical bacterial pathogens were most common in 0-6 months of age and lowest in 60 months and over. No statistically significant difference existed between the children with atypical bacterial pathogens and those without, in terms of respiratory rate, chest retractions, white blood cell count, C-reactive protein concentration, erythrocyte sedimentation rate and time to recovery. The children with atypical bacterial pathogens were more likely to have prolonged expiration and relatively low body temperature.

According to our results, atypical bacterial agents may extend beyond their classical periods in childhood lower respiratory tract infections and should be kept in mind when starting empirical antimicrobials to a child with such an infection.

Key words: Antigen detection, chlamydia trachomatis, chlamydophila pneumonia, mycoplasma pneumonia, pneumonia.

Introduction

The selection of an antimicrobial agent in childhood lower respiratory infections (LRI) is almost entirely empirical due to paucity of available non-invasive diagnostic methods, which would aid re-

veal the causative organism. Physicians evaluating a child with LRI often face the dilemma of whether to include a macrolide in order to cover a possible "atypical" organism, namely *Chlamydia trachomatis*, *Chlamydophila pneumoniae*, or *Mycoplasma pneumoniae*, which may cause physical manifestations that are clinically indistinguishable from those caused by other agents (1). The only practical way is to make a differentiation based on the patient's age, since these three organisms cause childhood pneumonia in relatively specific periods of pediatric age (2-4).

We have designed a cross sectional study in the setting of a university hospital in Turkey to see whether there were any divergences from classical knowledge in this field.

Materials and methods

Inclusion criteria

A child was included in the study if she/he had LRI (acute bronchiolitis, pneumonia, or both) (5,6).

Together with relevant symptoms, acute bronchiolitis was defined as the presence of prolonged expiration time or sibilant rhonchi. Pneumonia was defined as the presence of at least one of the following: tachypnea, rales, absence or diminution of breath sounds, peripherally-located bronchial sound, or pulmonary infiltrate on chest X-ray, which was interpreted by one investigator (S. Ö.).

Exclusion criteria

The children known to have cystic fibrosis, primary immune deficiency, congenital pulmonary malformations, neuromuscular disorders, cardiac failure, reactive airway disease, and those on immunosuppressive therapy, were excluded from the study.

Collection of specimens

Nasopharyngeal aspirate specimens in 295 hospital visits, in which the patient was diagnosed as LRI in the Department of Pediatrics and Child Health of Ankara University Faculty of Medicine for a one-year period and treated as either outpatients or inpatients, were taken after obtainment of informed consent from caregivers. After the explanation of the procedure to the child and the caregiver, a polyethylene feeding tube, attached to a syringe was introduced through the nostrils and advanced as far as the nasopharynx, where 1.5-2.0 mL of normal saline was pushed and drawn back into the syringe.

Laboratory Procedure

The laboratory procedure, which was carried out according to general principles for immunoassays and the instructions in the package inserts of the commercial kits, began with N-acetylcysteine being added to the specimens, which were incubated at room temperature for 20 minutes (7). The specimens were then transferred to conical test tubes containing 2 mL of phosphate buffer solution (PBS), which was added once more into the tubes to get a total mixture volume of 10 mL. The tubes were vortexed and centrifuged at +4°C and 1,500 rpm for 10 minutes. After the supernatant was poured out, 10 mL of PBS were added to the tubes and the whole process of vortexing, centrifugation, and supernatant removal was repeated. One mL of PBS was put in the tubes, which were vortexed once again. Portions of 50 µL, taken from this mixture, were poured onto slides, which were dried in open air, fixed with cold acetone for 10 minutes, and stored at -20°C until microscopic evaluation.

After being incubated for 30 and washed for 3-5 minutes with PBS, the slides were treated with fluorescein-conjugated antibody – containing solutions of Argene Biosoft (France) (anti *Chlamydia pneumoniae* and anti *Mycoplasma pneumoniae*) and Omega (United Kingdom) (anti *Chlamydia trachomatis*). The slides were cooled, left in a dark

place for 30 minutes at 37°C, re-washed with PBS for 3-5 minutes, dried and prepared for microscopic evaluation with the addition of Fluokeep solution.

Slides of samples containing less than 20 ciliated epithelium cells were not enrolled. Of the 885 (295×3) slides prepared from 295 samples, 799 slides (275 for *C. pneumoniae*, 277 for *M. pneumoniae*, and 247 for *C. trachomatis*) were suitable for microscopic evaluation.

The slides were examined by two investigators (T. M. Ö. and İ. D.) utilizing a fluorescence microscope at ×250 and ×400 magnifications. Bright green fluoroluminescence was interpreted as positive.

Statistical analysis

Parametric values were depicted as “mean ± standard deviation” and nonparametric or non-normal distribution values and values of groups containing less than 30 cases were expressed as “median(interval)”. T-test and Mann-Whitney U or Kruskal-Wallis tests were used. Statistical significance was set at P value equal to or less than 0.05.

Results

Patients in general

Obtained samples belonged to 135 girls (45.8%) and 160 (54.2%) boys. The ages of the patients were between 17 days and 16 years. More lower respiratory tract infections (68 cases, 23%) were diagnosed in January than in any other month. The diagnoses were 179 (60.7%) acute bronchiolitis with pneumonia, 65 (22.0%) acute bronchiolitis, and 51 (17.3%) pneumonia. The most common symptom was cough (Table 1). The duration of symptoms was 1 to 18 days. Fever (>37.5°C) was present in 77 (26.1%) patients. The mean body temperature and the mean respiratory rate were 37.00±0.89°C (36.00-41.00°C) and 50.4±14.3/minute, respectively. The most common auscultatory sign was rales with rhonchi [in 98 (33.2%) patients] (Table 2). The means of leucocyte count, C-reactive protein concentration, and erythrocyte sedimentation rate were 12,115±4,918/µL (3,900-29,200/µL, n=277), 3.1±5.4 mg/dL (0.01-37.0 mg/dL, n=273), and 32.2±23.9 mm/hour (2-166 mm/hour, n=258), respectively. Alveolar infiltration, hyperinflation, atelectasis, and completely normal findings were detected in the plain chest radiograms of 148 (50.5%),

107 (36.5%), 7 (2.4%), and 76 (25.9%) patients, respectively for whom radiological evaluation was deemed necessary. The duration of hospital stay was 1 to 24 days.

Patients infected with atypical organisms

Eighteen (out of 275 samples examined) (6.5%) *C. pneumoniae*, nine (out of 277 samples examined) (3.2%) *M. pneumoniae*, 11 (out of 247 samples examined) *C. trachomatis* (4.4%), and one *M. pneumoniae* - *C. pneumoniae* coinfection was detected. The ages of those patients with and

without atypical bacterial agents were 1 month to 6 years and 0.6 month to 16 years, respectively. The ages of the patients with atypical organisms are shown in Table 3.

Most hospital visits of the patients with atypical agents occurred in January with the most common presenting symptom of cough. The clinical diagnoses of the patients with atypical bacterial agents were 25 (64.1%) acute bronchiolitis + pneumonia, 11 (28.2%) acute bronchiolitis, and three (7.7%) pneumonia. The duration from the onset of symptoms to the presentation varied between 1

Table 1. Presenting symptoms of the patients with lower respiratory tract infection

Presenting symptom	Number of patients with atypical organisms (%)	Number of patients without atypical organisms (%)
Cough	35 (89)	231 (90)
Grunting	19 (48)	142 (55)
Fever	17 (43)	115 (44)
Difficulty breathing	7 (17)	55 (21)
Coryza	15 (38)	64 (25)
Sneezing	1 (2)	2 (<1)
Hoarseness	-	2 (<1)
Conjunctival injection	1 (2)	-
Stomachache	-	5 (1)
Sputum production	-	5 (1)
Nasal stuffiness	-	11 (4)
Chest pain	-	3 (1)
Vomiting	2 (5)	12 (4)
Convulsions	-	1 (<1)
Cyanosis	-	5 (1)
Diarrhea	2 (5)	3 (1)
Malaise	-	5 (1)
Groaning	-	1 (<1)
Loss of appetite	-	6 (2)

Table 2. Physical findings of the patients with lower respiratory tract infection

Finding	Number of patients with atypical organisms (%)	Number of patients without atypical organisms (%)
Normal	4 (10.3)	11 (4.3)
Rales	21 (53.8)	174 (7.9)
Ronchi	24 (61.5)	63 (24.6)
Wheezing	3 (7.7)	22 (8.6)
Coarseness of breath sounds	2 (5.1)	12 (4.7)
Diminution or absence of breath sounds	-	21 (8.2)
Peripherally located bronchial sound	-	4 (1.6)
Pleural friction rub	-	1 (0.4)
Stridor	-	1 (0.4)
Chest indrawing	25 (64.1)	157 (61.3)
Expirium prolongation	38 (97.4)	202 (78.9)

Table 3. Age distribution of the patients with atypical bacterial lower respiratory infection

Age (months)	Total # of patients	CP	MP	CT	CP+MP
0-6	18	9	2	7	
7-24	18	8	6	4	
>24	3	1	1	0	1
TOTAL	39	18	9	11	1

CP: *Chlamydomphila pneumoniae*, MP: *Mycoplasma pneumoniae*, CT: *Chlamydia trachomatis*

and 18 days. There was no statistically significant difference between those with and without atypical agents with regard to gender, age, duration of symptoms, and clinical diagnosis.

The mean body temperature of the patients with atypical bacterial agents was 36.7 ± 0.6 (36.0 - 38.1)°C. Seven (18.0%) patients with atypical organisms had fever (>37.5 °C). The mean respiratory rate of the patients with atypical bacterial agents was 54.2 ± 11.8 (28-90) per minute. The physical examination findings of the patients with atypical organisms are depicted in Table 2. The patients with atypical agents were more likely to develop expirium prolongation and low fevers compared with the patients without atypical agents.

Mean white blood cell count, C-reactive protein, and erythrocyte sedimentation rate of the patients with atypical agents, respectively, were $13,276 \pm 4,691$ (5,900–26,600)/ μ L, 3.3 ± 3.2 (0.1-11.9) mg/dL, and 37 ± 23 (2-90) mm/hour; no statistically significant difference existed between the patients with and without atypical agents with regard to these parameters. The chest radiograms showed pulmonary infiltrates in 13 (33.3%), hyperinflation in 2 (30.8%), infiltrates with hyperinflation in three (7.8%), and normal findings in 13 (33.3%) patients with atypical agents.

The ages of the patients with *Chlamydomphila pneumoniae* were between 1 and 48 months. Their clinical diagnoses were as follows: 10 (55.5%) pneumonia with acute bronchiolitis, 7 (38.9%) acute bronchiolitis, and one (5.6%) pneumonia. The duration from onset of symptoms till the hospital visits, most of which occurred during June, was 2 to 14 days. The mean body temperature of the patients, four (22.22%) of whom were feverish (>37.5 °C), was 36.8 ± 0.7 (36.00-38.00)°C. The mean respiratory rate was 50 ± 9 (28-68) per minute. The mean white blood cell count, C-reactive protein, and erythrocyte sedimentation rate were $13,552 \pm 4,471$ (7,200-21,800)/ μ L, 3.4 ± 3.3 mg/dL (0.1-11.9 mg/

dL), and 40 ± 29 (2-90) mm/hour, respectively. Radiologic findings were infiltrates [three (16%) patients], hyperinflation [7 (38%) patients], and infiltrates with hyperinflation [in two (11.0%) patients]. Six (33.0%) patients had completely normal radiologic findings. Resolution of symptoms took one to 17 days.

The ages of the patients with *Mycoplasma pneumoniae* were between 1.5 and 34 months. Their clinical diagnoses were 8 (88.9%) pneumonia with acute bronchiolitis and one (11.1%) pneumonia. The mean duration from onset of symptoms till the hospital visits, most of which occurred during January and February, was 2.33 ± 0.71 (1-3) days. The mean body temperature of the patients, one (11.1%) of which was feverish (>37.5 °C), was 36.63 ± 0.66 (36.0-38.1)°C. The mean respiratory rate was 60 ± 16 (36-90) per minute. The mean white blood cell count, C-reactive protein, and erythrocyte sedimentation rate were $14,460 \pm 5,992$ (7,740-26,600)/ μ L, 5.1 ± 3.5 mg/dL (0.4-10.1 mg/dL), and 35 ± 17 (6-65) mm/hour, respectively. Radiologic findings were infiltrates [six (66.0%) patients] and hyperinflation [1 (11.0%) patients]. Two (22.0%) patients had completely normal radiologic findings. Resolution of symptoms took one to ten days.

The ages of the patients with *Chlamydia trachomatis* varied between 1.5 and 19 months. Their clinical diagnoses were seven (63.6%) pneumonia with acute bronchiolitis, three (27.3%) acute bronchiolitis, and one (9.1%) pneumonia. The mean time from onset of symptoms till the hospital visits, most of which occurred during January, was 3.64 ± 1.75 (1-7) days. The mean body temperature of the patients, two (18.2%) of which was feverish (>37.5 °C), was 36.69 ± 0.65 (36-37)°C. The mean respiratory rate was 54 ± 10 (32-68) per minute. The mean white blood cell count, C-reactive protein, and erythrocyte sedimentation rate were $12,270 \pm 3,849$ (5,900-17,200)/ μ L, 1.7 ± 1.6 mg/dL (0.1-6.2 mg/dL), and 33 ± 2.0 (2-58) mm/hour, respectively. Ra-

diologic findings were infiltrates [three (27.0%) patients], hyperinflation [four (27.0%) patients], and infiltrates with hyperinflation [in one (9.1%) patients]. Four (36.4%) patients had completely normal radiologic findings. Resolution of symptoms took between one and nine days.

Statistically significant parametric comparisons were not possible because of the paucity of number of patients infected with a particular organism.

Discussion

Advantages of antigen detection with immunofluorescence technique used in this study are 1) its relatively low cost, 2) assessability of the sample quality, 3) evaluability of even a single cell for infection, 4) rapid obtainment of test results (in 1-4 hours), and 5) results' independency of viable microorganisms, thus, of antimicrobials the patient may be receiving (8). The disadvantages of the immunofluorescence antigen detection technique are 1) relatively slightly higher cross-reaction rate, 2) requirement of meticulous care in sample taking, slide preparation, and storage for providing sufficient number of epithelial cells and highest antigen yield, and 3) the requirement of experienced and skillful personnel for the microscopic evaluation of slides (9,10).

Looking at the studies carried out in Turkey, we come across Kaygusuz et al., who, using immunofluorescence, detected *C. pneumoniae* and *M. pneumoniae* antigens in 17,1% and 0%, respectively, of 76 children aged between 1 month to 14 years with acute respiratory symptoms (11). *M. pneumoniae* and *C. pneumoniae* antibody with significant increases in convalescent sera were found in 25% and 5%, respectively, in children aged between two months to 15 years with community-acquired pneumonia (12). *M. pneumoniae* seropositivity was found as 34.5% and 27% in two other asunder locations in Turkey (13,14).

No *C. trachomatis* was found in 184 United States children hospitalized for pneumonia, in whom *M. pneumoniae* (14%) and *C. pneumoniae* (9%) were detected as causative agents (15). In a United Kingdom study, the frequencies of community-acquired pneumonia due to *M. pneumoniae* and *C. trachomatis* were 3% and 0.7%, respectively (16). A similar study, conducted on 260 patients revealed

M. pneumoniae in 27% and *C. pneumoniae* in 28% patients (17); the frequencies of the same agents were 29.5% and 15%, respectively, in another study (18).

As the results of some studies including ours point out, unlike many studies from economically-developed countries, *M. pneumoniae* and *C. pneumoniae*, which have classically been regarded to be late-childhood pathogens, may also be prevalent in children less than five years of age (19-24). Whether this issue is due to temporal or geographical differences may be a matter of debate and awaits be elucidated with larger clinical trials.

The role of *C. pneumoniae* in children with lower respiratory infections vary between 0% and 18% according to location and laboratory detection method used, e.g. 9%, 3.6%, and 6.4% in the United States, Sudan, and Philippines, respectively (25-27).

Chlamydia trachomatis, an organism known to be associated with female infertility and precancerous changes in the cervix, should be considered in the etiologic differential diagnosis of infants 1-3 months of age with afebrile pneumonia (28,29). It is known, as depicted in major texts of pediatric infectious diseases, not to be noted beyond 16-19 weeks of life (4). Our study is also noteworthy for the vast majority (90%) of such children had signs of bronchiolitis, although wheezing is not an expected finding in *C. trachomatis*-caused lower respiratory illness (2). The presence of *C. trachomatis* in children beyond six months of age as an etiologic agent of lower respiratory tract infections was an unexpected and important result in our study. Caballal and co-workers are supporting our results in their Argentine study by stating that 20% of lower respiratory infections due to *C. trachomatis* occurred in children older than four months of age (30). As a result, these data may signify *C. trachomatis* as a so-far underestimated bacterial agent in lower respiratory tract infections of children more than six months of age and in the etiologic differential diagnosis of the wheezy child.

Our findings that 95% of children with *C. pneumoniae* antigen had acute bronchiolitis and that 88.9% of children with *M. pneumoniae* antigen had bronchiolitis-accompanied pneumonia was consistent with the current knowledge that these two bacteria had significant roles in the pathogenesis of wheezing in children.

Our patients with atypical bacterial pathogens were more likely to develop prolonged expirium and to have lower body temperatures than those without atypical agents. This contrasts with the results of Esposito and co-workers, who found no significant difference in clinical findings between children with and without *M. pneumoniae* and *C. pneumoniae* (31). Heiskanen-Kosma and colleagues are in agreement with us in their conclusion that serum C-reactive protein cannot differentiate bacterial and viral aetiology of community-acquired pneumonia in children (32).

Study limitations

A limitation of our study may be the fact that, because atypical bacterial agents may be excreted in secretions for weeks to months after the resolution of clinical picture, detection of such organisms in nasopharyngeal secretions does not necessarily mean that the detected organism is the causative agent of an actual acute infection. Nevertheless, this limitation also exists to varying degrees for other diagnostic tests other than antigen detection (direct microscopic examination, isolation of pathogens, serological tests, and nucleic acid tests) (28).

Another limitation may be the underrepresentation of older children with lower respiratory infections in our study group of patients, but this does not change the message depicted in the title of our study although some ratios might have been subject to slight changes.

Conclusions

According to our results, atypical bacterial agents may extend beyond their classical periods in childhood lower respiratory tract infections and should be kept in mind when starting empirical antimicrobials to a child with such an infection. Wider-scale studies both at home and in other parts of the world will aid in comparing these results and possibly in developing new guidelines.

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Multiple anterior abdominal stab wounds and therapeutic approach

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Abstract

Background: Laparoscopy can be done on a patient with multiple stab wounds to the abdominal area to fully understand the extent of the injuries.

Case Presentation: A laparoscopy done in a patient and 40 cm mesenteric tear at the duodenojejunal junction was discovered. The tear was sutured. Plain CT brain and cervical, and plain and contrast enhanced thorax, abdomen and pelvis performed. The results are there's left poses and erectile spine hematoma, multiple stab wound injuries with subcutaneous emphysema, minimal bilateral pleural effusion with adjacent atelectatic changes which could represent co-existing underlying lung disease, right parietal skull fracture with no intracranial hemorrhage. **Conclusion:** The procedure done for management of anterior abdominal multiple stab wounds was proven to be successful and the antibiotics used as prophylaxis for pre- and post-operation are also justified.

Key words: Laparotomy, appendicitis, gallstones, laparoscopy.

Introduction

Intraabdominal and wound infections commonly occur after stabbing abdominal trauma due to road accident, gunshot wounds, cutting by knife wounds and are most commonly observed visceral injuries like shock, hemorrhage, and massive inoculation of the peritoneal cavity with endogenous and exogenous microorganisms.

About one third patients among abdominal stab wounds haven't significant injuries that requires surgical repair (1-4). In early 1960, researcher demonstrated the safety of selective expectant observation based primarily on physical examination (5). The advocates of routine early laparotomy

emphasize its diagnostic accuracy and the importance of avoiding unnecessary delays when managing intraabdominal organ injuries (3, 6). Furthermore, the drug therapy, their selection and duration and reflecting some positive association (7).

Laparotomy is an abdominal exploration surgery done under general anesthesia to examine the abdominal organs. The size and location of the surgery done depends on the specific health issue which involves the abdominal area. Abdominal exploration may be used to help diagnose and treat many disease and health issues for example acute appendicitis, cancer, gallstones, and more. Laparoscopy (laparotomy performed with a camera) is used in stab wounds in the abdomen area to view any damage to the inner organs (3).

The purpose of this study was to determine the early outcome of patients with abdominal or lower thoracic stab wounds managed with either mandatory or selective laparotomy and or antibiotic therapy.

Case presentation

A 29 year old Malay male patient was admitted at the emergency room of Hospital University Sains Malaysia, with multiple stab wounds to the abdomen. He has no history of any surgical procedure, medical conditions and no past medication history. He currently works as a laundry shop worker.

Patient got the injuries by the knife or blades. He sustained lacerations and stab wounds at interior abdominal wall region and left posterior abdominal wall region. There is also a big scalp laceration wound and a small superficial right thigh laceration. On the right hand, the index finger was partially amputated. An emergency diagnostic laparoscopy was done and 40 cm mesenteric tear at the duodenojejunal junction on admission.

A CT scan was done on the brain to rule out any internal injuries of the brain. The result of the scan shows no intracranial hemorrhage, normal grey white water differentiation, normal ventricles and basal cisterns, no mass effect or midline shift, and a right parietal skull fracture involving only the outer cortex which indicates a right parietal scalp hematoma.

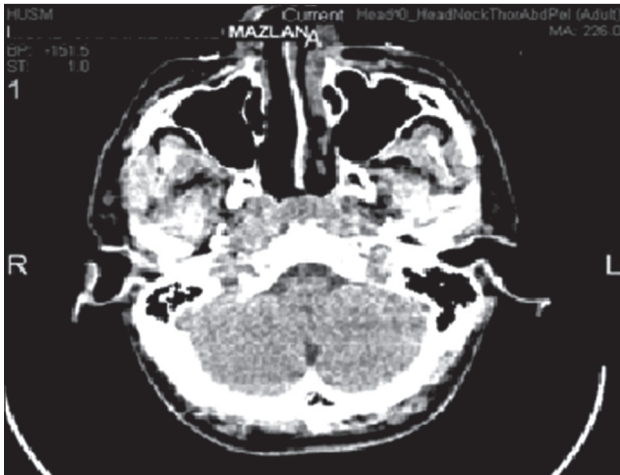


Figure 1. Brain CT scan

Another CT scan was done on the cervical spine. The results of the scan are spine alignment is maintained, C1/C2 normal (no lateral offset), vertebrae bodies and disc spaces are preserved, no fracture or dislocation and facet joints are preserved bilaterally.

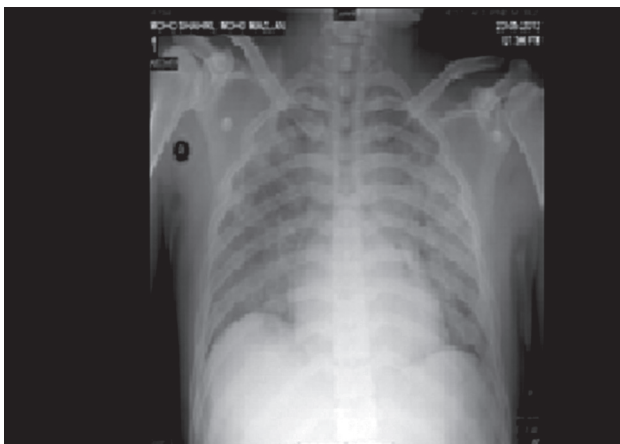


Figure 2. Thorax CT scan

Plain and contrast enhanced procedures done on the thorax, abdomen and the pelvis. The results for the thorax are minimal bibasilar pleural effusion with adjacent atelectatic changes (no adjacent subcutaneous hematoma appreciated), no pneu-

mothorax or pneumomediastinum, heart and great vessels are preserved, no pericardial effusion, and no rib fractures.

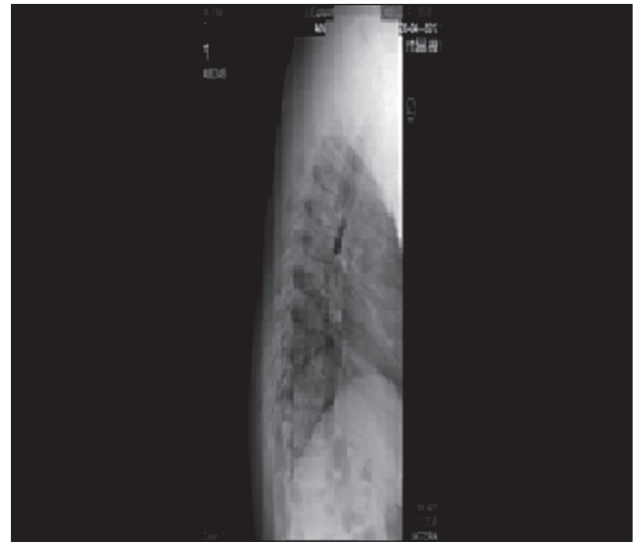


Figure 3. Abdomen CT scan

The results for the abdomen and pelvis scan are skin defect with underlying subcutaneous emphysema in the epigastric and both lumbar regions in keeping with the stab injury, subcutaneous emphysema at the right hypochondriac (involve the right transversus abdominis, external and internal oblique muscles) and left anterolateral lumbar (involve left external oblique muscle) region, underlying intraabdominal organs are preserved (liver, spleen, pancreas, adrenals and both kidneys are normal) (no laceration or hematoma), gallbladder and urinary bladder are normal in outline, skin defect at left para-spinal region associated with air pockets within the underlying erector spinae and psoas muscles, muscles appear irregular and bulky (suggestive of hematoma), no free fluid in the abdomen or pelvis and no pneumoperitoneum.

The summary of the scan results are there's left psoas and erector spinae hematoma, multiple stab wound injuries with subcutaneous emphysema, no underlying intraabdominal solid organ injury or pneumohaemoperitoneum, minimal bilateral pleural effusion with adjacent atelectatic changes which could represent co-existing underlying lung disease (in the absence of adjacent subcutaneous hematoma, lung contusion is less likely), right parietal skull fracture with no intracranial hemorrhage, and no cervical spine fracture.

The prophylactic antibiotics given to this patient for pre and post operation are cefuroxime (Zinacef) 750 mg TDS, Metronidazole (Flagyl) 500 mg TDS and Erythromycin 125 mg BD.

Discussion

The optimal management of hemodynamically stable, asymptomatic patients with anterior abdominal stab wounds remains controversial. Some strategies that are commonly used by surgeons in anterior abdominal stab wounds include local wound exploration (LWE), diagnostic peritoneal lavage (DPL), serial clinical assessment (SCA), and computed tomography (CT) imaging (8). However there is some contentious existing on prompt laparotomy on patients with anterior abdominal stab wound (AASWs).

In 1960, shaftan challenged the disagreement on laparotomy for AASWs by introducing the policy of management based primarily on the clinical evaluation of the surgeon. This policy was practiced by groups of surgeon at Kings Country Medical Center (5). The decision for laparotomy should not only be based on a significant peritoneal penetration but also on the presence of a significant intra-peritoneal injury. In one study done, immediate laparotomy was performed in 81 patients of 75 male (92.5%), 6 female (7.5%), with the mean age of 33 years, and 26 (32.1%) of those patients had multiple stab wounds. 68 of the patients that underwent laparotomy was therapeutic and 13 was deemed non-therapeutic.

The use of prophylactic antibiotics in abdominal trauma varies from one hospital or health center from another. The primary goal of prophylactic antibiotic use in injured patients requiring surgery is to reduce the incidence of emphysema and its associated morbidity (7). The outcome depends on several factors that had to be taken into consideration including the site of trauma, the time of administration, and the duration of the antibiotic given. An abdominal trauma requiring operative intervention like in current case, and also requires an antibiotic with a wide coverage including both aerobes and anaerobes microorganisms (9). There are two ways of doing so which either can be given a mono-therapy with a single antibiotic agent with wide coverage by itself or with poly-therapy with several an-

tibiotic agents each with its own specific coverage and when combined together gives a wide coverage. The Inter-hospital Multidisciplinary programme on Antimicrobial Chemotherapy (IMPACT) of Hong Kong suggested the use of cefoxitin 2 g q6h i.v. or cefuroxime 1.5 g q8h i.v. and metronidazole 0.5 g q8h i.v. for prophylaxis (10).

Conclusion

In conclusion, the patient underwent a laparoscopy and a 40 cm mesenteric tear at the duodenojejunal junction was discovered and sutured. Plain CT brain and cervical, and plain and contrast enhanced thorax, abdomen and pelvis performed showing left poses and erectile spinal hematoma, multiple stab wound injuries with subcutaneous emphysema, minimal bilateral pleural effusion with adjacent atelectatic changes which could represent co-existing underlying lung disease, right parietal skull fracture with no intracranial haemorrhage. A regimen of prophylactic antibiotics given for pre and post operation are cefuroxime (Zinacef) 750 mg TDS, Metronidazole (Flagyl) 500 mg TDS and Erythromycin 125 mg BD. All the steps taken in managing this patient has been justified by several studies done in several institutions in many countries mainly in the United States.

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Endodontic-oral surgery teleconsultation using the Store and Forward method

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Abstract

Introduction: Telemedicine has witnessed expansion in numerous disciplines of medicine, but its development in dentistry has been much slower. One of most common consultations in dentistry takes place between endodontists and oral surgeons. Our study aims to assess the validity of endodontist-oral surgeon teledentistry consultation using the Store and Forward method of telemedicine.

Material and methods: The study enrolled 793 randomly selected patient examinations in which the consultation of endodontist with oral surgeon had been required. The patient histories were taken, as well as their current clinical condition, and using a special procedure, photographs and radiographs of the regions of interest were taken. Digital telemedicine requests were formed in the XPA3 Online system, to be reviewed upon receipt by oral surgeons and upon which they based their diagnosis and treatment assessments. Afterwards, they clinically examined the patients and made the diagnosis and therapeutic suggestions. The results were then statistically processed, and the degree of diagnostic agreement was assessed using the Cohen kappa coefficient (κ).

Results: In 776 cases (97.86%) an agreement was achieved, while in 17 cases (2.14%) there was no agreement between the examinations. The Cohen kappa coefficient 0.9571 (95% CI: 0.9429 - 0.9714) indicated almost complete agreement, with sensitivity values of 0.9786 (95% CI: 0.9659 - 0.9875), specificity of 0.9786 (95% CI: 0.9659 - 0.9875), and efficacy of 0.9786 (95% CI: 0.9702 - 0.9851). There were 16 diagnostic fields reviewed in total (100%). Most examinations were performed in the field of chronic periapical processes – 196 examinations (24.72%), and least in the field of orthodontic consultations – 4 examinations (0.5%).

Conclusion: Teledentistry consultation realized between endodontists and oral surgeons using the Store and Forward telemedicine method is an absolutely acceptable alternative to direct visual-tactile patient examination.

Key words: Dentistry, telemedicine, teledentistry, endodontic, oral surgery.

Introduction

The method of telemedicine applied in the science and practice of dentistry is termed teledentistry. Teledentistry is lagging behind other branches of telemedicine in both practical use and in scientific validation of the method. If we consider the status in the most significant scientific data base, the MEDLINE, the search of the word „teledentistry“ produces only 48 publications, out of which more than half belonging to the review and not to research articles⁽¹⁾. Moreover, if we search for the combination of related terms, such as „telemedicine dentistry“ etc., we get much better search results (about 150 papers), with the remark that a significant percentage of them are not directly related to the application of telemedicine in dentistry⁽²⁾. Although it is based upon the continual need for interdisciplinary consultation, dentistry is lagging behind other medical disciplines. The absence of use of teledentistry is associated with the burden of sending the patient to different specialists during the process of making a proper diagnosis or a concrete, applicable treatment plan. Patients are often sent back and forth between different dentistry specialists and between dentists and doctors of medicine (most commonly internists, cardiologists, hematologists and transfusiologists, dermatovenerologists, ophthalmologists, otorhinolaryngologists), precious time is lost, treatment is unnecessarily delayed, and alleviation of pain and discomfort is postponed. At the same

time, costs are rising and uncertainty on the part of the patient as to the possible solutions is prolonged. The whole consultation process in dentistry can be very strenuous for both patients and their dentists. If a consultant present a different opinion to the patient, a number of dentists can feel that they are losing the patient's confidence and that they are being degraded as experts in their field. In order to avoid this destruction of authority, many dentists avoid seeking consultation and make final decisions themselves, which is especially the case with less significant patient conditions. They „relieve“ both themselves and their patients of the strenuous process of seeking and getting consultation. Perhaps such a decision would not have vital implications, but the patient quality of life would be put at risk. For instance, a prosthetician may declare an affected tooth (caries, periapical processes, fousse route, etc.) untreatable and extract it during the planning of a fixed dental prosthetic replacement, i.e. a bridge. This would deprive the patient of a fixed replacement and forces him to accept mobile prosthesis or very expensive dental implants (if the placement of implants is at all possible due to jaw atrophy, collision with the maxillary sinus or mandibular canal). On the contrary, if a dentist declares an untreatable tooth still viable, this may partly or completely put at risk any fixed prosthetic replacement, since later it may become necessary to extract the untreatable carrier tooth ⁽³⁾.

In fact, considering the practice of dentistry, most common doubts or needs for consultation arise in the triangle dentists prosthetician – endodontist – oral surgeon, or in the direct relation between endodontist – oral surgeon. The reasons are obvious – a prosthetician needs help to decide whether a teet can be cured/preserved and later used as a bridge carrier. He needs the opinion of an endodontist about the possible endodontic treatment of a tooth. An endodontist then assesses the situation, but he needs the opinion of an oral surgeon about the surgical treatment of the tooth after endodontic intervention. Common examples include dental root tip resection, radicular cyst extirpation, collision with the mandibular canal, collision with the foramen mentale, collision with the maxillary sinus, tooth hemisection, use of artificial bone, and so on.

Reviewing everyday communication of endodontists and oral surgeons, our intention was to

view the subject of the consultation through the prism of telemedicine and to draw scientifically sound conclusion as to the validity of this type of telemedical consultation. Our study was further supported by recent introduction of the national telemedicine system XPA3 Online, making the process of teledentistry consultation better organized and more accessible.

The above facts clearly determined the aim of our study: to assess the validity of teledentistry consultation of endodontists and oral surgeons, using the Store and Forward method of telemedicine.

Methods

XPA3 Online

XPA3 Online is a national, Internet-based teledentistry system of Serbia, aiming to unite and connect the specialists in all fields of dentistry and medicine at the national level. It has been formed at the University Of Kosovska Mitrovica Serbia, its use is free of charge, and in order to get access to the system, it is necessary to submit appropriate evidence about the completed studies of dentistry, medicine, pharmacy, or physical education.

Simplifying the matter, the system functions in the following way: teleconsultant information are stored in the system data base, with cell phone numbers and e-mail addresses. If a dentist needs consultation support, he accesses the system, chooses teleconsultants by their specialty or by person, and forms an electronic teleconsultation request, involving: available patient data, disease information and history, as well as the photographs of the region of interest. The electronic request is uploaded to the system, and the system instantly sends SMS messages to the selected teleconsultants, informing them about the received request, its level of emergency, and expected time to response. The teleconsultants are able to access the XPA3 Online system using the nearest computer or directly, using their smartphones. Then they download the consultation material and upload their response. The consultation requester is then informed about the received responses via SMS messages and is able to review the responses. If necessary, a teleconsultant may initiate re-consultation, possibly with new consultants, or requests additional information and analyses from the requester (Figure 1).

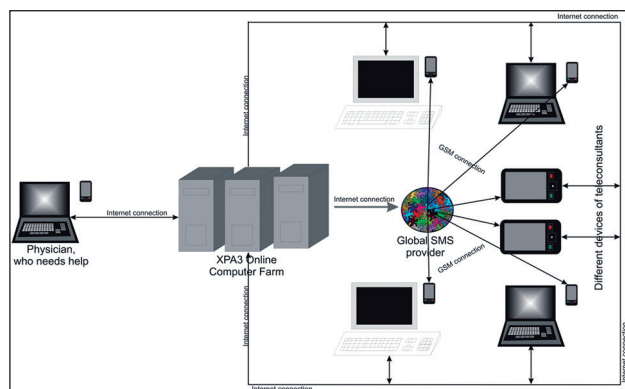


Figure 1. XPA3 Online open telemedical system

Methodology of the study

Experimental randomized study was performed in three study sites: University of Kosovska Mitrovica, Dentistry Clinic; University of Niš, Dentistry Clinic; and Military Medical Academy, Belgrade, Dentistry Clinic. The study enrolled 793 randomly selected patient examinations (in which the consultation of endodontists with oral surgeons had been requested), processed by 5 endodontists and 5 oral surgeons. Experimental and control groups were formed. The experimental group consisted of oral surgery telemedicine patient examinations, while control group consisted of direct oral surgery examinations of the same patients. When a patient was referred to an endodontist and the endodontist found that oral surgery consultation was required, he would prepare the patient completely for telemedicine consultation, and sent the request to an oral surgeon – that was how the experimental group was created. After distance examination and diagnosis, the same patient was referred for direct visual-tactile examination by the same oral surgeon – that was how the control group was created („the golden standard“).

Telemedicine consultation can be described as follows: an endodontist accessed the telemedicine system XPA3 Online via the Internet, at the address www.xpa3.com, using the ADSL 6/1 mbps access and opened a new teleconsultation request. He entered the patient history, involving personal and family history, description of present complaints, objective endodontal examination, involving inspection, percussion, palpation, probing, and vitality assessment. Available radiographs were attached to the request (panoramic x-rays, targeted x-rays, etc.), laboratory findings, and other relevant documents (hospital dis-

charge lists, specialists' reports, etc.). Photographs were taken in the following way for each patient: digital photo en face, left and right profile, occlusal photographs of both upper and lower arches, and several targeted photographs of the dental region in question (vestibular fornix, oral portion of dentoalveolar process), and in cases of caries intraoral camera shots: occlusal, oral, and vestibular photographs of the tooth (Figure 2). The following cameras were used: Samsung Galaxy S2 (with the resolution of 3264 x 2448 pixels, 72 dpi, 24 bit), Nikon Coolpix 5200 (2592 x 1944 pixels, 72 dpi, 24 bit). Cammy™ Standard was the intraoral camera used (with the resolution of 640 x 480, 72 dpi, 24 bit). Teleconsultation forms were uploaded to the system and the system informed the oral surgeon about the request. Teleconsultants used PCs and ADSL 6/1 mbps Internet access to log on to the system (passing the procedures of authentication and authorization), reviewed the received teleconsultation request, made their diagnosis and evaluated possible therapies. Then they uploaded their responses to the system, and the system informed the teleconsultation requesters (endodontists). During the same day the patient was transported for direct visual-tactile examination by the same oral surgeon for real-time diagnosis and treatment assessment.



Figure 2. Example of a characteristic, almost everyday endodontic-oral surgery consultation about options in the management of the second upper premolar. The screen with associated photographs in a Store and Forward telemedical consultation via the XPA3 Online computer medical system.

The degree of diagnostic accuracy was determined using the following scale:

- true – if the telemedicine diagnosis was identical to the primary one, or it was acceptable as a differential diagnosis, and
- false – if the telemedicine diagnosis was completely different from the primary one, or the diagnosis was not made at all.

The degree of accuracy of the treatment plan was determined similarly (true/false).

Statistical data processing and analysis of obtained results were performed using the software SPSS for Windows, version 15. The degree of agreement was determined as the number of consultations with achieved agreement divided by the total number of consultations. Diagnostic sensitivity (SE), specificity (SP), and efficacy (EFF) were determined. The degree of achieved agreement using the method of telemedicine was determined using the Cohen's kappa (κ) coefficient. The kappa coefficient, with 95% confidence interval, was interpreted using the Landis and Koch scale. Statistical significance of the difference between true and false diagnoses and therapeutic plan, diagnostic accuracy, sensitivity, and specificity, and

comparisons of all obtained values were determined using the z-test, and testing for nonparametric characteristics employed Mc Nemmar's χ^2 test for the threshold of significance at $p=0.05$.

Results

Five teleconsultant oral surgeons performed 793 dual examinations (100%), out of which diagnostic agreement was achieved in 776 cases (97.86%), while in 17 cases (2.14%) there was no agreement between telemedical and direct, visual-tactile diagnosis, i.e. therapy. The Cohen's kappa coefficient of 0.9571 (95% CI: 0.9429 - 0.9714) indicated almost complete agreement, with sensitivity of 0.9786 (95% CI: 0.9659 - 0.9875), specificity of 0.9786 (95% CI: 0.9659 - 0.9875), and efficacy of 0.9786 (95% CI: 0.9702 - 0.9851). Sixteen diagnostic fields were reviewed in total (100%). Most examinations were performed in the field of chronic periapical processes – 196 examinations (24.72%), and least in the area of orthodontic consultations – 4 examinations (0.50%). Complete agreement of all teleconsultants ($\kappa=1.000$) was obtained for 9 diagnostic fields (56.25%), almost complete agreement (kappa between 0.81 and 0.99) for 6 diagnostic fields

Table 1. Total agreement of examinations made by involved teleconsultants

Examination	ALL TELECONSULTANTS						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	47	(6.06%)	0	(0.00%)	47	(5.93%)	1.000
Periodontal diseases	44	(5.67%)	0	(0.00%)	44	(5.55%)	1.000
Chronic periapical processes	190	(24.48%)	6	(35.29%)	196	(24.72%)	0.939
Endodontic failures	40	(5.15%)	0	(0.00%)	40	(5.04%)	1.000
Dental root fracture	30	(3.87%)	1	(5.88%)	31	(3.91%)	0.936
Dental caries	11	(1.42%)	1	(5.88%)	12	(1.51%)	0.833
Iatrogenic perforations	23	(2.96%)	0	(0.00%)	23	(2.90%)	1.000
Prosthetic reconstruction	76	(9.79%)	1	(5.88%)	77	(9.71%)	0.974
Collision with the maxillary sinus	51	(6.57%)	0	(0.00%)	51	(6.43%)	1.000
Collision with the mandibular canal	49	(6.31%)	0	(0.00%)	49	(6.18%)	1.000
Help in interpretation of x-rays	82	(10.57%)	3	(17.65%)	85	(10.72%)	0.929
Soft tissue changes	4	(0.52%)	2	(11.76%)	6	(0.76%)	0.333
Exostoses	9	(1.16%)	0	(0.00%)	9	(1.13%)	1.000
Pericoronitis, semi-impacted and impacted teeth	25	(3.22%)	0	(0.00%)	25	(3.15%)	1.000
Orthodontic consultation	4	(0.52%)	0	(0.00%)	4	(0.50%)	1.000
Insufficient or improper filling of the root canal	91	(11.73%)	3	(17.65%)	94	(11.85%)	0.936
TOTAL	776	(97.86%)	17	(2.14%)	793	(100.00%)	0.9571

Table 2. Total agreement of telemedical and direct examination, by teleconsultants and total.

	Teleconsultant 1	Teleconsultant 2	Teleconsultant 3	Teleconsultant 4	Teleconsultant 5	ALL Teleconsultants
Cohen's Kappa	0.9417 95% CI: 0.9116 - 0.9718	0.9811 95% CI: 0.9627 - 0.9995	0.945 95% CI: 0.9015 - 0.9884	0.9375 95% CI: 0.8949 - 0.9801	0.9808 95% CI: 0.9542 - 1.0073	0.9571 95% CI: 0.9429 - 0.9714
Sensitivity	0.9708 95% CI: 0.9408 - 0.9882	0.9906 95% CI: 0.9663 - 0.9989	0.9725 95% CI: 0.9217 - 0.9943	0.9688 95% CI: 0.9219 - 0.9914	0.9904 95% CI: 0.9476 - 0.9998	0.9786 95% CI: 0.9659 - 0.9875
Specificity	0.9708 95% CI: 0.9408 - 0.9882	0.9906 95% CI: 0.9663 - 0.9989	0.9725 95% CI: 0.9217 - 0.9943	0.9688 95% CI: 0.9219 - 0.9914	0.9904 95% CI: 0.9476 - 0.9998	0.9786 95% CI: 0.9659 - 0.9875
Efficiency	0.9708 95% CI: 0.9515 - 0.9840	0.9906 95% CI: 0.9760 - 0.9974	0.9725 95% CI: 0.9411 - 0.9898	0.9688 95% CI: 0.9394 - 0.9864	0.9904 95% CI: 0.9657 - 0.9988	0.9786 95% CI: 0.9702 - 0.9851

(37.50%), and fair agreement (kappa between 0.21 and 0.40) for 1 field (6.25%) (Table 1).

Teleconsultant 2 had highest degree of agreement in both diagnosis and therapy assessment, for both distant and visual-tactile examinations (kappa=0.9811), while teleconsultant 4 had the lowest value of kappa (kappa=0.9375) (Table 2). Teleconsultant 1 could not achieve agreement in 7 cases (2.92%), while in 233 cases (97.08) agreement was achieved. Lack of agreement was present in 2 instances (28.57%) in chronic periapical processes and once (14.29%) in each of another 5 fields (Table 3). Teleconsultant 2 had disagreement in only 2 cases (0.94%), while in 210 cases (99.06%) agreement was achieved. He was unable to make the same diagnosis in chronic periapical processes (50%) and interpretation of x-rays (50%) (Table 4). Teleconsultant 3 did not make the same diagnosis/therapy assessment in 3 cases (2.75%), while in 106 cases (97.25%) the examination status was identical. He had problems with chronic periapical processes in one case (0.33%), interpretation of x-rays in one case (0.33%), and with soft tissue changes in one case (0.33%) (Table 5). Teleconsultant 4 had differing opinions in 4 cases (3.13%), while in 124 cases (96.87%) the opinions agreed. He made 2 mistakes (50%) with chronic periapical processes, and one mistake (25%) with both tooth caries and improper filling of root canal (25%) (Table 6). Teleconsultant 5 did not have agreement in one case (0.96%), and in 103 cases (99.04%) there was agreement. The mistake was made in the area of improper filling of root canal (Table 7).

Discussion

The results showed that there was no statistically significant difference in endodontic oral surgery consultative examination made via the telemedicine Store and Forward system and examinations performed using direct visual-tactile approach.

This knowledge is of huge importance to us, since it could contribute to the elimination of frequent patient referrals from one clinic to another, from one town to another, and from one dentist to another. Naturally, this would reduce material costs on the part of the patient, as well as the time lost, eliminating also any delays of necessary, urgent interventions.

Table 3. Participation of teleconsultant 1 in the agreement of examinations

Examination	TELECONSULTANT 1						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	12	(5.15%)	0	(0.00%)	12	(5.00%)	1.000
Periodontal diseases	9	(3.86%)	0	(0.00%)	9	(3.75%)	1.000
Chronic periapical processes	44	(18.88%)	2	(28.57%)	46	(19.17%)	0.913
Endodontic failures	12	(5.15%)	0	(0.00%)	12	(5.00%)	1.000
Dental root fracture	10	(4.29%)	1	(14.29%)	11	(4.58%)	0.818
Dental caries	7	(3.00%)	0	(0.00%)	7	(2.92%)	1.000
Iatrogenic perforations	11	(4.72%)	0	(0.00%)	11	(4.58%)	1.000
Prosthetic reconstruction	24	(10.30%)	1	(14.29%)	25	(10.42%)	0.920
Collision with the maxillary sinus	15	(6.44%)	0	(0.00%)	15	(6.25%)	1.000
Collision with the mandibular canal	19	(8.15%)	0	(0.00%)	19	(7.92%)	1.000
Help in interpretation of x-rays	28	(12.02%)	1	(14.29%)	29	(12.08%)	0.931
Soft tissue changes	2	(0.86%)	1	(14.29%)	3	(1.25%)	0.333
Exostoses	3	(1.29%)	0	(0.00%)	3	(1.25%)	1.000
Pericoronitis, semi-impacted and impacted teeth	10	(4.29%)	0	(0.00%)	10	(4.17%)	1.000
Orthodontic consultation	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Insufficient or improper filling of the root canal	27	(11.59%)	1	(14.29%)	28	(11.67%)	0.929
TOTAL	233	(97.08%)	7	(2.92%)	240	(100.00%)	0.9417

Table 4. Participation of teleconsultant 2 in the agreement of examinations

Examination	TELECONSULTANT 2						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	14	(6.67%)	0	(0.00%)	14	(6.60%)	1.000
Periodontal diseases	17	(8.10%)	0	(0.00%)	17	(8.02%)	1.000
Chronic periapical processes	56	(26.67%)	1	(50.00%)	57	(26.89%)	0.965
Endodontic failures	9	(4.29%)	0	(0.00%)	9	(4.25%)	1.000
Dental root fracture	8	(3.81%)	0	(0.00%)	8	(3.77%)	1.000
Dental caries	2	(0.95%)	0	(0.00%)	2	(0.94%)	1.000
Iatrogenic perforations	5	(2.38%)	0	(0.00%)	5	(2.36%)	1.000
Prosthetic reconstruction	19	(9.05%)	0	(0.00%)	19	(8.96%)	1.000
Collision with the maxillary sinus	16	(7.62%)	0	(0.00%)	16	(7.55%)	1.000
Collision with the mandibular canal	12	(5.71%)	0	(0.00%)	12	(5.66%)	1.000
Help in interpretation of x-rays	16	(7.62%)	1	(50.00%)	17	(8.02%)	0.882
Soft tissue changes	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Exostoses	5	(2.38%)	0	(0.00%)	5	(2.36%)	1.000
Pericoronitis, semi-impacted and impacted teeth	10	(4.76%)	0	(0.00%)	10	(4.72%)	1.000
Orthodontic consultation	1	(0.48%)	0	(0.00%)	1	(0.47%)	1.000
Insufficient or improper filling of the root canal	20	(9.52%)	0	(0.00%)	20	(9.43%)	1.000
TOTAL	210	(99.06%)	2	(0.94%)	212	(100.00%)	0.9811

Table 5. Participation of teleconsultant 3 in the agreement of examinations.

Examination	TELECONSULTANT 3						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	5	(4.72%)	0	(0.00%)	5	(4.59%)	1.000
Periodontal diseases	5	(4.72%)	0	(0.00%)	5	(4.59%)	1.000
Chronic periapical processes	30	(28.30%)	1	(33.33%)	31	(28.44%)	0.936
Endodontic failures	2	(1.89%)	0	(0.00%)	2	(1.83%)	1.000
Dental root fracture	2	(1.89%)	0	(0.00%)	2	(1.83%)	1.000
Dental caries	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Iatrogenic perforations	2	(1.89%)	0	(0.00%)	2	(1.83%)	1.000
Prosthetic reconstruction	12	(11.32%)	0	(0.00%)	12	(11.01%)	1.000
Collision with the maxillary sinus	7	(6.60%)	0	(0.00%)	7	(6.42%)	1.000
Collision with the mandibular canal	9	(8.49%)	0	(0.00%)	9	(8.26%)	1.000
Help in interpretation of x-rays	16	(15.09%)	1	(33.33%)	17	(15.60%)	0.882
Soft tissue changes	1	(0.94%)	1	(33.33%)	2	(1.83%)	0.000
Exostoses	1	(0.94%)	0	(0.00%)	1	(0.92%)	1.000
Pericoronitis, semi-impacted and impacted teeth	3	(2.83%)	0	(0.00%)	3	(2.75%)	1.000
Orthodontic consultation	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Insufficient or improper filling of the root canal	11	(10.38%)	0	(0.00%)	11	(10.09%)	1.000
TOTAL	106	(97.25%)	3	(2.75%)	109	(100.00%)	0.945

Table 6. Participation of teleconsultant 4 in the agreement of examinations

Examination	TELECONSULTANT 4						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	7	(5.65%)	0	(0.00%)	7	(5.47%)	1.000
Periodontal diseases	11	(8.87%)	0	(0.00%)	11	(8.59%)	1.000
Chronic periapical processes	33	(26.61%)	2	(50.00%)	35	(27.34%)	0.886
Endodontic failures	12	(9.68%)	0	(0.00%)	12	(9.38%)	1.000
Dental root fracture	7	(5.65%)	0	(0.00%)	7	(5.47%)	1.000
Dental caries	1	(0.81%)	1	(25.00%)	2	(1.56%)	0.000
Iatrogenic perforations	1	(0.81%)	0	(0.00%)	1	(0.78%)	1.000
Prosthetic reconstruction	10	(8.06%)	0	(0.00%)	10	(7.81%)	1.000
Collision with the maxillary sinus	5	(4.03%)	0	(0.00%)	5	(3.91%)	1.000
Collision with the mandibular canal	6	(4.84%)	0	(0.00%)	6	(4.69%)	1.000
Help in interpretation of x-rays	12	(9.68%)	0	(0.00%)	12	(9.38%)	1.000
Soft tissue changes	1	(0.81%)	0	(0.00%)	1	(0.78%)	1.000
Exostoses	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Pericoronitis, semi-impacted and impacted teeth	2	(1.61%)	0	(0.00%)	2	(1.56%)	1.000
Orthodontic consultation	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Insufficient or improper filling of the root canal	16	(12.90%)	1	(25.00%)	17	(13.28%)	0.882
TOTAL	124	(96.88%)	4	(3.13%)	128	(100.00%)	0.9375

Table 7. Participation of teleconsultant 5 in the agreement of examinations.

Examination	TELECONSULTANT 5						
	Agree	(%)	Disagree	(%)	Sum	(%)	Kappa
Tooth pain	9	(8.74%)	0	(0.00%)	9	(8.65%)	1.000
Periodontal diseases	2	(1.94%)	0	(0.00%)	2	(1.92%)	1.000
Chronic periapical processes	27	(26.21%)	0	(0.00%)	27	(25.96%)	1.000
Endodontic failures	5	(4.85%)	0	(0.00%)	5	(4.81%)	1.000
Dental root fracture	3	(2.91%)	0	(0.00%)	3	(2.88%)	1.000
Dental caries	1	(0.97%)	0	(0.00%)	1	(0.96%)	0.000
Iatrogenic perforations	4	(3.88%)	0	(0.00%)	4	(3.85%)	1.000
Prosthetic reconstruction	11	(10.68%)	0	(0.00%)	11	(10.58%)	1.000
Collision with the maxillary sinus	8	(7.77%)	0	(0.00%)	8	(7.69%)	1.000
Collision with the mandibular canal	3	(2.91%)	0	(0.00%)	3	(2.88%)	1.000
Help in interpretation of x-rays	10	(9.71%)	0	(0.00%)	10	(9.62%)	1.000
Soft tissue changes	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Exostoses	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Pericoronitis, semi-impacted and impacted teeth	0	(0.00%)	0	(0.00%)	0	(0.00%)	-
Orthodontic consultation	3	(2.91%)	0	(0.00%)	3	(2.88%)	1.000
Insufficient or improper filling of the root canal	17	(16.50%)	1	(100.00%)	18	(17.31%)	0.889
TOTAL	103	(99.04%)	1	(0.96%)	104	(100.00%)	0.9808

Although the studies of the methods of telemedicine in endodontic/oral surgery consultations have not been evidenced so far, our results can be adequately compared with the results of other studies of telemedicine in dentistry. Duka et al. ⁽⁴⁾ in their sizeable study of the potentials of Store and Forward system in the assessment of pathology of impacted third molars found that with this method the patients could be diagnostically managed in the same way as in the conventional method. They showed that it was possible that oral surgeons, without any physical contact with their patients, make proper evaluation of the condition of their third molars and adequately assess the necessity of future therapy. Herce et al. ⁽⁵⁾, studying the possibility of presurgical telemedical examination of patients with problems caused by impacted wisdom teeth, found that Store and Forward method of telemedicine was able to offer to a therapist an effective and accurate insight into the problem of impacted wisdom teeth and to eliminate the need for hospital visit. We may see from the above that highly respectable authors in closely targeted studies of telemedicine used in the management of third molars obtained results similar to ours, with our obtained degree of agreement being even higher, i.e. complete agreement (kappa=1.000).

Salazar-Fernandez et al. ⁽⁶⁾ found that telemedicine allowed for adequate diagnosis and therapy in most cases of temporomandibular joint disorders, shortening the period to therapy and reducing exposure of patients to excess costs. We did not have, in fact, the opportunity to monitor temporomandibular joint disorders, but our results agree in general with the findings of other renown authors in the field.

Ignatius et al. ⁽⁷⁾, in their 13 month study of distant diagnosis and distant planning of prosthetic solutions in patients who needed oral-prosthetic management, found that in 24 cases (88.89%) out of 27 (100%), teleconsultations were successful. We found that in 76 cases (98.70%) out of 77 (100%), prosthesis-related consultations were successful. The results agree, with our percentage of success being markedly higher though.

Kopycka-Kedzierawski and Billings ⁽⁸⁾ found that caries can be successfully detected using the methods of teledentistry, in parallel with traditional visual-tactile methods. Regarding caries, we achieved agreement in 11 cases (91.66%) out of 12 (100%), with the kappa coefficient of 0.833 (almost complete agreement, although close to the lower limit).

It is worth mentioning that in the obtained results (Table 1) only a fair agreement between consultation and direct examination was achieved with soft

tissue changes ($\kappa=0.333$) – insufficient to replace direct with telemedicine examination. Torres-Pereira et al.⁹, studying the feasibility of distance diagnosis of oral diseases via e-mail, found that in 15 out of 25 consultations (60%) both teleconsultants made correct diagnosis, in 7 cases (28%) only one consultant made correct diagnosis, and that in 3 cases (12%) none of the consultants made correct diagnosis. Regarding soft tissue changes (classified principally among oral diseases), the tendency of being more difficult to diagnose was obvious using the systems of telemedicine, as was demonstrated in our study as well.

In general, in our study compared to previous investigators, we obtained even higher degrees of agreement between the diagnoses made using the method of telemedicine and those made after direct examination, and the assessments of therapy differed accordingly. It should be pointed out that in 9 fields (56.25%), we obtained complete agreement ($\kappa=1.000$) between all teleconsultants. We think that this was the consequence of more advanced technology used in the study, excellent training of all those involved, and the use of a specialized telemedicine system as the basis of the process of teleconsultation.

The benefits associated with the use of telemedical consultation on the part of the dentists are perhaps needless to count. In modern times, when dentists have numerous tasks, being always in a hurry and stressed by the efforts to offer high quality service and top-notch esthetic results, telemedical consultation is seen as a necessary relief, since one of the features of the Store and Forward method of telemedicine is the absence of pressure for response on the part of the teleconsultants.

Practical significance of this mode of consultation of endodontists and oral surgeons certainly lies in the availability of experts otherwise inaccessible for personal consultation, as is the case with professors in the field, experienced but retired specialists, and renown experts from other countries or even other continents.

This paper aimed to inform and encourage the readers to introduce the methods of telemedicine in their own dentistry practice. Standardized teledentistry is insufficiently present in everyday practice of dentistry, the main causes of which are insufficient education of dental clinicians about the potentials

of telemedicine, insufficient number of studies of the validity of methods of telemedicine in dentistry⁽²⁾, and perhaps the most important, absence of national centers of teledentistry which would integrate and organize dentistry practice to offer dental health care utilizing the systems of telemedicine.

We expect that teledentistry should be widely accepted as a routine approach in dental health care in near future, which would enable the preservation and improvement of health and quality of life.

Conclusion

Teledentistry consultation realized between an endodontist and an oral surgeon using the Store and Forward method of telemedicine is an absolutely acceptable alternative to the traditional direct visual-tactile examination of our patients.

As the consequence of availability of experienced experts in the field, without the limitations imposed by time or place, the method has numerous advantages over direct consultation. Associated also with significant reduction of costs, the approach would certainly represent a challenge for dentists in near future.

Acknowledgement

This paper is dedicated to my old man. Thank you, dad! (M.M)

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Is seton procedure for complex anal fistula associated better surgical outcomes than fistulotomy?

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Abstract

Objectives: The aim of this study was to compare outcomes after seton procedure to those following fistulotomy for patients with a complex anal fistula.

Methods: Patients undergoing fistulotomy or elastic seton under caudal anesthesia for complex anal fistula from 2002 to 2005 were included in this study. Complete anorectal examination, rectoscopy and endoanal ultrasonography were performed prior to surgery. Fecal incontinence severity index to assess anal continence and SF-36 questionnaires for QOL after surgery were utilized. Anal continence status, postoperative complications, recurrence and quality of life were compared between two surgical techniques.

Results: Eighty-one patients (6 female) were included. Most patients had transsphincteric fistula (n=49) and most fistula involved less than 25% of sphincter muscles (n=63, 78%). While preoperatively 5 patients suffered anal incontinence, 8 patients had incontinence after surgery. At 1 year follow up recurrence was experienced in 6 patients, which was significantly higher in seton group (n=4, 12.9%) than fistulotomy group (2, 4%, p<0.001). Operative time for seton group was significantly shorter than fistulotomy group (p<0.001). At 1 year follow-up 32% of patients in seton group and 41% in fistulotomy group rated their satisfaction with the surgery as bad, mostly due to perianal wetness.

Conclusion: Although recurrence was higher after seton procedure for complex anal fistula, seton procedure was associated with lower rate of complications, shorter operative time and same rate of satisfaction with surgery compared to fistulotomy.

Key words: Anal fistula, seton, fistulotomy, quality of life, fecal incontinence.

Introduction

Anal fistulae are best described in two main groups. These consist of low located fistulae, with minimal involvement of the external anal sphincter (EAS), and high-located complex fistula, involving a bigger proportion of the sphincter mechanism. The failure of anal canal function in various degrees often occurs after the surgery for complex fistula. Elimination of unusual tract, preservation of sphincter mechanism, and prevention of patient from recurrence are the main goals for surgery. It is important that how much sphincter muscles is involved or how much remains after surgical procedure. The procedure involved an accurate separation of the sphincter is the particular risk of incontinence. (1,2)

Treatment for low fistulae using simple fistulotomy result in good outcomes.³ However, for the complex high anal fistula, however, fistulotomy might be associated with higher risk of incontinence or recurrence and worse quality of life than seton procedure. Therefore, the aim of this study was to compare outcomes after seton procedure to those following fistulotomy for patients with complex anal fistula. (4-7)

Materials and methods

Eighty-one patients undergoing surgery (seton or fistulotomy) due to anal fistula between 2002 and 2005 who were on active duty in the Army were included in this study. Complete anorectal exam, rectoscopy and endoanal ultrasonography (EAUS) (Radial 360 degree probe, 13-16 MHz, B-K Medical, Denmark) were performed to assess type of primary and/or secondary tract and involvement of sphincter muscles by fistula tract. Du-

ring EAUS, hydrogen peroxide was given into the tract both to evaluate the internal opening and to see where the tract trace around the anal canal in two dimensional views on the screen. The fistulas were categorized as trans-sphincteric (TS), intersphincteric (IS) and subcutaneous (SC) fistulae. MRI was employed if necessary. In patients complaining with fecal incontinence, FISI score had been quantified preoperatively. (Table 1)

Surgical technique

Patients were instructed to read and then sign a detailed informed consent form if they accepted the therapy. Ten-milliliter bupivacain 20% and same amount of physiologic saline were syringed to perform caudal anesthesia and then waited approximately 10-15 minutes until the numbness was created. If the patient still suffered pain after the set up, the caudal anesthesia was repeated. If the patient had still pain then the local anesthetic (10 ml lidocaine 2%, diluted with 20ml amount of saline) was injected into 4 quadrants around the anus. Hydrogen peroxide was injected to expose the internal opening. After peroxide was seen in any point above the dentate line, soft tip stile was inserted into the tract to see and classify how far the tract involves the sphincter mechanism. Patients with less than 30% of anal sphincter involvement underwent fistulotomy; however those with less than 50% of remaining of whole sphincter underwent tight seton procedure by using elastic substance derive from a surgical glove. Fistulotomy was not employed for the tract located anterior part of region where more than 30% of the sphincter was influenced. But it was used for SC and other proper tract with different type of fistula. In some patients during surgery, external orifice with indurations and the fistula tract was partly removed to the level of superficial EAS

fibers. Anoderm and anal mucosa was excised to internal orifice then sphincter muscle was quite demonstrated. Internal anal sphincter (IAS) was partially incised to make a secondary tract drained easily before entire track was curetted.

Postoperative follow up

Patients had been given a rest about a week. After the rest they were back to the work. Anal manometer (Gould Instruments Inc, OH, and Arnoldorfer Inc. WI, US), FISI and SF-36 FI questionnaire were used to evaluate their anal canal function and quality of life for each patient at postoperative 12th week and one year. Maximal resting (MRP) and minimal squeezing (MSP) pressures, minimal sensory volume (MSV), rectoanal inhibitory reflex (RAIR) and anal canal length (AL) were measured. The volumes from the first sensation to the urge to defecate had been defined by an independent resident of surgery. The continence function of the anal canal has been scored by FISI, reflecting both severity and frequency of the complaints.^{2,3,4} FISI scoring system was readapted for patients according to the data from their records. FISI score greater than 8 was accepted as incontinence, score 7 and less was accepted as normal, besides the manometric results calculated as stated above. In patients who declared incontinence and a FISI score higher than 8, anal canal function was evaluated also by the performing digital exam and EAUS.

Statistical Methods

Chi-square test was used for categorical frequencies. The required percentages of values were stated. Cross tables were utilized for mutual variables. Mann-Whitney U test was used for nonparametric and nominal variables. ANOVA analysis was also used for the variables from more than 3

Table 1. Fistula characteristics and history of anal function

Fistul type	FISI>8	Wetness	Influenced % sphincter			P value
			<25%	25-50%	>50%	
TS (n=49)	3	23	34	13	2	0,006
IS (n=11)	2	7	9	2		
SC (n=21)		8	20	1		
Preoperative	5					0,949
Postoperative	8					0,283
Total		38 (47%)	63(77,7%)	16	2	

TS: Transsphincteric, IS: Intersphincteric, SC: Subcutaneous fistula

groups. Analysis was performed using SPSS 15.0 (SPSS Inc., Chicago, IL, USA) version statistical pocket program. A p value <0.05 was considered statistically significant

Results

Eighty-one patients were included. Six (7.4%) were female. The mean age was 25 years. The mean follow up was 33 months. Of 81 patients, 73 had undergone previous surgical procedures due to perianal abscess. Majority presented with pain and wetness and irritation around the anus due to colored discharge from external orifice. No patient had inflammatory bowel disease.

Forty-nine patients had transsphincteric (TS), 11 with intersphincteric (IS) and 21 with subcutaneous fistula (SC). Twenty-six patients with TS, 4 with IS and 9 with SC fistulas had external orifices located anterior part of the anal orifice. In preoperative evaluation 5 patients had incontinence with FISI higher than 8. When compared the relationship between types of fistula and preoperative and postoperative continence scores (FISI) there was no statistical difference ($z=0.064$, $p=0.949$, $z=1.074$, $p=0.283$). EAUS affirmed that less than 25 % of sphincter muscles had been involved by a fistula tract in the majority of patients ($n=63$, 78%). However sphincter mechanism was scattered in different length by the different types of fistula tract ($z=2.765$, $p=0.006$).

During the follow up at 12 weeks after surgical procedure; pain, urinary retention, and soft tissue infection were commonly experienced. As for assessment of anal canal function while 7 patients had gas incontinence, 4 soiling and 38 (46.9%) had wet perineal region at 12th weeks, at one year follow-up 6 patients developed gas incontinence, 2 soiling and 16 (20%) had wetness. Fistula was recurred in 6 patients (out of 6, 2 patients (4%) had fistulotomy and 4(12.9%) had seton procedure.) ($z=7.821$, $p<0.001$). (Table 2). The annoying wetness that lasted more than 12th weeks in the region was related to the recurrence ($z=5.488$, $p=0.000$). Recurrence was not associated with any types of fistula ($p=0.891$), the amount of the sphincter mechanism lying beneath the fistula tract ($p=0.085$), or the internal orifice which was exposed during the operation ($p=0.788$). However recurrence was statisti-

cally related to longer operative time ($p=0.003$) and postoperative FISI scores ($p=0.005$).

The mean operation time for a fistulotomy was significantly longer than that for a seton procedure (36,1 vs.19,1 minutes respectively, $p<0.001$). Mean hospitalization time was 14,6 (SD \pm 8,1) hours. Length of hospital stay was statistically different when compared with 3 different types of fistula ($p=0.001$), which was in favor of SC fistula. The mean time of return to work after the procedures was 9,4 days (SD \pm 3,1). It was remarkably short in the patients with SC fistula undergoing surgery ($f=8.109$, $p=0.001$) (Table 3).

Overall 63% of 64 patients rated their satisfaction with surgery as good. Sixteen patients (41%) out of 39 underwent fistulotomy and 8 out of 25 one (32%) underwent set on procedure had declared bad life quality due to annoying wetness in the perineal region, incontinence and the other reasons. Of 64, 24 patients (37,5%) suffered either incontinence or the burning on the perianal region due to the permanent wetness (Table 4). It was the reason that they did not come back the work early and not to make an adequate effort. However total satisfaction was around 63% of patients at the end of a year and only 6 with recurrent fistula (7,4%) managed by re-surgery.

Discussion

It is known that about 30-47% of patients with a perianal abscess develop a perianal fistula. (8,9) More than 90% of the patients had previous perianal abscess in this study which was unexpectedly high. It could be explained by the fact that the most of the patients worked under hard conditions. Therefore the cleaning of their own body and perianal region were limited under that sort of circumstances after the surgical procedures particularly in the official wards.

One drawback of our study is that it is retrospective. However, although preoperative continence status is less provided, impairment of the sphincter function is always followed with great care in our clinic and in the operative report the status and level of fistula tract have been clearly recorded in accordance with strict official law orders.

On the other hand preoperative patient's continence status and wound healing after the proce-

Table 2. Postoperative complications and anal canal function during the follow-up

PO Complications		Fistulotomy (n=50)	Seton (n=31)	P value
Urinary retention		4 (8%)	1 (3,2%)	
Bleeding		2 (4%)	1 (3,2%)	
PO Severe pain		7(14%)	2 (6,5%)	
Infection 1wk.after surgery		2(4%)	2 (6,5%)	
Re-fistula at 12 th wk. after surgery		2 (4%)	4 (12,9%)	<0,001
Anal function failure (FISI>8) 12 wk.	Gas incontinence	4	3	<0,001
	Soiling	2	2	
	Wetness	23	15	<0,001
Anal function failure (FISI>8) a year	Gas incontinence	4	2	0,001
	Soiling	1	1	
	Wetness	11	5	<0,001

Table 3. Operative and early postoperative characteristics of the patients.

	SC fistula (n=21)	IS fistula. (n=11)	TS fistula (n=49)	P value	
Operation time(min)	16,6	52,5	36,5	<0.001	
Hospital stay (h)	3,4	7,5	18,8	<0,001	
Internal orifice found	19	8	36	<0,001	
Return to work (d (SD))	8,3 (2,5)	10,9 (3,6)	10,7(2,8)	0,001	
Operation	Fistulotomy	17	6	27	<0.001
	Plastic Seton	4	5	22	

TS: Transsphincteric, IS: Intersphincteric, SC: Subcutaneous fistula

Table 4. Patients satisfaction in the series at the first year after intervention

Satisfaction	Fistulotomy		Seton		Total satisfaction
Perfect	5	58,9%	4	68%	62,5%
Good	7		5		
Fair	11		8		
Bad and worst	16	41%	8	32%	37,5%

dures are the factors which influence postoperative continence status and QOL. (3,15,21,22) However we could not observe that issue in our study. Despite the impact of previous surgeries on sphincter mechanism, preoperative continent sphincter status was not associated with anal canal function that assessed after the surgical treatment. The other factor related to postoperative incontinence could be a wound breakdown which requires long hospitalization. In this study, we did not observe wound dehiscence in any patient. But 11 patients (13,6%) at first follow up visit, and 8 (12,5%) at the end of a year had incontinence. In addition, annoying wetness with high percentage could possibly be related to the minimal soiling originated

from the distortion of topographic anatomy of the anal canal due to the seton setting. That situation was as much critical as the disabling condition along with incontinence in clinical practice, because the patients after surgical procedure had been expected to return their hard works in near-normal health status. The wetness in that region made their QOL worse due to warm climate, humidity and the clothes for hard field situations. The disappointment after both procedures, particularly seton procedure, increased to 37,5% and 32% of patients respectively. However the patients declared that seton procedure was more preferred and associated with higher satisfaction when compared with fistulotomy (68% vs. 58,9%).

Recurrence was experienced 2 patients (4%) undergoing fistulotomy and 4 (12,9%) with seton procedure which was in favour of fistulotomy. Operative time was found to be associated with recurrence. All patients with recurrence in this study were re-operated.

Conclusion

In conclusion, in some patients with seton procedure, QOL may be worse, and recurrent fistula formation may occur. The other complication was wetness in the region that caused irritating itching which made patients unsatisfied with the outcome of the surgery. Nevertheless, patients with seton procedure had shorter hospitalization, low percentage of postoperative early complications and reasonably shorter operative time compared to fistulotomy in patients with a complex fistula.

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Knowledge of adolescents from Novi Sad (Serbia) about epilepsy

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Abstract

Aim: Determine the level of knowledge of 502 adolescent students (ages 15-17; from both genders) about epilepsy.

Methods: To assess knowledge of high school students about epilepsy was used instrument, the questionnaire designed by Bozkaya and associates. All data were processed using the computer program SPSS, version 18.0.

Results: The majority of study participants had heard about epilepsy, mainly from mass media. While books were found to be a significant source of epilepsy information for students enrolled in medical vocational schools, those enrolled in other schools obtained information about epilepsy from newspapers and magazines. Sleep disturbance and food were mentioned as the most frequent triggers of epileptic seizures; sleep disturbance was mentioned significantly more frequently by medical vocational school students, while students from other schools more frequently mentioned video games and computers. No statistically significant response differences were found with respect to study participant age. Study respondents mentioned sudden loss of consciousness, convulsions and foaming-at-the-mouth as the most common symptoms of epilepsy. Convulsions were significantly more frequently mentioned by female study participants than males. With respect to other symptoms, study respondents from medical vocational schools more frequently mentioned self-wetting and tongue biting than other participants. Among all respondents, the most frequently mentioned emergency measure required in the case of epileptic seizure was: protect the head, remove potentially dangerous objects and call an ambu-

lance. Response differences by gender and school type were not statistically significant.

Conclusions: Finally, one could point out that high school students show an enviable knowledge of epilepsy, but it is still necessary to implement health education campaigns, mainly through lectures and workshops for youth counseling at health centers, and through the mass media that proved to be the dominant source of information to young people about this disease, which would further raise the level of knowledge about epilepsy.

Key words: Poll, epilepsy, epilepsy awareness, secondary school children.

Introduction

From a clinical perspective, epileptic seizures are defined as follows:

Occasional, stereotypical episodes of disturbed function which may affect consciousness, behaviour, emotional reactions, and/or motor and sensory functions, which (based on the overall clinical picture and diagnostic tests) are considered to be a consequence of cortical neuron discharges.

Epilepsy is defined as a state in which the above mentioned episodes occur spontaneously with different intervals (1-5).

Epilepsy appears most frequently in either early or late stages of life, and is one of the most frequent neurological disturbances, with a prevalence rate of 2.8 to 19.5 per 1000 in the general population: representing an estimated 1% of the entire global disease burden. Furthermore, epilepsy patients are under increased risk for the development of psychological illnesses, such as depression, anxiety or even psychoses. Unfortunately, socio-cultural attitudes continue to have a negative in-

fluence on the treatment of epileptics, especially in developing countries, where epilepsy is still linked with superstition, discrimination, and stigmatization (6,7). This problem is compounded by the fact that, geographically, approximately 80% of epilepsy sufferers live in developing countries.

The main objective of the present study is as follows: 1) to obtain insight into the level of knowledge of junior secondary school students from Novi Sad, Serbia about epilepsy; and 2) correlate potential differences to educational curriculum (medical-vocational school vs. all others) and gender.

Material and methods

The present study included 502 secondary school students (ages 15-17; from both genders) who were enrolled in one of six high schools in Novi Sad, Serbia, including: 2 medical vocational schools, 1 electrical engineering school, and 1 comprehensive (gymnasium) school. The study was conducted from May to June 2011, and was based on a cross-sectional design. Before beginning the study, written consents were obtained from all school headmasters. All polling was voluntary and anonymous.

To assess the level of knowledge and attitudes of these students about epilepsy, study participants were given a questionnaire developed by Bozkaya et al. (8), which consisted of two sections. The first section of the questionnaire was used to determine the socio-demographic characteristics of the study participants, while the second part dealt with student knowledge of epilepsy.

All data were processed using the computer program SPSS, version 18.0. Various descriptive statistical methods were used for data analysis, and the statistical significance of response differences were assessed using the χ^2 and Mann-Whitney test. Results with $p \leq 0.05$ were considered to be statistically significant.

Results

Demographic characteristics of the sample

The polling sample consisted of 37.3% boys and 62.7% girls. Of the participants, 48.8% were enrolled in medical vocational schools, while 51.2% attended other secondary school programs (either 'gymnasium', commercial, or electrical engineering).

Analysis of the data concerning the education level of the study participants' parents revealed that the majority finished vocational education, whereas only one fifth held a university degree (Figure 1).

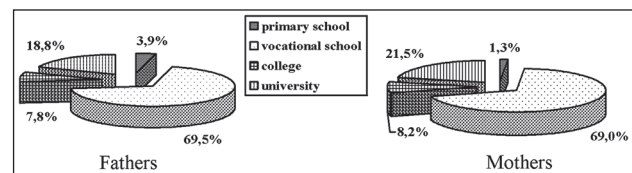


Figure 1. Educational level of the study participants' parents

Figure 2 shows data on the number siblings in the polled subjects' families. As can be seen, nearly one half of the respondents (46.0%) had one sibling. However, because 37% of the subjects did not answer this question it was not possible to establish the percentage of study participants with no siblings.

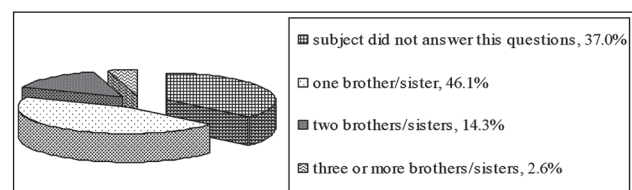


Figure 2. Number of siblings

Knowledge about epilepsy

Analysis of the second part of the questionnaire revealed that a majority of the study participants (89.1%) had heard about epilepsy. No statistically significant difference was found between genders with respect to knowledge of epilepsy (Mann-Whitney $Z = -0.222$, $p = 0.8243$) or school type (Mann-Whitney $Z = -0.035$, $p = 0.972$).

Results from questions concerning sources of epilepsy information are shown in Figure 3. As can be seen, the majority of the poll participants obtained information about epilepsy from television.

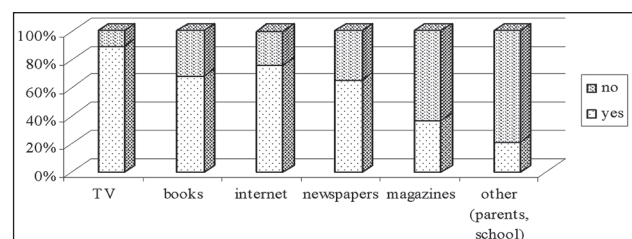


Figure 3. Sources of information about epilepsy

However, as might be expected, significantly more study participants enrolled in medical vocational schools responded that they obtained their information about epilepsy from textbooks ($\chi^2=12790$, $df=1$, $p=0.000$) (Figure 4). Interestingly, significantly more female participants ($\chi^2=5.310$, $df=1$, $p=0.021$) and non-medical students ($\chi^2=5.565$, $df=1$, $p=0.017$) responded that newspapers were a source of information about epilepsy (Table 1). No statistically significant differences were found for other sources of epilepsy information with respect to gender or secondary school program.

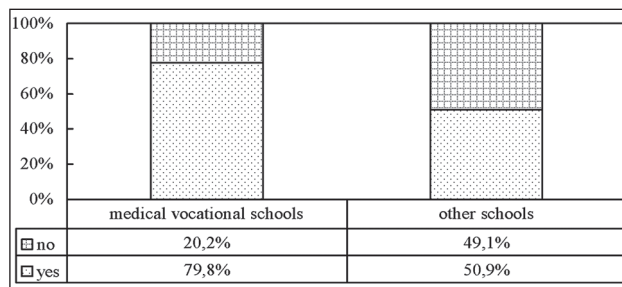


Figure 4. Books as sources of information vs. school program

The next section of the questionnaire dealt with student awareness of possible epileptic triggers or causes of epileptic attacks. As can be seen in Figure 5, the majority of study participants mentioned insomnia and food as epileptic triggers.

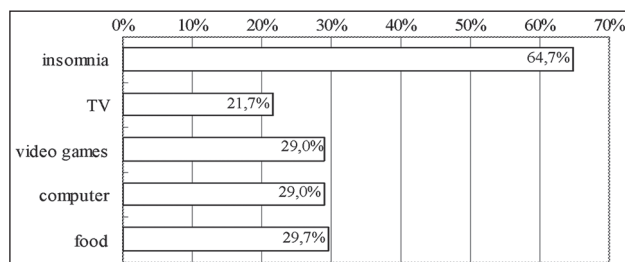


Figure 5. Knowledge about epileptic triggers

With respect to school program, study participants enrolled in medical vocational schools considered

insomnia as the most common trigger of epileptic attacks, whereas students enrolled in other school programs more frequently mentioned video games and computers (Table 2). No statistically significant difference was found between genders concerning knowledge of epileptic triggers ($p>0.05$).

Table 2. Student knowledge of possible epileptic triggers vs. school program

Epileptic Trigger	School Program	
	Medical vocational school	Other
Insomnia		
Yes	81.7%	68.0%
No	5.3%	7.0%
Not sure	13.0%	25.0%
Total	100.0%	100.0%
P	0.032	
Video games		
Yes	40.7%	61.4%
No	36.5%	13.3%
Not sure	22.8%	25.3%
Total	100.0%	100.0%
P	0.001	
Computer		
Yes	39.4%	61.3%
No	34.0%	8.7%
Not sure	26.6%	30.0%
Total	100.0%	100.0%
P	0.001	

As can be seen in Figure 6, the most frequently mentioned symptoms of an epileptic attack were as follows: abrupt loss of consciousness, convulsions and increased salivation (foaming-at-the-mouth) (Figure 6).

Students enrolled in medical vocational school programs more frequently mentioned “self-wetting” and “tongue biting” than their peers (Table 3), indicating an increased level of knowledge about epilepsy. However, this might be expected

Table 1. Newspapers as source of epilepsy information as a function of gender and school program

Newspapers as source of information	Gender		School	
	Boys	Girls	Medical vocational school	Other schools
Yes	52.5%	72.5%	55.7%	75.0%
No	47.5%	27.5%	44.3%	25.0%
Total	100.0%	100.0%	100.0%	100.0%
P	0.021		0.017	

considering differences in curriculum between medical vocational schools and other secondary school programs. With respect to gender, girls more frequently than boys mentioned convulsions as a symptom of epilepsy ($\chi^2=15.008$, $df=2$, $p=0.001$) (Figure 7). No statistically significant differences were found for other epilepsy symptoms ($p>0.05$).

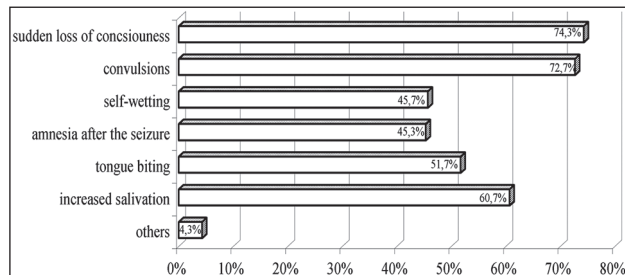


Figure 6. Symptoms of an epileptic seizure mentioned by the participants

Table 3. Study participant knowledge of particular symptoms of epilepsy vs. School program

Epilepsy symptom	School Program	
Self-wetting	Medical vocational schools	Other schools
Yes	76.4%	52.5%
No	13.6%	22.8%
Not sure	10.0%	24.7%
Total	100.0%	100.0%
P	0.001	
Tongue biting		
Yes	80.9%	60.9%
No	10.1%	9.8%
Not sure	9.0%	29.3%
Total	100.0%	100.0%
P	0.001	

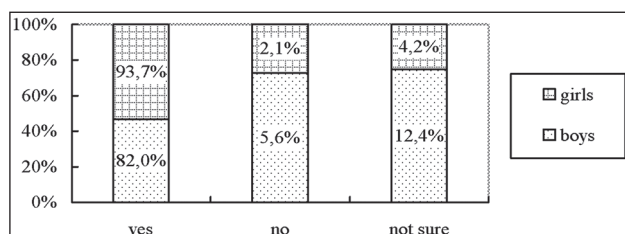


Figure 7. Distribution of answers concerning knowledge of convulsions as an epilepsy symptom as a function of gender

The next section of the questionnaire polled student knowledge of emergency measures required in the case of an epileptic attack. Based on our results, the majority of the poll participants responded that the most important emergency measure to take in the case of an epileptic attack is to protect the head of the victim and call an ambulance (Figure 8).

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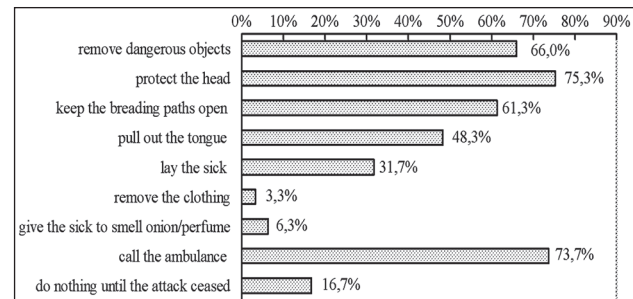


Figure 8. Knowledge of actions to take in the case of witnessing an epileptic seizure

With respect to school program, more study participants enrolled in medical vocational schools said that the basic response to an epileptic seizure is to protect the head of the victim, remove dangerous objects, and wait until the end of the attack (Table 4). Interestingly, more female study participants responded that calling an ambulance was a necessary measure ($\chi^2=6.082$, $df=2$, $p=0.018$) (Figure 9). No statistically significant difference was found for other emergency measures.

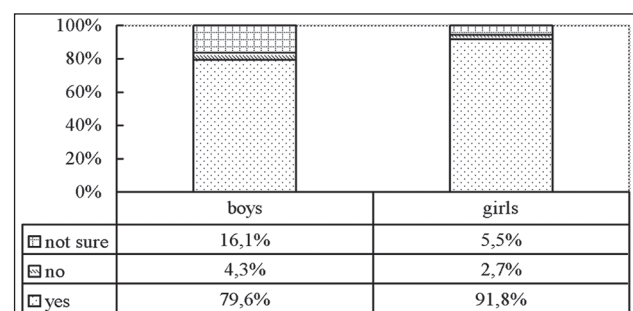


Figure 9. Number of "call an ambulance" responses by gender, when asked what measures to take when witnessing an epileptic seizure

Four out of ten participants (40.7%) said that they knew a person suffering from epilepsy; with more medical vocational school students responding that they know an epileptic than their peers from other schools ($\chi^2=13.897$, $df=1$, $p=0.000$) (Figure 10). No statistically significant difference was found with respect to gender in response to this question ($p>0.05$).

Table 4. Knowledge of emergency measures to take during an epileptic attack vs. school program

Emergency Measure	School Program	
	Medical vocational schools	Other schools
Remove dangerous objects		
Yes	89.9%	68.3%
No	3.9%	10.8%
Not sure	6.2%	20.9%
Total	100.0%	100.0%
P	0.0001	
Protect the head		
Yes	89.6%	81.4%
No	4.4%	2.3%
Not sure	6.0%	16.3%
Total	100.0%	100.0%
P	0.021	
Wait until the end of the attack		
Yes	42.0%	12.7%
No	43.0%	68.3%
Not sure	15.0%	19.0%
Total	100.0%	100.0%
P	0.0001	

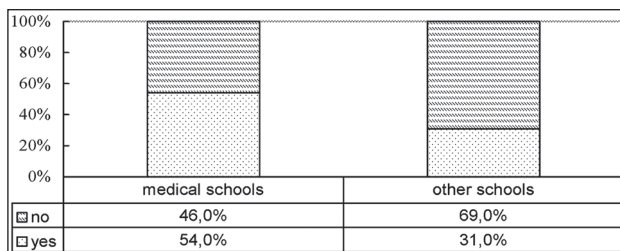


Figure 10. Number of participants reporting that they knew a person suffering from epilepsy versus school program

Approximately 1 in 6 (16.9%) students mentioned that he/she had witnessed an epileptic event, and 8.2% of the participants remembered febrile convulsions during their childhood (Figure 11). However, no statistically significant differences were found with respect to gender or school type ($p>0.05$).

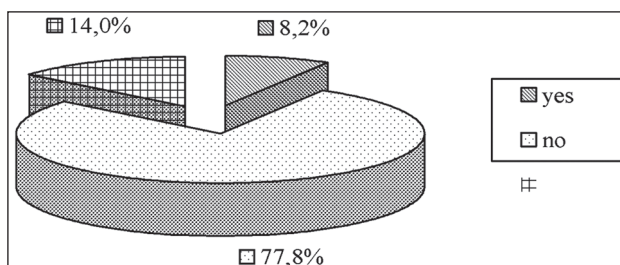


Figure 11. Remembrance of the occurrence of febrile convulsions in childhood

Discussion

Based on our results, the majority of the study participants (89.41%) had some knowledge of epilepsy, in agreement with the findings from similar investigations in other parts of the world. For example, in a study concerning the attitudes of secondary school children toward epilepsy in Cameroon, 94.7% of respondents gave a positive answer concerning knowledge of epilepsy (9). In a similar investigation conducted by Mecarelli et al., among school children and university students in Rome, 91% of the respondents said that they knew of epilepsy as a disease (10). In a Turkish study on the influence of epilepsy awareness and attitudes on the quality of life of epileptic children and their parents, Hirfanoglou et al. reported that 65.4% of children and their parents considered epilepsy to be a neurological disease (11).

However, in some cultures, epilepsy remains the subject of superstition, resulting in a high incidence rate of stigmatization and discrimination. For example, in a study by Al-Rashed et al. on knowledge, perception and attitudes toward epilepsy among Kuwaiti students, 34% of the respondents said that epilepsy is caused by evil spirits, and 17.4% considered this disease to be "God's punishment" (12).

The majority of investigations have shown that TV is the most common source of information about epilepsy. Secondary school children and students also obtained information about epilepsy through mutual communication (37%), their parents and friends (24%), or mass media (19%) (9). In the present study, the majority of respondents mentioned insomnia (64.7%) and food (29.7%) as triggers of epileptic attacks, and sudden loss of consciousness, convulsions and foaming-at-the-mouth as the most typical symptoms of epilepsy.

When asked how they should respond if they witnessed an epileptic seizure, study respondents mentioned protecting the head of the victim, removing dangerous objects, and calling an ambulance as the most important measures required. According to an investigation by Zielinska et al. (13), only 2% of school-age children would know how to provide first aid in the case of an epileptic seizure. Another study by Farid et al. conducted among students in Trinidad and Tobago, found limited knowledge of the causes, incidence, and first-aid methods to be used in the case of an epileptic seizure; however, students who mentioned that they had known an epileptic person showed a significantly higher level of knowledge vs. other participants (14).

In a study conducted in Cameroon, 73.3% of the respondents knew an epileptic, while 75% had witnessed an epileptic seizure (9). In contrast, only 46% of student participants in a study in Poland knew a person with epilepsy (13). Similarly, in the present study, approximately 40% of the students knew someone suffering from epilepsy, while one sixth thought they had witnessed an epileptic seizure.

Conclusions

A majority of the polled students had heard about epilepsy, mainly from mass media, and no statistically significant difference was found with respect to gender or school program. However, students from medical vocational schools significantly more often mentioned books as a source of epilepsy information, whereas other poll participants more frequently mentioned newspapers.

Insomnia and food were most frequently mentioned as triggers of epileptic seizures. Insomnia was significantly more frequently mentioned by

students from medical vocational schools, whereas students from other schools more frequently mentioned video games and computer. Differences between responses by gender were not statistically significant.

Sudden loss of consciousness, convulsions and foaming-at-the-mouth were mentioned as the most typical symptoms of epilepsy. Convulsions were significantly more often mentioned by girls than boys. Concerning other symptoms, participants from medical vocational schools significantly more often mentioned self-wetting and tongue biting.

When asked what measures to take if they witness an epileptic seizure, the study participants most frequently mentioned protecting the head of the victim, removing dangerous objects and calling an ambulance. No statistically significant differences were found with respect to gender or school type.

Less than half of the respondents knew a person suffering from epilepsy; however, more medical vocational students reported that they knew an epileptic. One sixth of the poll participants witnessed an epileptic seizure.

In conclusion, based on the present study, the study participants demonstrated a reasonable level of knowledge about epilepsy.

Acknowledgements

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Ectopic ACTH syndrome caused by acute lymphoblastic leukemia: Case report and literature review

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Abstract

Most common primary tumors in ectopic ACTH syndrome are located in lung, bronchia, mediastinum and pancreas, while tumors in other sites are seldom reported. Ectopic ACTH syndrome caused by hematological leukemia is extremely rare. A 33-year-old woman was referred to the department of endocrinology for hyperpigmentation and weakness. She was revealed to be ectopic ACTH syndrome caused by acute lymphoblastic leukemia L2 (ALL-L2). The plasma level of ACTH was markedly elevated at 315-351 pg/ml and the normal diurnal rhythm of cortisol was lost. 24-hour urinary free cortisol (UFC) was slightly high, 158-233 µg, which could not be suppressed by low-dose Dexamethasone test. The level of ACTH and cortisol returned to normal range when the leukemia got remission after the induction chemotherapy. No other disease as a cause of the increased ACTH was detected. This case illustrates that ACTH can be secreted from lymphoblastic cells. The discrepancy between very high ACTH level and slightly elevated 24-hour UFC suggests that the ACTH may contain other pro hormones, such as proopiomelanocortin (POMC), which has low ACTH bioactivities.

Key words: Ectopic ACTH syndrome, Cushing's syndrome, acute lymphoblastic leukemia, POMC.

Introduction

Ectopic ACTH syndrome is defined as abnormal ACTH secreted from the other organs or tumors except pituitary (1). Various tumors can cause ectopic ACTH syndrome, especially those originating from neuroendocrine cells. Small cell lung carcinoma, carcinoid from the lungs, thymus and gastrointesti-

nal tract counts for about 70% of primary tumors in ectopic ACTH syndrome (2). Other tumors, such as islet cell tumors, pheochromocytoma and medullary thyroid carcinomas are occasionally reported (1, 2). Actually, the ACTH can be secreted from almost all kinds of tumors, such as breast carcinoma, lymphoma, melanoma, gallbladder tumor and leydig cell tumor (2). However, it is extremely rare that ectopic ACTH secreted from leukemia. To our knowledge, only four cases of Cushing's syndrome accompanied by leukemia have been reported (3-6). Among them, two patients with leukemia involving the central nervous system had their ACTH produced from pituitaries (3, 4). The other two had their ACTH secreted from vast immature and infantile leukocytes (5, 6). Some ACTH secreting tumors would also produce POMC simultaneously, which can explain the discrepancy between very high ACTH level and slight elevated cortisol in those cases (6, 7). And it is reasonable that patients with dominant POMC secreting tumors would have fewer clinical characteristics of Cushing's syndrome such as moon face and purple striae (6, 7). Here we provide a female patient with chief complaints of hyperpigmentation and weakness, which turned out to be ectopic ACTH syndrome caused by acute lymphoblastic leukemia L2 (ALL-L2). The possible mechanisms for ACTH production and for the discrepancy between high ACTH level and few features of Cushing's syndrome were discussed.

Case report

A 33-year-old woman was admitted to our hospital on May 14, 2009 with the chief complaints of skin pigmentation and weakness for 3 months. The hyperpigmentation was more obvious on the face, neck, extensor surfaces of fingers and waist.

Acne was present on the face and back. She did not have clinical features of Cushing's syndrome, such as moon face, buffalo hump, purple striae, centripetal obesity or increased body weight. Her pigmentation was exacerbated and for this reason, she was referred to a local hospital. A skin biopsy was scheduled but refused by the patient. Then she came to our hospital. She denied any visual field deficiency, kidney stones, bone fracture or exogenous glucocorticoid exposure. She had regular menstruation, G6P2. Her past medical history and family history were negative.

On physical examination, the blood pressure was 150/110 mmHg, and other vital signs were normal. She had a weight of 53 kg, a height of 150 cm, a BMI of 23.6 kg/m² and a waist circumference of 72.5 cm. The hyperpigmentation was found on the whole body, especially in the areas of face, neck, nipples, extensor surfaces of fingers and waist where the belt was hold. She had no buffalo back, supraclavicular fat pad, moon face or purple striae. The liver and spleen were not palpable, and peripheral edema was not present.

A series of tests were carried out to diagnose Cushing's syndrome: ACTH 315-351 pg/ml (reference range: 0-46), cortisol (8am) 12.7-17.5 µg/dl, cortisol (0am) 5.95 µg/dl. 24-hour UFC 158.1-233.0 µg (reference range: 12.5-104.4). The cortisol (8am) was 11.7 µg/dl after 1 mg overnight Dexamethasone suppression test. The 24-hour UFC were 39.9 µg and 24.5 µg after low-dose and high-dose Dexamethasone suppression tests. The serum potassium was 4.2 mmol/L, sodium 139 mmol/L, fasting blood glucose 5.1 mmol/L. Blood routine test showed WBC 10.1×10⁹/L, LY 50.0%, NEUT 42.9%, Hgb 12.4 g/L, PLT 174×10⁹/L; The serum thyroid hormone, prolactin, insulin-like growth factor-I, liver and renal function were normal. No abnormalities were found in chest and adrenal CT scan. Enhanced sellar MR imaging showed partial empty sella without space-occupying lesions. Her bone mineral density was normal. Two weeks later (2009-5-31), the blood routine test showed WBC 90.0-95.7×10⁹/L, LY 73.3%, NEUT 7.4%, Hgb 11.8 g/L, PLT 159×10⁹/L. The blood smear revealed 5% infantile lymphocyte. Bone marrow smear showed hypercellular marrow with increased blastic lymphocyte, accounting for up to 91% of all bone marrow nucleated cells. The blastic lympho-

cytes had different shapes and sizes with round or oval nucleus and relatively little cytoplasm. The nuclear membranes were thick, and some orange or purple particles could be detected in some cytoplasm. Both peroxidase and AS-DNCE staining were negative. The positive rate of PAS and ACP staining was 43% and 99%, respectively. BCR/ABL staining was negative. Bone marrow smear for immunophenotypic markers analysis showed prominent blasts(91.9%) which were positive for CD34, CD19, CD20, and CD10. The bone marrow biopsy demonstrated increased hemopoietic tissue and decreased fat tissue. B lymphocytes dominated the hemopoietic tissue. Immunohistochemistry showed ACTH (-), CD3(+), CD20(++), MPO(+). Cytogenetic analysis of the blast cells were IgH: (+) [VH(-), R3A(-), R2(+)]; IgK: (-)[3K(-)]. Her cerebrospinal fluid (CSF) pressure was 115 mmH₂O with total cells 0/ul, CSF-Glucose 3.4 mmol/L, CSF-Chlorine 123 mmol/L, CSF-Protein 0.35 g/L. No blastic lymphocytes were found in CSF collection. According to these results, acute lymphoblastic leukemia L2 (large granular type) and ectopic ACTH syndrome were diagnosed.

After the first cycle of induction chemotherapy with Hyper-CVAD, the bone marrow smear showed blastic lymphocytes was 2%. The function of pituitary-adrenal axis returned to normal: ACTH 17.7 pg/ml, 24-hour UFC 64.5 µg, cortisol at 8am and 0am were 6.9 µg/dl and 0.53 µg/dl, respectively, and the skin pigmentation of the patient showed markedly improvement. The patient received seven courses of systemic chemotherapy and thirteen intrathecal injection totally. She died one year after the diagnosis. Oral informed consent for publication was obtained from her husband.

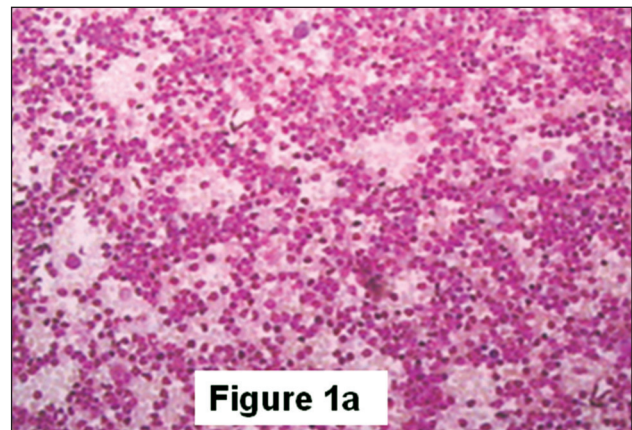


Figure 1a

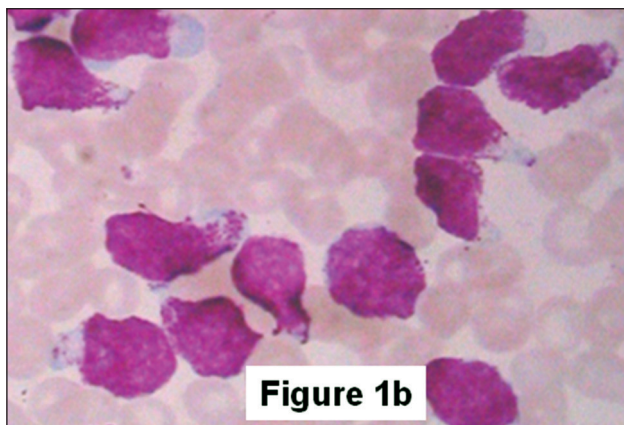


Figure 1b

Figure 1. The bone marrow smear in a female patient with ectopic ACTH syndrome was revealed to be ALL-L2. It showed hypercellular marrow with increased blastic lymphocyte, accounting for up to 91% of all bone marrow nucleated cells (1a). The blastic lymphocytes had different shapes and sizes with round or oval nucleus and relatively little cytoplasm. The nuclear membranes were thick, and some orange or purple particles could be detected in some cytoplasm (1b).

Discussion

The patient was diagnosed as ectopic ACTH syndrome based on the following reasons:

1. She had progressive hyper-pigmentation, especially in the areas of nipples, extensor surfaces of fingers and waist belt areas.
2. Her plasma ACTH was significantly elevated, while 24-hour UFC was only slightly high, suggesting a low ratio of cortisol to ACTH, which is typical of ectopic ACTH production.
3. Sellar MR imaging showed empty sella without space occupying lesions.

The source of ACTH was speculated from ALL-L2 because of 1. the confirmed diagnosis of ALL-L2 by the results of bone marrow smear and immunophenotypic markers analysis, and 2. the levels of plasma ACTH, serum cortisol and 24-hour UFC returned to normal range when the lymphoblasts disappeared after the induction chemotherapy. To our knowledge, only 4 cases of leukemia with Cushing's syndrome have been reported, while none of them was ALL-L2.

Ectopic ACTH syndrome caused by hematological malignancy was extremely rare (1, 2).

Only four such cases have been reported and the mechanism of ACTH production was completely different. In the first two cases (3, 4), the ACTH was produced from pituitary. It was postulated that the infantile cells infiltrating the central nervous system, especially hypothalamus and limbic system, might interfere the normal function of hypothalamus-pituitary-adrenal gland axis and cause clinical Cushing's syndrome (3). Pituitary gland basophilic hyperplasia, ACTH hypersecretion and adrenocortical hypertrophy were detected in this condition (3). Elevated intracranial pressure and infantile cells collected from cerebrospinal fluid were good clues for leukemia involving the central nervous system (4).

The third case reported by Pfluger revealed a patient with ectopic ACTH syndrome caused by acute myeloblastic leukemia (AML) (5). They demonstrated that the immunoreactive ACTH in the supernatant of cultured bone marrow cells from the patient was significantly higher than that from other AML patients, confirming that these infantile cells can produce ACTH [5]. The fourth case was a 47-year-old man who was diagnosed as ectopic ACTH syndrome with ALL-L1 (6). His plasma level of ACTH was markedly elevated and the level of cortisol was normal. In the plasma of this patient, the researchers confirmed that an abnormally large molecular ACTH (probably proopiomelanocortin) exists in addition to authentic 1-39 ACTH (6).

Similar to this patient, our patient had very high level of ACTH (more than 300 pg/ml), and serum cortisol and 24-hour UFC were only slight elevated. The discrepancy can be speculated that the ACTH secreted from infantile lymphocytes is biologically less active or only portion of the total ACTH are authentic 1-39 ACTH. A larger precursor molecule, POMC, contains the full sequence of β -endorphin, γ -MSH, β -MSH and β -LPH. It has been proved that some ACTH secreting tumors would also produce POMC simultaneously (6, 7). It is not surprise to notice that those patients with dominant POMC secreting tumors would have less characteristics of Cushing's syndrome such as moon face and purple striae but more prominent in hyperpigmentation (6, 7).

In summary, we described a female patient diagnosed as ectopic ACTH syndrome caused by hematological malignancy ALL-L2 and this type of

leukemia has not been reported yet. The high level of ACTH decreased to normal after remission of the disease, indicating that the ACTH is secreted from the vast infantile lymphocytes. The discrepancy between the very high ACTH and slighted elevated 24-hour UFC indicates that most part of these ACTH is only immunoactive, not bioactive.

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The relationship between Lp-PLA2 level and severity coronary artery disease in patient with acute coronary syndrome

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Abstract

Background: Inflammation is one of the factors playing role in acute coronary syndrome (ACS). Many independent evaluation studies have been published verifying the role of inflammation in atherogenesis and supporting the opinion that lipoprotein-associated phospholipase A2 (Lp-PLA2) is a cardiovascular risk indicator which is independent from classical risk factors. In this study, serum Lp-PLA2 level in patients who were hospitalized with prediagnosis of high risk ACS and relationship between Lp-PLA2 level and coronary artery disease were investigated.

Method: The study included 51 ACS patients. Patients were divided into two groups as Lp-PLA2 positive (mean age; 53±14 years) and negative (mean age; 58±9 years). Number of Lp-PLA2 positive patients was 17 and negative patients was 34. Routine biochemical parameters and Lp-PLA2 levels were performed.

Results: There was not a significant difference between groups in terms of mean age, gender, smoking status. CKMB values was found significantly higher in Lp-PLA2 positive patient group. Although plasma CKMB level was predictive for high Lp-PLA2 value, Gensini score was not significantly predictive.

Conclusion: A significant relationship could not be found between coronary artery disease severity estimated with Gensini score and serum Lp-PLA2 values.

Key words: Acute coronary syndrome, Lp-PLA2; thrombosis, inflammation.

Introduction

Cardiovascular diseases are the leading cause of death worldwide. Acute coronary syndrome presenting with different clinical conditions varying from unstable angina pectoris (USAP) to acute myocardial infarction (AMI) is a progressive, systemic and multifactorial (genetic, environmental factors, inflammation) disease that mainly atherosclerotic plaque takes part (1).

Coronary arterial inflammation is commonly seen in acute coronary syndrome (ACS) (2). Inflammation is one of the factors playing role in ACS pathogenesis and role of inflammation has gained more importance as the result of recent studies. The basic physiological event in ACS is rupture of the vulnerable atherosclerotic plaque and subsequent thrombus development (2). Mechanical rupture of fibrous cap in atherosclerotic plaques and superficial erosion of the endothelium coating the plaque induce thrombus in coronary artery. While 75% of coronary thrombi develop with plaque rupture, remaining 25% develop with plaque erosion (3). Obliteration is less than 50% in two-thirds of plaques leading to ACS (2).

Within previous 10 years, evidence were collected indicating that inflammation plays an important role in initiation and progression of atherosclerosis and all these data have put forward that inflammation markers may be beneficial for prediction of individual risk for cardiovascular disease (3).

Many independent evaluation studies have been published verifying the role of inflammation in atherogenesis and supporting the opinion that lipoprotein-associated phospholipase A2 (Lp-PLA2) is a cardiovascular risk indicator which is independent from classical risk factors (4,5,6). Lp-PLA2 is an enzyme

released from lipoprotein associated macrophages, increasing plaque inflammation and as determined in population studies corrected according to other cardiovascular risk factors, of which high levels indicate an increased myocardial infarction (MI) and stroke risk in the ratio of 40-400% (7).

Lipids and lipoproteins are known to play a role in atherosclerosis process which take years however they cannot provide much data about the stage of atherosclerotic disease. Similarly, although non-lipid risk factors like hypertension and smoking are related with endothelial dysfunction, they are insufficient to predict plaque stability. However Lp-PLA2 seems to be a specific marker determining high atherosclerotic activity. Lp-LPA2 is independent from other risk factors and metabolic syndrome and these are additive. Therefore Lp-LPA2 measurements may warn the clinician to apply strategies determined to prevent stroke and coronary events (8).

In this study, serum Lp-PLA2 level in patients who were hospitalized with prediagnosis of high risk ACS and relationship between Lp-PLA2 level and coronary artery disease were investigated.

Patients and methods

Patient group: Patients who were admitted to emergency service of Dr. Siyami Ersek Thoracic and Cardiovascular Surgery Training and Research Hospital with a typical chest pain lasting ≥ 20 min and who had 1mm and above ST depression on ECG obtained on admission were included in the study.

Patients who had angiographically detected coronary artery disease (CAD) and who underwent surgical and mechanical revascularization, who had chronic hepatic and renal failure were excluded from the study.

Patients who were using antihypertensive drugs or whose systolic blood pressure was 140 mmHg, diastolic blood pressure was 90 mmHg on three different measurements were accepted to be hypertensive; whose triglyceride level was above 150 mg/dl were accepted to be hypertriglyceridemic. Patients who were smoking within previous three years were accepted as smokers. Patients whose fasting plasma glucose was above 126 mg/dl or HbA1c values was above 6% were accepted as diabetic. Values above 350 ng/ml, 0.06 ng/ml, 100 pg/ml, 380

mg/dl for D-dimer, troponin, BNP and fibrinogen, respectively were accepted positive. A value above 200 ng/ml was accepted positive for Lp-PLA2.

Coronary angiography: Selective coronary angiography was performed via femoral percutaneous route with Judkins catheters using SIEMENS angiography device. LAD, Cx were evaluated with at least four poses and RCA was evaluated with at least two poses. Coronary reference segment was chosen from proximal and distal of the lesion. Diameter and lumen narrowness were measured with guide catheter calibration. Coronary lumen obliterations were evaluated by two cardiologists who were blinded to clinical condition of the patients. Coronary angiographies were interpreted with coronary artery disease severity score. Gensini score which was defined previously was used for his scoring (9).

Coronary arterial tree was analyzed as segments. Factorial of segments and lumen diameter score were multiplied according to functional importance and total Gensini score indicating coronary artery disease severity was obtained quantitatively.

Biochemical analysis: Lp-PLA2 enzyme level was measured with turbidimetric immunoassay method using Roche modular P888 device with PLAC test kit.

Statistical Analysis

SPSS (Statistical Package program for Social Sciences) version 16.0 was used for statistical analysis. Non-paired t-test was used for comparisons and qui-square test was used for constant variables. Relationship between Gensini score and parameters was investigated with Pearson's linear regression analysis. Results were evaluated in 95% confidence interval and at a significance level of $p < 0.05$.

Results

The study was carried out with 51 patients who were admitted to Emergency Department of Dr. Siyami Ersek Thoracic and Cardiovascular Surgery Research and Training Hospital.

Patients were divided into two groups as Lp-PLA2 positive and negative. Number of Lp-PLA2 positive patients was 17 and negative patients was 34. There was not a significant difference between groups in terms of mean age, gender, smoking status. CKMB values was found significantly higher

in Lp-PLA positive patient group. Other demographic data are shown in Table 1.

Although plasma CKMB level was predictive for high Lp-PLA2 value, Gensini score was not significantly predictive.

Discussion

Level of inflammatory markers in serum is in parallel with ruptured plaque prevalence (10). While systemic inflammation leads to myocardial necrosis to some extent, local production of inflammatory mediators resulted from ruptured plaques should not be ignored (11). So both systemic and local arterial inflammation play role in development and pathogenesis of acute coronary syndrome. Measurement of inflammatory markers also enables risk assessment of patients. Many different cells and mediators play a role in the process leading to arterial inflammation.

Multiple marker approach seems more important rather than isolated markers in risk assessment of ACS. Assessment of inflammatory markers like hs-CRP, embolization and myocardial necrosis markers like troponin and hemodynamic stress markers like B-type natriuretic peptid (BNP) together strengthen determination of prognosis (12). SIESTA (Systemic Inflammation Evaluation in patient with non-ST segment elevation acute coronary syndromes) study will be one of the prospective studies that will use many markers like CRP, WBC, fibrinogen, BNP, neopterin, interleukin 6,8,10,18, TNF, E-selectin, endothelin 1, tissue factor, VCAM-1, ICAM-1, troponin, creatinin kinase MB (13).

Although cholesterol level measurement is widely used to determine coronary health, its value to determine cardiovascular events is limited. Only 25% of diagnosed premature coronary artery diseases are related with high LDL level. According to 26-year analysis, only 50% of individuals who developed CAD could be pre-determined using only total cholesterol levels. In this study, cholesterol levels of 89% of the individuals who experienced AMI and cholesterol levels of the individuals who did not were close to each other. Additionally, mean LDL-C levels of individuals with CAD and LDL-C levels of general population were similar (150 mg/dL) (7).

Plaque rupture risk is associated with intrinsic properties of the plaque and extrinsic forces (triggers of plaque rupture) facilitating rupture in vulnerable plaques (14).

Vulnerable plaques are the ones that carry high thrombosis risk in the short term, in other words lead to ACS (15). Difficulty is to find, treat the plaques (or the patients) vulnerable to thrombosis and thereby to prevent ACS (16).

Almost three-fourths of all infarction-related thrombi develop on plaques that lead to only mild-moderate stenosis before infarction due to outward remodeling tendency and higher prevalence compared to stenotic plaques (17). Therefore vast majority of myocardial infarctions arise from hemodynamically insignificant and probably asymptomatic atherosclerotic lesions. On the contrary, plaques responsible for stable angina are usually smaller however they may lead to more severe lumen obliteration due to accompanying local arterial contraction.

Plaque rupture causes approximately 75% of all coronary thrombi responsible for ACS (17,18). Lipid accumulation (19), local loss of smooth muscle cells and thinning of fibrous sheath of the plaque (20) and inflammation in many macrophages and mast cells and neutrophils (21-24) and intra-plaque haemorrhage (25) impair plaque stability and make the plaque vulnerable to rupture. On the contrary, smooth muscle-mediated recovery and repair process stabilize plaques and protect from rupture (26).

Most of myocardial infarctions and sudden cardiac deaths arise from atherosclerotic lesions that have led to moderate stenosis. Falk et al. showed that most of AMIs arise from lesions that have caused less than 59% occlusion. More than 70% occlusion was detected on 16% of the lesions. Some part of the patients whose stress ECG and CAG are normal may have high risk for plaque rupture. In conclusion, it should be considered that atherosclerosis is a systemic disease and usually mild-moderate stenosis lead to cardiac events (27).

Temperature difference in coronary artery is mostly detected in the patients who admit with acute coronary syndrome. It also shows inflammation which is one of the most important parts of the pathogenesis of the disease, there is a close relationship between cellular adhesion molecules and temperature difference measured in the plaque responsible

for acute coronary syndrome (28). However these techniques are invasive and not widely used.

It is seen that a non-invasive, easily repeatable and inexpensive technique meets clinical need is required to determine the plaques that have a thin fibrous capsule and vulnerable to rupture. Plaques obtained from carotis tissue with endarterectomy or autopsy examinations are used to determine fibrous capsule thickness, macrophage infiltration and also lipid core. Recently, Klogie et al. showed that plaques containing severe atherosclerosis were stained with a novel anti-inflammatory marker, Lp-PLA2 antibodies (29).

Lavi et al. recently reported Lp-PLA2 blood concentrations concurrently detected both in human coronary ostium and in coronary sinus; this condition indicate that an explicit increase occurred in Lp-PLA2 levels when blood passes from coronary vascular bed including atherosclerotic plaque. However a decline was detected in Lp-PLA2 levels in absence of coronary plaques. This study also showed that lysophosphatidyl choline produced in oxidized LDL-C hydrolysis stimulated by Lp-PLA2 was closely related with coronary artery endothelial disorder (30). High Lp-PLA2 levels are also found in plaques that have tendency to rupture and seemingly Lp-PLA2 enzyme is released to circulation by these plaques (31).

In contrast to Lp-PLA2, high LDL-C levels do not give an idea about endothelial health and inflammation in atherosclerotic lesions.

Patients with metabolic syndrome or prediabetic patients have many risk factors including low HDL-C levels, small LDL-C particles, high level of lipoprotein remnants and systemic inflammation. High Lp-PLA2 levels have been detected to significantly increase CVD risk in patients with metabolic syndrome (32,33).

Clinically stable plaques have a thick fibrous capsule with dense collagen content and a small lipid core. Stable plaques also have little inflammatory cells and low Lp-PLA2. On the contrary, unstable plaques include a thin fibrous capsule including little collagen and a large lipid core. Discrimination between stable and unstable plaques may be determined by considerable activated inflammatory cells and high Lp-PLA2 activity.

Lp-PLA2 has been introduced as a cardiovascular risk marker independent from classical

risk factors and supporting them (34). Like high hs-CRP, high Lp-PLA2 levels also make the first and repeated CVD risk almost two-fold greater. Interestingly, concurrently high levels of both inflammatory markers enable a stronger prediction capacity (35). On the other hand, low levels of both markers enable detection of individuals carrying the lowest CVD risk.

Lp-PLA2 is produced from macrophages and foam cells in atherosclerotic plaque. Lp-PLA2 measurements may be done inexpensively and non-invasively. Additionally, Lp-PLA2 is primarily related with LDL-C particle. Lp-PLA2 is the only enzyme which hydrolyses oxidized phospholipids on LDL-C. Oxidized fatty acids and lysophosphatidyl choline emerging from this hydrolysis are known to be the molecules which trigger inflammation cascade. Lp-PLA2 is a non-invasive test that may be used for determining plaque stability (36). Today, its levels of <200 ng/mL is accepted low, 200-235 ng/mL near upper limit and >235 ng/mL high. Lp-PLA2 has a low biological variability as LDL-C and this low biological variability property enables clinicians to follow up levels serially (4).

Staining studies done with coronary and carotid tissue revealed the presence of Lp-PLA2 enzyme in thin fibrous capsule or in plaques vulnerable to rupture however the enzyme is not seen in early stage plaques (37).

More than 25 of prospective epidemiologic studies investigated the relationship of Lp-PLA2 enzyme with potential cardiovascular events and stroke, among them, a statistically significant relationship was detected between high Lp-PLA2 and primary coronary or cardiovascular events in 10 out of 11 studies; a statistically significant relationship was shown between recurrent coronary or cardiovascular events in 12 out of 13; Lp-PLA2 is a quite specific marker for vascular inflammation as it is not affected from general infections and arthritis (38 - 40). Cardiovascular risk ratio is typically does not decrease after multi-variable corrections in prospective studies as Lp-PLA2 level is independent from classical risk factors (41). Additionally, Lp-PLA2 –attributable cardiovascular risk does not decrease even with inclusion of systemic inflammation markers like hs-CRP to the model. In an analysis conducted with 312 CAD and 479 age and gender-matched controls, Khuseyyinova et al.

reported that Lp-PLA2 enzyme in the uppermost and lowest quarter was related with 1.9 fold-higher cardiovascular disease risk even after completely corrected according to 24 lipid, lipoprotein, inflammatory and hemostatic markers (42).

Another relatively unique property of Lp-PLA2 is its being independent from BMI and insulin resistance. In many studies that BMI was included in multi-variable analysis together with classical risk factors, Lp-PLA2 stayed as a statistically significant CVD risk prediction factor (43).

Many independent studies have also verified the role of inflammation in atherogenesis and the value of other variable inflammatory markers for risk prediction. Among these markers, Lp-PLA2 has been put forward as a cardiovascular risk marker independent from classical risk factors and supporting them (44).

As Lp-PLA2 level is independent from classical risk factors, cardiovascular risk ratio does not typically decrease after multi-variable corrections in prospective studies. Additionally, Lp-PLA2 attributable cardiovascular risk does not decrease even with inclusion of systemic inflammation markers like hs-CRP. In an analysis conducted with 312 CAD patients and 479 age and gender-matched controls, Khuseyinova et al. reported that Lp-PLA2 enzyme in the uppermost and lowest quarter was related with 1.9 fold greater CAD risk even after completely corrected according to 24 lipid, lipoprotein, inflammatory and hemostatic marker.

Lp-PLA2 is also a marker indicating coronary arterial inflammation and also one of the factors playing a role in inflammation pathogenesis. Our study was carried out with patients who were admitted to emergency service with typical chest pain lasting for more than 20 min and 1 mm and above ST depression on ECG. Relationship between Lp-PLA2 enzyme level studied in the blood obtained on admission and coronary artery disease severity estimated with Gensini score from coronary angiography was investigated. Patients included in this study were the ones with high CAD risk according to AHA (American Heart Association) and ESC (European Society of Cardiology) guidelines. 84% of the patients underwent surgical or mechanical revascularization. Risk scorings including multiple risk factors were used in the studies up to date for ACS risk classification. In our study, role of Lp-PLA2 enzyme in diagnosis, deter-

mination of intervention need, prediction of coronary artery lesion severity in ACS patients was not found significant. Although the relationship between serum CKMB values and values of Lp-PLA2(+) patient group is not significant ($p=0.045$), this should be verified through studies that would be conducted with more patients.

A significant relationship could not be found between coronary artery disease severity estimated with Gensini score and serum Lp-PLA2 values. In many studies, role of Lp-PLA2 values in prediction of cardiovascular risk was emphasized. However sometimes only a single plaque may lead to a severe clinical condition but this does not indicate the extensiveness of coronary artery disease. This may be the reason for not finding a relationship between Lp-PLA2 values and coronary artery disease severity estimated with Gensini score based on coronary angiography in high risk patients who were admitted with prediagnosis of ACS. Additionally, the most important limitation of our study is little number of patients.

In conclusion, more comprehensive prospective studies aiming at determination of diagnosis, intervention need, prediction of coronary artery disease severity in ACS patients should be added to the studies predicting the use of Lp-PLA2 levels as cardiovascular risk predictor.

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Long-term benefits of cardiac resynchronization therapy in heart failure patients

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Abstract

Background: Patients with heart failure (HF) have poor prognosis and mortality rate is between 15%-60% per year. Cardiac resynchronization therapy (CRT) is a therapeutic choice for patients in NYHA III/IV class with left ventricular ejection fraction (LVEF) $\leq 35\%$, and with wide QRS complex (≥ 120 ms) who have ventricular dyssynchrony and are on optimal medical therapy. **Objective:** Aim of the study was to examine the effects of a CRT in a moderate to severe HF patients during 1 year after device implantation.

Methods: We included 142 HF patients. First group of patients received CRT, while in second, control group were patients without echo criteria for CRT and among them 38 patients received an ICD pacemaker.

Results: Results of the study showed that CRT in HF improved different clinical parameters: symptoms, echocardiographic parameters, decreased QRS duration, increased 6 min walk test distance, decreased mortality rate.

Conclusions: Benefit of CRT in addition to optimal medical therapy is verified in patients with HF and ventricular dyssynchrony. Patients with CRT showed improvement in HF symptoms during one year of follow up. This type of therapy in HF leads to acute hemodynamic improvements and also it has influence on long-term prognosis.

Key words: Cardiac resynchronization therapy, heart failure, prognosis.

Introduction

Heart failure is a clinical syndrome with high prevalence worldwide. Mortality rate in heart failure

is high (in range of 15%-60%) which carries an enormous economic burden (1).

Prognosis in heart failure patients is poor and one-year mortality rate in different groups of patients varies from 15%-60%. Prognosis depends on clinical status. Markers of clinical status such as left ventricle ejection fraction (LVEF), end-systolic and end-diastolic left ventricle volume, left ventricular wall stress are good predictors of mortality in these patients. One year after myocardial infarction mortality rate in patients with LVEF $< 25\%$ is 50%, while in those with LVEF around 55% it is below 10% which indicates that prognosis depends on quantity of preserved myocardium (2). There are different modalities of heart failure therapy such as non-pharmacological treatment (lifestyle modification, moderate physical activity and training), pharmacological treatment (ACE inhibitors, beta blockers, diuretics, digitalis, vasodilators, anticoagulants, antiarrhythmics et al.) and surgical treatment and use of mechanical devices (resynchronization therapy, surgical revascularisation and others) (3).

Cardiac resynchronization therapy (CRT) is used in treatment of patients with advanced heart failure who are in NYHA III-IV class with LVEF $\leq 35\%$ and with left bundle branch block (QRS complex duration ≥ 120 ms) who have echocardiographically determined ventricular asynchrony and are on optimal drug therapy during one year. Cardiac resynchronization therapy was approved by the American FDA in 2001. Large multicentre, randomized trials showed that the CRT is a safe and effective treatment which leads to patient's clinical improvement and to an increase in a physical tolerance and better functional status (4).

There are four levels of cardiac asynchrony in patients with heart failure – atrio-ventricular, inter-

ventricular, intra-ventricular and intramural. Cardiac resynchronization therapy improves asynchrony of myocardial contraction on all abovementioned levels. The duration of QRS complex could be used for a measurement of ventricular asynchrony and it could be useful tool in selection of patients for CRT and in evaluation of the treatment's efficacy. The example of treatment efficacy is shortening of the QRS complex duration after implantation of biventricular pacemaker with simultaneous activation of both ventricles and achievement of resynchronization on an inter-ventricular level (5).

Purpose of our study was the evaluation of the effects of resynchronization therapy on symptoms (both physical and psychological) and objective signs of the disease in patients with heart failure during one year.

Methods

We enrolled 142 patients with heart failure who were admitted to Clinic for cardiovascular diseases Nis, from September 2008 to October 2010. All patients gave written informed consent and the study was approved by Medical Ethical Committee University of Nis. In the first observed group ($n=60$) we included patients with heart failure who were treated with the CRT (they were in NYHA functional class III-IV, $LVEF \leq 35\%$, QRS complex duration ≥ 120 ms, with dilated left ventricle (LV) > 55 mm), and who were on optimal drug treatment for heart failure (6). These patients fulfilled all echocardiographic criteria for the CRT responsiveness (pre-ejection left ventricular period was longer than 140 ms, difference between pre-ejection intervals of left and right ventricle was longer than 40 ms, systolic posterior wall motion delay-SPWMD was longer than 135 ms) (7). In the first observed group of patients with the cardiac resynchronization therapy, 42 patients got CRT pacemaker with an option of pacing therapy alone (CRT-P), while 18 patients got CRT pacemaker with additional defibrillation option (CRT-D). In the second group (control group) were patients with heart failure (they were in NYHA III-IV, $LVEF \leq 35\%$, and $QRS \leq 120$ ms, on optimal drug therapy) who did not meet all echocardiographic criteria for the CRT responsiveness ("echocardiographic non-responders"). In the control group 38 patients got an ICD therapy since

they fulfilled criteria for ICD implantation. In the primary prevention an ICD pacemakers are used in patients with left ventricle dysfunction ($LVEF \leq 35\%$) minimum 40 days after myocardial infarction (MI) and in patients who already survived ventricular fibrillation (VF) or had hemodynamic unstable ventricular tachycardia (VT). It is also used in patients with non-ischemic dilated cardiomyopathy and significant dysfunction of a left ventricle with sustained VT and life expectancy of a minimum one year (8).

In the control group, 44 patients with heart failure were on optimal drug therapy alone – beta blocker, ACE inhibitor, diuretic, digitalis and antiarrhythmic as necessary (in patients who did not accept an ICD implantation in a primary prevention strategy).

In all patients before the CRT pacemaker implantation and in those from the control group we performed: 12 lead ECG, echocardiography examination, 6 minute walking test, assessment of life quality and drug compliance. After an average follow up period of one year we performed a 12 lead ECG, 6 minute walking test, evaluation of patient's quality of life and we compared the numbers of hospitalizations due to worsening of heart failure in both groups of patients.

In statistical analysis continuous variables are provided as means \pm SD, and categorical variables are shown as percentages. Comparisons between groups for continuous variables were performed using Student *t* test or Wilcoxon's rank-sum test, as appropriate. Comparisons for categorical variables were performed using the Chi-squared test. Multivariable logistic regression was used for the composite end point of death or re-hospitalization. $P < 0.05$ was considered as statistically significant. SPSS 17 for Windows package was used for statistical analysis.

Results

In Table 1 are given the baseline characteristics of patients included in our study (there were no significant difference between groups regarding the age, gender, risk factors for heart disease, aetiology of heart failure and its duration). In Table 2 it is shown that the group of patients with the CRT one year after pacemaker implantation had significantly shorter QRS complex duration (149.23 ms

vs.125.33 ms) and lower end-diastolic volume-EDV (283.87 ms vs.167.43 ml) and end-systolic volume-ESV (185.5 ms vs. 112.8 ms), increased LVEF (24.63% vs. 36.27%) and 6 minute walking test distance (220.83 m vs. 296 m). In the group of patients with implanted cardioverter-defibrillator alone there was a significant increase in ESV from 93.68 to 98.05 ($t=4.340$, $p<0.001$) and an increase in pre-ejection period of left ventricle (PEP LV) from 125.89 to 128.95 ($t=3.550$, $p=0.002$). In patients with heart failure who were on drug therapy alone, significant decrease is observed in LVEF (31.82 vs. 30.41%; $t=2.663$, $p=0.015$) and in 6 minute walking test distance (215.14 m vs. 202.27 m; $t=3.199$, $p=0.004$). In the same group of patients there was an increase in ESV (91.59 ml vs. 96.41 ml; $t=2.704$, $p=0.013$) and in PEP LV (123.64 vs. 127.45 ml; $t=2.489$, $p=0.021$).

A table 3 show that in the group of patients with the CRT mortality rate was 6.7% (4 patients)

during one year. In the group of patients with implanted cardioverter-defibrillator mortality rate was 21.1% (8 patients), while in the group of patients who were on drug therapy alone it was 31.8% (14 patients). Mortality rate was significantly lower in the group of patients with implanted CRT-P(D) compared to other subgroups ($p<0.05$). Among patients with CRT-P and CRT-D there was no significant difference in mortality rate. Patients with implanted CRT had significantly longer survival period (389.4 ± 8.782 days) than those on drug therapy alone (330.882 ± 11.097 days) (Log Rank $\chi^2=9.731$; $p<0.01$). Patients with implanted cardioverter defibrillator also had significantly longer survival period than those on drug therapy alone (349.564 ± 8.984 vs. 330.882 ± 11.097 days; Log Rank $\chi^2=6.741$; $p<0.05$) as shown in Figure 1.

In Table 4 it is shown that 26 (43.3%) patients with the CRT were not re-hospitalised for the worsening of HF during one year which is significantly

Table 1. Baseline patients' characteristics

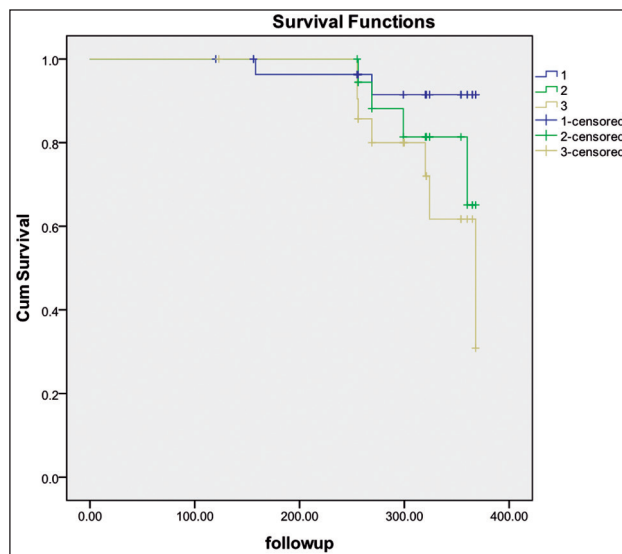
Group of patients with different therapy modality	CRT-P(D)	ICD	Drug therapy
Male/Female	44/16	34/4	36/8
Age (years)	61.77 \pm 9.81	58.11 \pm 13.24	62.18 \pm 7.84
Smokers N (%)	26 (43.3)	18 (47.4)	22 (50)
Family history of cardiovascular diseases N (%)	26 (43.3)	16 (42.1)	18 (40.9)
Renal failure N (%)	10 (16.7)	6 (15.8)	16 (36.4)
Diabetes mellitus N (%)	8 (13.4)	7 (18.4)	7 (15.9)
Angiographically documented coronary artery disease N (%)	22 (37.7)	24 (64.2)	15 (72.4)
Cause of heart failure ischemic vs. non-ischemic	40% vs. 60%	50% vs.50%	55% vs.45%

Table 2. Comparative analysis of parameters of interest (QRS complex duration, LVEF, 6 minute walking test distance, EDV, ESV) in patients with different therapy modalities

	CRT-P(D)		ICD		Drug therapy	
	Before \bar{x} (sd)	After \bar{x} (sd)	Before \bar{x} (sd)	After \bar{x} (sd)	Before \bar{x} (sd)	After \bar{x} (sd)
QRS (ms)	149.23 (10.30)	125.33 (10.66)*	113.16 (5.58)	113.95 (5.91) ^{ns}	103.86 (9.37)	104.32 (8.90) ^{ns}
EF (%)	24.63 (5.08)	36.27 (8.37)*	27.16 (6.59)	27.00 (5.89) ^{ns}	31.82 (6.26)	30.41 (5.75)‡
6min (m)	220.83 (38.53)	296.00 (67.63)*	209.89 (28.18)	213.11 (32.62) ^{ns}	215.14 (28.73)	202.27 (30.22) †
EDV (ml)	283.87 (55.81)	167.43 (44.38)*	166.37 (24.40)	164.11 (23.97) ^{ns}	156.36 (33.13)	157.45 (34.03) ^{ns}
ESV (ml)	185.50 (50.6)	112.80 (22.33)*	93.68 (21.19)	98.05 (21.43)*	91.59 (14.61)	96.41 (18.67) ‡

* $p<0.001$; † $p<0.01$; ‡ $p<0.05$

higher ($p<0.001$) than in those with the ICD alone (4 patients or 10.5%) or on drug therapy (0%). There is direct connection between number of hospitalisations and type of used therapy ($r=0.756$, $p<0.05$).



1- patients with CRT- P(D)

2- patients with ICD

3- patients on drug therapy alone

Figure 1. Kaplan Meier survival curve in patients with different therapy modalities

In patients before CRT-P(D) implantation 40 patients (66.7%) were in NYHA 3 class and 20 (33.3%) were in NYHA 4 class. One year after device

implantation none of the patients were in NYHA 4 class and 30 patients (50%) were in NYHA 3 and the same number in NYHA 2 class (Table 5).

One year after the beginning of the study the lowest number of the patients in NYHA class 2 were in the group on drug therapy alone (8 or 18.2%) which is significantly lower than those in the group with CRT ($p<0.01$).

Number of patients with moderate to severe mitral regurgitation before device implantation was 48(80%). After CRT-P(D) pacemaker implantation that number significantly decreased to 4 (6.7%), $p<0.01$.

Discussion

Early after the CRT was introduced in HF therapy some authors claimed that it was accepted without all necessary scientific data from the controlled randomized clinical trials. Nowadays, most would agree that there is no lack of data. More than 4000 patients with the CRT were included in the randomized clinical trials with different follow up period.

Cardiac resynchronization therapy is as effective as others pharmacological and non-pharmacological therapeutic measures regarding the survival and rehospitalisation in the treatment of patients with advanced HF.

Table 3. Mortality rate in patients with different modalities of heart failure therapy

		CRT-P(D)		ICD		Drug therapy		Total	
		N	%	N	%	N	%	N	%
Mortality	no	56	93.3	30	78.9	30	68.2	116	81.7
	yes	4	6.7	8	21.1*	14	31.8*	26	18.3
Total		60	100.0	38	100.0	44	100.0	142	100.0

* $p<0.001$

Table 4. Number of rehospitalisation in patients with different therapy modalities

Type of therapy		CRT-P(D)		ICD		Drug therapy		Total	
		N	%	N	%	N	%	N	%
Number of re-hospitalisations	0	26*	43.3	4	10.5	0	0.0	30	21.1
	1	22	36.7	14	36.8	8	18.2	44	31.0
	2	8	13.3	8	21.1	18	41.0	34	23.9
	3	4	6.7	10**	26.3	10**	22.7	24	17.0
	4	0	0.0	2**	5.3	6**	13.6	8	5.6
	5	0	0.0	0	0.0	2**	4.5	2	1.4
Total		60	100.0	38	100.0	44	100.0	142	100.0

* $p<0.001$, ** $p<0.05$

Table 5. NYHA class before and one year after device implantation or drug therapy alone

		CRT-P(D)		ICD		Drug therapy	
		N	%	N	%	N	%
NYHA class before	2			6	15.8	12	27.3
	3	40	66.7	26	68.4	30	68.2
	4	20	33.3	6	15.8	2	4.5*
NYHA class after	2	30	50.0	8	21.1	8	18.2*
	3	30	50.0	24	63.2	34	77.3
	4			6	15.8	2	4.5

*- $p < 0.01$ vs CRT-P(D) group

The favourable cost-effectiveness ratio could be assigned to the CRT. Preliminary results from the COMPANION study show that CRT intervention has positive effectiveness-cost ratio. High cost of the CRT device is overcome by significant reduction in the number of hospitalisations one year after device implantation (9).

PATH-CHF trial was controlled, randomized designed to estimate acute hemodynamic effects and long-term benefits of right ventricle (RV), left ventricle (LV) and biventricular pacing in patients with moderate to severe heart failure and intra-ventricular conduction block. Results were encouraging with a mild improvement in all primary and secondary endpoints during the pacing (10).

MUSTIC study was also randomized estimation of the CRT. It included 67 patients. Primary endpoint was change in 6 minute walking distance and secondary endpoints included: change in quality of life, NYHA class, peak $\dot{V}O_2$, number of rehospitalisation, worsening of heart failure symptoms and change in total mortality rate. Cardiac resynchronization therapy led to significant improvement in primary and secondary endpoints (11). In our study 6 minute walking distance was 220.83 m before CRT-D pacemaker implantation and it significantly increased to 296 m after one year of follow up ($p < 0.001$).

MIRACLE trial analyzed results of the previous studies with resynchronization therapy and it included additional assessment of the efficacy mechanisms of the CRT therapy. MIRACLE trial started in 1998 and it was ended in 2000. Patients who were randomized to a group with the CRT compared to control showed significant improvement in life quality which further indicated improvement of clinical status in heart failure patients. Less number of patients with the CRT needed re-

hospitalisation compared to control group (8% vs. 15%) and intravenous drug administration (7% vs. 15%) in treatment of worsening heart failure (both, $p < 0.05$). Patients with the CRT had decreased number of re-hospitalisations for 50% and decreased duration of re-hospitalisations for 77% during 6 months of follow up (12). Results from our study were similar.

The protocol of MIRACLE-ICD study was almost identical to those of MIRACLE trial. MIRACLE-ICD was prospective, multicentre, randomized, double blind study with goal to assess safety and clinical efficacy of combined ICD with CRT system in patients with dilated cardiomyopathy. In the group of 369 patients with randomly assigned ICD on and CRT off ($n=182$) pacemaker modality or ICD on and CRT on ($n=187$) modality, patients with activated CRT had significant improvement in the life quality, NYHA class, physical activity tolerance and clinical status. Gained improvement could be compared to that obtained in the MIRACLE trial which indicates that patients with heart failure who have indications for ICD have as much benefits of CRT as those without indications for ICD. Efficacy of biventricular anti-tachycardia pacing is significantly higher than that with univentricular (RV) configuration. This observation points out one more potential benefit of combined ICD plus CRT pacemaker in these patients (13).

Comparison of Medical Therapy, Pacing, and Defibrillation in Heart Failure (COMPANION) clinical trial examined the use of an optimal pharmacology treatment alone or combined with the CRT in patients with dilated cardiomyopathy, intra-ventricular conduction delay (IVCD), NYHA class III/IV. During follow up period of 12-16 months total mortality rate or rehospitalisation due to any cause in patients with any "device" therapy was decrea-

sed for 20% in comparison to those who used of only pharmacological measures. Beside “pacing-only” resynchronization device decreased the risk of death from any cause for 24% and resynchronization device with the ICD pacemaker decreased the same risk for 36% ($p=0.003$). The reason for implementation of ICD in CRT devices is based on assumption that prevention of a sudden cardiac death in patients with heart failure could decrease the mortality rate more efficiently than the CRT alone (14). This was confirmed by our study also.

Resynchronization therapy in patients with heart failure leads to improvement in clinical symptoms (lowering NYHA class), it shortens QRS complex duration, leads to improvement in echocardiographic parameters (increases LVEF, decreases end-systolic and end-diastolic volumes and diameters, decreases pre-ejection filling time and mitral regurgitation), further it increases 6 minute walking distance, decreases the number of re-hospitalisations due to heart failure and decreases mortality rate. Short term benefit of the cardiac resynchronization therapy combined with an optimal drug therapy is confirmed and indisputable in patients with heart failure and asynchrony. Our study confirms that gained short term benefits from the CRT persist one year after device implantation and that CRT has prognostic significance in all abovementioned parameters.

It is probable that in the near future indications for this type of therapy will be widened along with an improvement of methods for patients’ selection in order to achieve better and more adequate therapeutic response.

Duration of QRS complex remains the most practical and most valid parameter for selection of patients. Predictive role of the QRS complex duration derives from its strong correlation with the mechanic asynchrony. However, echocardiography has the paramount importance in estimation of a mechanic asynchrony. The biggest problem remains the detection of parameters which will predict clinical improvement in patients with the CRT and to avoid pacemaker implantation in patients in whom we could not gain enough success to overcome the risk of complications of implantation.

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Ureteroscopy result in ureteropelvic avulsion and proximal ureteral avulsion completely with a blood vessel connected to middle ureter: a case report

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Abstract

Ureter avulsion is one of the rare and severe complications of ureteroscopy. This case developed to ureteropelvic avulsion and proximal ureteral avulsion completely with a blood vessel connected to middle ureter, which was treated by open surgery. This kind of ureter avulsion has not been reported yet.

Key words: Ureteroscopy; Ureter Avulsion

Case report

A 38-year-old male patient was admitted to the emergency of our hospital at 8 pm, on July 5, 2006, because of repeating unbearable left lumbago, nausea and vomiting without evident cause for the previous 2 months and relapsing for 1 hour. After the treatment of anti-inflammatory and spasmolysis, the pain eased.

Physical examination: temperature 37.3°C, regular pulse 82 beats/min, respiration 20/min, blood pressure 125/70 mmHg, middle-aged man with good nutrition. The clinical presentations showed normal, no mouth cyanosis and no jugular veins filling, there were no rales throughout either lung field. There was no obvious heart murmur, no tenderness and rebound tenderness in abdomen, There was sensitive to percussion in left renal region, but not in right renal region and both ureter regions. No edema in both lower extremities.

Auxiliary examination: Laboratory tests: white blood cell count was $13.60 \times 10^9/L$, neutrophilic granulocyte percentage was 81.46%, and the level of blood plasma creatinine and FBS was 158.30 $\mu\text{mol/L}$ and 6.40 mmol/L. The chest X-ray appeared normal in both lung fields. Electrocardiogram and

echocardiography were atypical. The renal ultrasound B appeared calculus in upper and lower segments of Left ureter and hydronephrosis in upper segment of Left ureter.

The patient was transferred into operating room immediately at 9 pm on July 7, 2006 to perform ureteroscopy air pressure trajectory lithotripsy in Left ureter. After completely anaesthetic, We felt there was force of resistance when execute ureteroscopy, and inspect stenosis, rigid tubal wall in inferior segment of Left ureter intraoperative. The size of calculi was 0.8cm-1.0cm. The ureteroscope was introduced just under the stone following dilatation of ureteric orifice if needed. The stone was fragmented with air pressure trajectory lithotripsy to less than 3mm with retrieval of pieces using stone removal forceps and/or basket. It came to feeling nothing when performed additional ureteroscopy by force, after indwelled a single 4.5F Double-J stent tube in the ureter and withdrew the ureteroscopy, we found ureter tissues were pulled up at urethral meatus by ureteroscopy. Ureter incompletely avulsion was diagnosed. A special messenger assisted to hold Ureteroscopy, The patient was changed to prostration position, then we performed open surgical approach in left abdomen. Residual tissue of left ureter was found fixed on ureteroscopy, It resulted in ureteropelvic complete avulsion and proximal ureteral complete avulsion, but we found a few mesenteria connect to the body tissue with 1—2mm diametrical blood vessel connect to the middle ureter. The patient underwent ureteropelvic anastomosis and plus proximal ureterovesical anastomosis, but did not execute either autotransplantation of kidney, greater omentum investment outside the native distal ipsilateral ureter or anastomosis of the renal artery and internal iliac

artery in the right iliac fossa. A single 6F Double-J stent tube was indwelt in the left ureter. Rechecked renal ultrasound B and IVP appeared mezzo hydronephrosis after removed the single Double-J stent tube in 2 months later, and it was mild hydronephrosis in 3 months later. Renal function was always normal. So we pulled out the kidney pelvis fistulae in 3 months later. There was no calculi or ureteric stenosis after one year's follow-up, and ultrasound B showed hydronephrosis disappeared.

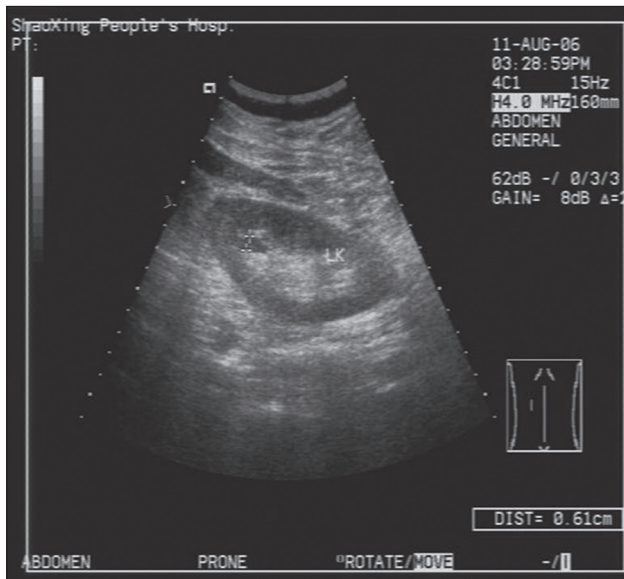


Figure 1.

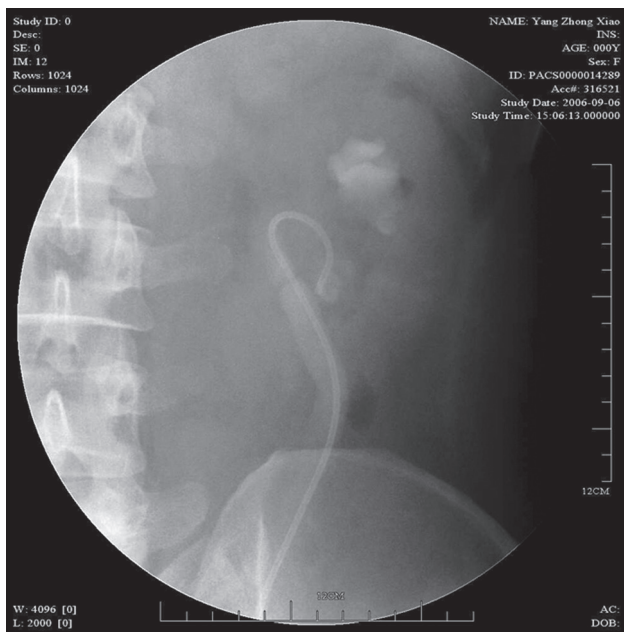


Figure 2.

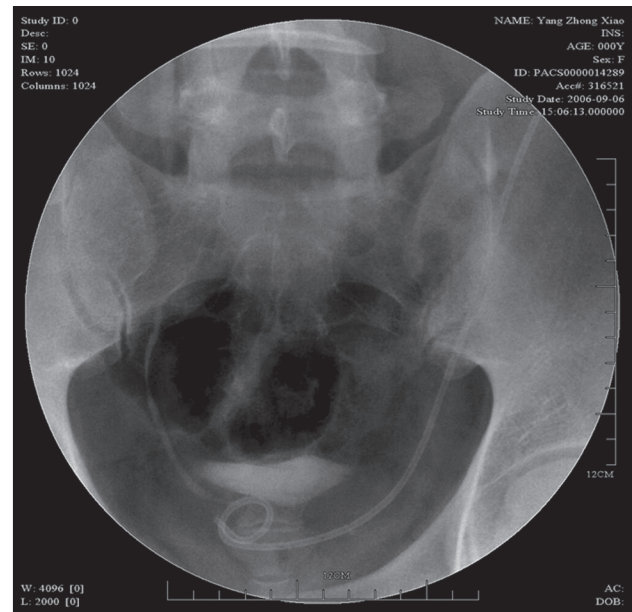


Figure 3.

Discussion

Ureteroscopic examination or treatment procedures may lead to various complications, such as stone residuals, mucosa injury, perforation, bleeding, edema and even ureteral avulsion^[1, 12]. Ureteral avulsion is one of the rare but most serious complications and it is difficult to manage, with an incidence of 0.06% to 0.45%^[2-4]. For proximal ureteral complete avulsion, autotransplantation of kidney is preferred because the distal ureter is isolated and has no blood supply^[5, 6]. Other literature report that severe whole range ureter avulsion need the difficult operations on ureter such as renal autotransplantation, replacement of the ureter with ileum and nephrectomy because there is no blood supply^[7]. In this case, we found a few mesenteria connect to the body tissue with 1—2mm diametrical blood vessel connect to the middle ureter to supply blood though ureteropelvic complete avulsion and proximal ureteral complete avulsion. So the patient underwent ureteropelvic anastomosis and plus proximal ureterovesical anastomosis, and avoid executing either autotransplantation of kidney plus greater omentum investment outside the native distal ipsilateral ureter or anastomosis of the renal artery plus internal iliac artery in the right iliac fossa.

The mechanism of ureteral avulsion may consist of the following: 1. The fist, incarcerated stones may cause ureteral mucosa inflammation, edema, ureteral tortuosity and stenosis, increased fragility, and

reduced elasticity of ureteral tissue. In other hand, the most patients' ureteres are itself innormal such as lumina stenosis or stiff, or had history of open ureteral surgery; 2 The second, ureteric intine will firmly cover over ureteroscopes when insert ureteroscopes into inferior extremity ureter because it is relative stenosis. If you push the ureteroscopes by force, inferior extremity ureteric intine is easy to lead to avulsion, and superior segment of ureter develop into avulsion if the ureteroscopes is excessly dragged when you withdrew it. The most easy to develop ureteral avulsion positions are PUJ or the place of calculi obstructed which is relative unsbstantial^[8]; 3. The third, Prolonged ureteroscopic procedure and inadequate anesthesia are likely to cause ureteral injury, and even avulsion.

Ureteral avulsion is one of Iatrogenic injuries of ureteroscopes examination or treatment procedures. The key is to avoid it, so the surgical indications should be chosen carefully to prevent the serious complications such as ureteral avulsion. In addition, The ureteral lumen should be compatible with the ureteroscope and the surgical field should be kept clear ^[8]. The surgeon's manipulation should be gentle. General anesthesia may be considered if necessary (particularly, in case of large incarcerated stones in the upper and middle segment of the ureter) ^[8]. Caution should be exercised when manipulating a rigid ureteroscope in the following cases to avoid ureteral injury, and even avulsion: symptomatic stones persisting >3months; stones above the sciatic spine level; stones >5mm; proximal ureteral distention; no observation of the renal pelvis and calices during intravenous urography; stones tightly encapsulated by granulation tissues, even with pelvic infection; inadequate anesthesia and a strong sense of tightness when moving the ureteroscope^[9]; stone difficulty in migrating the stone or incarceration and mandatory use of a dormia basket^[10] and rude access to the ureteral lumen with stone baskets ^[11], history of open ureteral surgery, immobilization, ureteral stenosis, stiffness, or tortuosity; ureteral lumen bleeding ; indiscreet removal of large stones and obscure visual field during lithotripsy. Careful, gentle manipulation and avoidance of persistent dragging of the ureter may prevent or reduce the incidence of this serious complication.

Ureteral avulsion is a big stroke to patients. In this case, stones is above the sciatic spine level,

stones >5mm, proximal ureteral distention, uncareful and ungentle manipulation and persistent dragging of the ureter when the ureteroscopes was withdrew increase the incidence of this serious complication. If the manipulator can distent proximal ureter enough, carefully and gently manipulate, stop to push the ureteroscopes by force, change to place zebra guidewire, then insert double-J tube and not excessly drag when he withdraw the ureteroscopes, it can avoid developping into ureter avulsion. Manipulator should allow for ureter avulsion if he come to the feeling to nothing and find intracavity preternatural still image of tunica mucosa ureteris and vascular lake. He should stop to move ureteroscopes and change to open operation.

This kind of ureter avulsion may happen in clinic again, if we can arrive at earlier judgment from this experience to avoid shorter ureter becoming devitalized tissue when it is dragged to urethral meatus, the patient may avoid suffer more difficult operations on ureter such as renal autotransplantation plus greater omentum investment outside the native distal ipsilateral ureter, replacement of the ureter with ileum, or anastomosis of the renal artery plus internal iliac artery in the right iliac fossa. This can decrease complications, enhance curative effect and improve postoperative rehabilitation of ureteroscopes.

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Acute suppurative parotitis with development of abscess in infant with bronchopneumonia

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Abstract

Acute suppurative parotitis (ASP), with or without development of abscess, occurs mainly in the elderly, but in children except in the newborn period, as a single attack occurs sporadically.

We describe infant with prolongate infection of respiratory tract complicated with ASP and later development of abscess of parotid gland. After antibiotic treatment for rhinitis and bronchopneumonia, our patient came to clinic because of swelling and tenderness in right parotid region and high temperature. She had elevated erythrocyte sedimentation rate, leucocytosis with granulocytosis and high level of C-reactive protein, but normal serum amylase level. Ultrasound examination established diagnosis of ASP. Initially therapy was maintenance of hydration and parenteral administration of broad-spectrum antibiotic cephalosporin, along with metronidazole. The culture of pus from Stensen's duct gave a growth of *Streptococcus* species sensitive to Ceftriaxon. Despite that therapy an inflamed gland reach a stage of abscess formation which required surgical drainage. Fine-needle aspiration helped us to isolate real causative bacteria for ASP, parotid abscess, rhinitis and bronchopneumonia - *Staphylococcus aureus* sensitive to Vankomycin. Next treatment included parenteral administration of Vankomycin and surgical drainage. After ten days therapy inflammation's markers and clinical signs of infection parotid gland were normal. Bronchopneumonia was clinically and radiologically resolved. Follow-up examination demonstrated no residues.

Culture of mother's swab throat gave the same bacteria. We believe that predisposing factors for that infection were prolongate respiratory tract infection and gavage feeding and that *Staphylococcus aureus* from mother's throat was trans-

mitted to baby's respiratory system. As a result, child had at first rhinitis, than bronchopneumonia, with later seeding infection to parotid gland.

Conclusion: Informations in literature about the etiopathogenesis and management of the ASP are still very limited. How community-acquired *Staphylococcus aureus* pneumonia is increasing in children it is possible to have more frequently such complications in the future.

Key words: Bronchopneumonia, neonatal suppurative parotitis, infant, *Staphylococcus aureus*.

Introduction

Acute suppurative parotitis (ASP), with or without development of abscess, occurs mainly in the elderly, but in children, except in the newborn period, as a single attack occurs sporadically and usually in association with terminal illnesses (1). We describe infant with infection of respiratory tract complicated with ASP and later development of abscess of parotid gland.

Case report

Three month female infant was presented in our clinic with swelling of the right parotid gland of one day duration after eight days antibiotic treatment because of respiratory infection.

Child came from pregnancy under control and uncomplicated vaginal delivery at 40 weeks of the gestation. Her birth weight was 3600g. The cardiopulmonary adaptation was normal. The infant was breastfed for first two months of life and after that adaptive cow milk-based formula was given by bottle. Since birth, the child had suffered from few infections of upper respiratory tract.

Prior to presentation she had received oral antibiotic Cefaklor 20mg/kg/day for five days be-

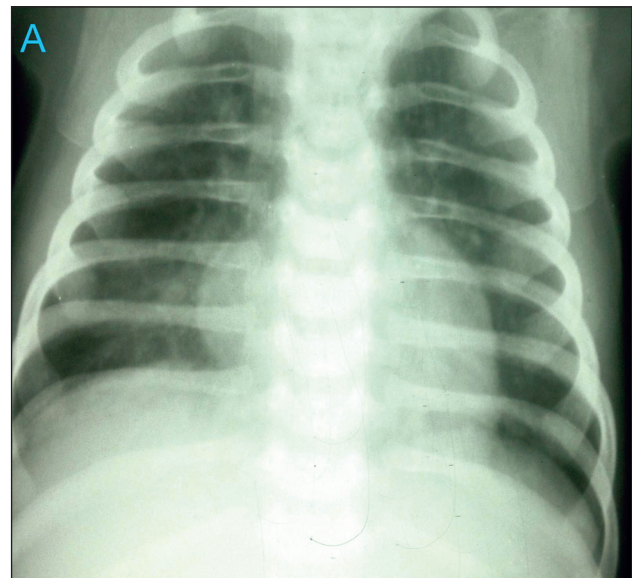
cause of rhinitis, cough, high temperature 38.8°C, C-reactive protein 20 mg/l and Ceftriaxon 70mg/kg/day for three days because of radiology and clinical established bronchopneumonia (Figure 1a). Ninth day of antibiotic treatment examination revealed a diffuse and tender right preauricular swelling of 2x2cm without redness, mimicking furunculus. The swelling was not mobile, non-pulsatile and non fluctuant. There was no history of trauma. Stensen's duct opening was slightly edematous with thick mucoid discharge. Clinical examination showed an ill looking and well nourished child. Her weight was 7550g, rectal temperature was 38.2°C (after antipyretic), RR 55/min, SatO₂ 99%, CP 157/min. Hydration status was normal. Examination of the ear and throat was unremarkable. Nose was slightly obstructed. Auscultatory examination of lungs showed fine crackles during inspiration at the lung bases. Her examination was otherwise unremarkable.

Laboratory tests revealed: hemoglobin 9.5 g/dl, white blood cell count 23 G/l with a 69.9% granulocytes, erythrocyte sedimentation rate 100 mm/h, C-reactive protein 81.8 mg/l and serum amylase concentration 10 U/L. Serum ELISA tests for mumps and cytomegalovirus were negative. The renal and liver function tests and serum electrolytes were normal. The blood culture and pus from Stensen's duct were obtained and sent for culture. Echsonography of the parotid glands demonstrated an enlarged right parotid gland with hypoechoic area compatible with ASP and diagnosis of ASP was established.

In the therapy, we added intravenous Metronidazol 22.5 mg/kg/day with adequate hydration. The culture of pus from Stensen's duct gave a growth of *Streptococcus* species sensitive to Ceftriaxon. The blood culture was sterile. After three days therapy C-reactive protein was 106.44 mg/l, white blood cell count was 20.6 G/l with granulocytosis 68.3%. Patient was still febrile. The swelling remained of the same size but with redness and addition pitting of the swelling on pressure (Figure 1b). MRI scanning of parotid glands demonstrated abscess without malformations (Figure 1c). Auscultatory examination of lungs was not in regression.

The parotid gland was aspirated through the skin above the gland and the material was sent for culture (Figure 1d). Culture of the pus gave a growth of *Staphylococcus aureus* sensitive to Vankomycin

with resistance to beta lactams antibiotics. Ceftriaxon was changed to intravenous Vankomycin 40 mg/kg/day. Surgical drainage was performed by incision. The fever resolved within 24h and the parotid swelling resolved within 48h. After ten days therapy erythrocyte sedimentation rate, C-reactive protein and white blood cell count were normal. Bronchopneumonia was clinically and radiologically resolved. The patient's serum immunoglobulin levels were within normal limits IgG 9.98 g/l, IgG1 7.12 g/l, IgG2 1.64 g/l, IgG3 0.76 g/l, IgG4 0.037 g/l, IgA 0.95 g/l, IgM 0.70 g/l. Follow-up examination demonstrated no residues. Culture of mother's swab throat gave a growth of *Staphylococcus aureus* sensitive to Vankomycin with resistance to beta lactams antibiotics.



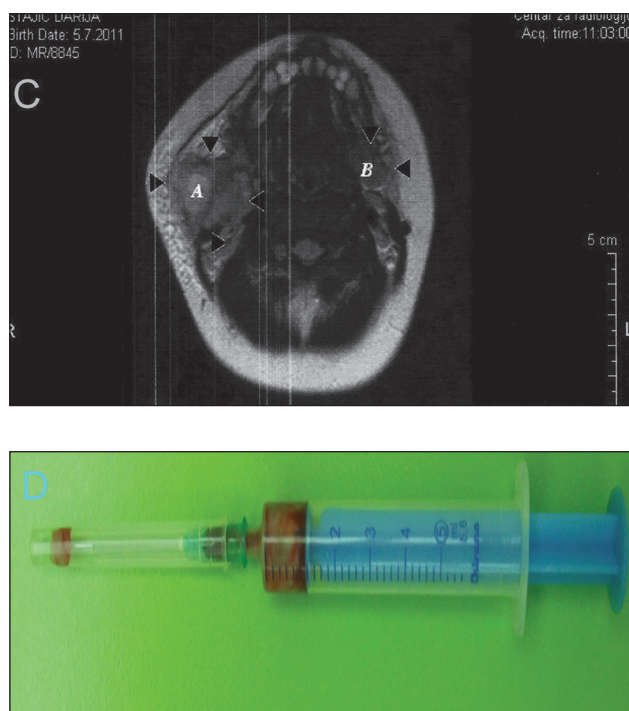


Figure 1. A. Diffuse interstitial infiltrates in lungs. B. Clinical feature of abscessus of right parotid gland. C. MRI scanning of parotid glands. Right parotid gland without malformations but with 37x35x25mm size abscess, no abnormalities of the left parotid gland were seen. D. Pus from parotid gland

Discussion

ASP with or without abscess in the neonate and infant has been seen rarely. Between one year of age and adolescence it is extremely rare and only a few cases have been reported (1).

Disease have sudden onset of tenderness, redness and swelling of the parotid region. The clinical parameters, bacteriological features or any predominating factors did not significantly differ between children with ASP versus children with parotid abscess (1). Our patient initially had swelling with tenderness and high temperature but later in stadium of abscess she had redness.

Predisposing factors for infections include prematurity, dehydration, sialectasis, malnutrition, gavage feeding, taking medications (antihistamines, anticholinergics, tranquilizers and diuretics), odontogenic orofacial infections, septicemia, immunosuppression, comatose states, oral neoplasm, allergy, heredity (2,3). In one report, recurrent skin infections, insulin dependent diabetes and tetralogy of

Fallot were found like predisposing factors (1). In our case predisposing factors were respiratory tract infection and gavage feeding. In literature there are no reports about ASP or abscess of parotid gland in patient with prolonged respiratory tract infection.

The contamination mode of the parotid gland is unknown. Although bacterial seeding of the parotid can occur hematogenously (even in cases with minimal systemic manifestations), infection is more common from oral flora tracking in a retrograde fashion into the gland, probably because of dehydration with resultant decrease in saliva production and stasis (might be the main cause), dilatation of the duct through scarring or obstruction by a stone or mass, and congenital variations in ductal structure (4). Some reports like probable source of infections reported: contaminated maternal breast milk (5), bacterial colonization of milk and bottle for fed⁴, intrahospitally pathogen colonization oral flora (4), recurrent furunculosis (6). In our case we believe that *Staphylococcus aureus* from mother's throat was transmitted to baby's respiratory system. As a result, child had at first rhinitis, than bronchopneumonia, with later seeding infection to parotid gland.

Laboratory findings in ASP have usually been nonspecific. Our patient had elevated erythrocyte sedimentation rate, leucocytosis with granulocytosis and high level of C-reactive protein but normal serum amylase level. In phase with abscess, markers of inflammation were higher. In one report were found neutrophilia in 71% cases and elevated erythrocyte sedimentation in 20% cases. Serum amylase levels were elevated in 45% cases (1,4,7).

Diagnosis of ASP is making by clinical presentation, ultrasound of parotid gland and attempts to culture expressed material from gland (7). Ultrasound examination is sufficient to make diagnosis of ASP or parotid abscess (before the development of fine fluctuation) and differential diagnosis with exclusion of predisposing factors. In resistant cases magnetic resonance imaging (MRI) can be very helpful (2). That was the reason that we made MRI scanning.

The most common organism cultured in such cases is Penicillin-resistant coagulase-positive *Staphylococcus aureus*, like it was in our case, and *Streptococcus pneumoniae* and β -hemolytic *Streptococcus*. Interesting, but isolate *Strepto-*

coccus species in Stenson's swab from our patient, probably was not causative or simple pathogen for ASP. Gram-negative organisms (*E. coli*, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*) have been cultured rare. Polymicrobial aerobic-anaerobic infection is common. The isolation of anaerobic bacteria sensitive only to metronidazole or clindamycin is possible in 30-43% cases. Methicillin-resistant *Staphylococcus aureus*, *Mycobacterium tuberculosis*, atypical mycobacteria and *Treponema pallidum* have been reported as extremely rare etiologic agents (4,7). Most parotid abscess in children are acute multi-bacterial infections (2).

Initially therapy includes maintenance of hydration and administration of parenteral antimicrobial therapy to cover the most common causative organisms. The broad-spectrum antibiotic cephalosporin (especially in septicemia) or penicillase-resistant penicillin, along with clindamycin or metronidazole are good initial choices. A treatment period of 7-10 days appears to be adequate. In cases of severe swelling, some authors propose corticosteroids. Clinical improvement should be accomplished within 24 to 48 h with recovery in 78% of patients (4). However sometimes an inflamed gland may reach a stage of abscess formation that requires surgical drainage because of a potentially life-threatening condition (pharyngeal obstruction, osteomyelitis and sepsis). Before that, fine-needle aspiration may reveal the diagnosis by obtaining pus for culture or cells for cytology (3). It helps us to isolate real causative bacteria for ASP, parotid abscess, rhinitis and bronchopneumonia.

In conclusion, informations in literature about the ethiopathogenesis and management of the disease are still very limited. We presented that infection of parotid gland may be complication respiratory infections and that source of pathogen may be colonized mother's upper respiratory system. How community-acquired *Staphylococcus aureus* pneumonia is increasing in children⁸ it is possible to have more frequently such complications in future.

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Factors Effecting distribution of medical specialists in Iranian national health system

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Abstract

Introduction: Health workers shortages are pressing problem around the world. There is inequality in the distribution of physicians in Iran.

Objective: We attempted to find out main factors that may influence the distribution of specialist doctors throughout the country.

Method: The nominal group technique was used to determine essential factors responsible for maldistribution of physicians.

Results: Results revealed that among 38 factors influencing the distribution of specialist doctors across the country, 17 factors were related to Iran's National Health System. The number of population in an area and the place of hospital in relation to health system services level ranked as 1 and 38, respectively.

Discussion: Although "number of population" assigned to Cultural and social category a subset of outside INHS factors was referred as the most important factor, ranking the categories showed that "human resources" category was the most critical among the 11 categories.

Conclusion: Taking in to account the resulted items and the relative importance of them in policy-making processes can be informative.

Key words: Factors, Effecting distribution, medical specialists, national health system.

Introduction

Lack of health human resources have always been an important issue for health systems around the world. A major part of it stems from the maldistribution of health workers, particularly those of high level professionals.(1) Studies show that

inequitable distribution of physicians is a global concern and the applied strategies to distribute them equitably have not been effective. The strategies have failed to solve the problems like geographic maldistribution and specialty maldistribution. In Iran the ratio of physician to population in rich provinces is three times of the poor provinces, indicating that there is a physician distribution problem and, consequently a large amount of inequality in accessing to health care services.(2)

To distribute the physicians, there are many variables involved which can be classified into two groups: health system related variables including health human resources and healthcare facilities; and health system non-related including society demand for health services, urban and rural amenities, population, population growth, economic growth, elderly population, burden of disease and distance to health facilities.(3, 4) To meet the society demand for physicians, health policy makers in countries distribute physicians based on different variables having high priorities. In Iran, the physicians are distributed considering the system for allocation of structural and hospitalization resources, statistics of workforce and specialized services in the nation's database of specialty workforce, the number of the graduates of the specialty discipline, documents and opinions of the experts working in the ministry of health (Deputy for Health affairs) and also the opinions of the experts working in the Medical Universities. (5)

Since huge amount of time and public resources are used for training and graduation of physicians, one of the common pressing problems of health policy makers, for improving healthcare services in the country, is organization and equi-

table distribution of physicians as one of the most critical workforces. This study aims at identifying and prioritizing the most important variables influencing distribution of physicians in Iran.

Methods

Nominal Group Technique

The Nominal group technique is a structured method for collecting and organizing the ideas within a group.(6) In this method participants attend structured meetings facilitated by a leader, information is gathered by asking group members to respond to questions and record ideas. Once the group members recorded their ideas, they are asked to rank the ideas or suggestions of all participants. The main advantage of this process is that it prevents the minority domination, all group members are supported to participate, resulting in a set of ranked suggestion that represent the group's preferences.(7) To increase the validity of this technique leaders should refrain from imposing their own opinion during the meeting.(6) Since the mix of group members can affect the final outcomes, so it is important to select the right members to participate in the nominal group technique.(8)

Research design

A mix of fifty chief administrators in Iran's ministry of health (MOH) and faculty members at Tehran University of Medical Sciences (TUMS) were assigned randomly to five groups, each group consisted of ten members. Two inclusion criteria were applied for the members to be qualified for this study: 1) having a minimum 4 years experience as a chief administrator and 2) having a PhD degree in health administrative field. For all groups the following problem statement was presented: "what variables influence the distribution of specialist doctors across the country (Iran)?"

Data collection procedure

In this study the Nominal Group Technique was used to draw up the essential factors that can affect the geographical distribution of specialist doctors in Iran. Accordingly, five stages were followed: 1) the problem of inequalities in doctors distribution was clearly stated by the leader. Then participants were given about 10 minutes so that they

could jot down any initial items pertained to equally distribution of specialists in Iran's National Health System (INHS) in their opinion and also a brief interaction took place for the purpose of clarification; 2) In this stage the leader asked the participants randomly to mention one of the items that they have regarded to be important and have written down, to be written on a flipchart. This operation repeatedly went around the group until all participants could bring forward one response at each round; 3) in this stage the listed items on the flipchart were reviewed and the items mentioned more than once identified and duplication eliminated; 4) each member was asked to select five items that (s) he considered them as the most important and then ranked them by assigning points. The selected items were ranked, ranging from 1 to 5, with 1 for most important and 5 for least important and 5) the whole items were gathered on the flipchart and an overall importance score based on the individual scores was obtained.

Results

Five interview sessions resulted in a large number of ideas. Since the gathered ideas were not directly comparable, therefore a four-step categorization was done to classify the evolved ideas in a structured and meaningful way. All items were first organized into 118 variables. Considering the particular situation of Iran and applicability of the variables, they were reduced to 38 variables by integrating the variables and/or omitting not applicable ones. Then the variables were classified into 11 categories based on the common characteristics of the items. Finally, the categories were figured in two major categories. (Table 1)

In addition to identifying common variables across the interview sessions, an index of variable importance was calculated for the ideas evolving out of the nominal grouping sessions. The importance index reflected the frequency with which a variable was mentioned as well as the rank assigned to it by the group participants. Variable scores were subsequently aggregated across the groups to provide an overall index of relative importance, indicated in Table 2.

The results showed that among the 11 categories of variables influencing distribution of spe-

Table 1. Categorization of influencing variables on distribution of specialist doctors in Iran

Major Categories	Categories	Variables
Factors inside INHS	Human resources	Existence of other closely related specialists
		The performance of existing specialists
		Existence of specialists with the same specialty in the region
	Equipment and technologies	Medical equipments
		Telemedicine
		number of beds
		beds available for types of admission
	Physical spaces	Number of hospitals
		The place of hospital in health system
		Type of hospital
		Physical resources in hospital
	Processes	Referral system
		Contracts with private sector
Factors outside of INHS	Environmental factors	Geographical area
		Population density
		Distance from referral system
		Geographical conditions
	Economic factors	Economic growth and development
		Income and purchase power of families
	Cultural and social factors	number of population
		Population growth
		Type of occupations
		Customs and beliefs
		Population variation
	Nongovernmental health care providers (private sector, other than ministry of health system)	Number of hospitals
		Number of specialists in private sector
		Private clinics
		Charges in private sector
		Induced demand
	Diseases	Diagnostic, treatment and inpatient facilities
		Burden of diseases
		variety of disease types
	Individual factors	Disease patterns
		Gender of physician
	distinctive conditions	Physician's health
		Strategic region
		Unique region
		Deprived region

cialists, the most important ones were “human resources”, “equipment and technologies”, and “environmental factors”. Moreover, the categories inside INHS are of high importance compared to factors out of INHS.

Discussion

Although the study indicated 38 variables influencing the distribution of specialist physician in Iran, the first five most important variables are: “number of population”, “medical equipment”, “deprived region”, “Existence of specialists in the

Table 2. Description of the variables and the assigned importance score (rank)

Subgroups	Description	Rank
number of population	number of population live in an area	1
Medical equipments	The minimum level of diagnostic and therapeutical equipment required for special services to be delivered	2
Deprived region	Areas considered as poor areas in comparison with other areas within Iran	3
Existence of specialists in the same specialty	The number of specialists in the same specialty	4
beds available for types of admission	Surgery, pediatric, ICU, CCU, ...	5
number of beds	number of beds available	6
Number of hospitals	Number of governmental hospitals available	7
Existence of other closely related specialists	Services which entail cooperation of different specialists	8
Physical resources in hospital	Operation room, laboratory, Radiology,...	9
Population density	The number of population in square kilometers	10
Number of hospitals	number of non-governmental hospitals available	11
Geographical conditions	Geographical conditions can affect access to health services	12
Burden of diseases	The frequency of diseases	13
Distance from referral system	The distance of covered population from the first level of services	14
variety of disease types	Various diseases are common in an area	16
Number of specialists in private sector	number of specialists in non-governmental sector	17
Geographical area	In square kilometers	18
Population growth	population growth rate in an area	19
The performance of existing specialists	The expected performance	20
Diagnostic, treatment and inpatient facilities	Diagnostic, treatment and inpatient facilities are provided by private sector	21
Referral system	The role of referral system in the effectively directing of the patients	22
Type of hospital	Educational and non-educational	23
Income and purchase power of families	Income and purchase power of covered population	24
Economic growth and development	The extent of economic growth and development	25
Disease patterns	Diseases patterns and the changing patterns of them	26
Private clinics	number of private clinics available in an area	27
Contracts with private sector	The number of workforce have been contracted from private sector	28
Physician's health	Physical, social and spiritual health of a physician	29
Customs and beliefs	Attitudes of the people living in an area and their life styles	30
Strategic region	Abu Musa island	31
Charges in private sector	level of charges in private sector in an area	32
Unique region	Kish, Gheshm , and areas with high migration rate	33
Gender of physician	Being a female or male doctor	34
Population variation	Migration into and out of an area	35
Type of occupations	Type of occupation that implies need for a specialty	36
Telemedicine	using diagnostic and treatment technologies at a distance	37
Induced demand	The amount of demand are induced by specialists	37
The place of hospital in health system	City, province, national	38

Table 3. Average of ranking in categories and major categories

Average of ranking										
Factors outside of INHS							Factors inside INHS			
22.1							16.9			
distinctive conditions	Individual factors	Diseases	Nongovernmental health care providers	Cultural and social factors	Economic factors	Environmental factors	Processes	Physical spaces	Equipments and technologies	Human resources
22.3	31.5	18.3	24.2	20.2	24.5	13.5	25	19.3	12.5	10.7

same specialty” and “beds available for types of admission” which play a very critical role for equitable distribution.

Number of population

This variable, belonging to Cultural and Social category in outside INHS, was referred to as the most important factor for distribution of doctors. Like our study, there are many studies on distribution of specialists based on the ratio of physician to population in many countries. They indicate the importance of the population using the healthcare services.

In addition to this variable, there were other cultural and social factors not ranked in the first five variables. (Table 2) Factors like “population over 60 years old”, “population below 5 years old”, “Daytime population density”, “Population density” although mentioned in other studies as factors related to the distribution, they were not even ranked among the first 38 priorities in our study.(3, 4, 9-14)

Medical equipment

The second most important variable for the distribution is “medical equipment”. It is grouped in equipment and technologies category inside INHS. In fact, to provide special services, a specialist physician needs the minimum level of diagnostic and therapeutic equipment required for the services to be delivered. It indicates that allocating specialists to regions lacking the equipment is irrational. Studies show physicians tend to deliver services at more equipped facilities.(3, 15)

Deprived region

In Iran deprived regions are referred to areas considered as poor in comparison with other areas benefiting from urban development facilities. Although this variable is in “distinctive condition” category in outside INHS factors, it is ranked as the third most important variable. The reason for this is that specialist doctors are not interested in delivering their services in such areas mainly due to less economic development, lack of comfort and welfare facilities, low income population, climate and etc. The focus group based on their experiences for distributing specialists pinpointed this variable as one the first five factors. Studies show that the physician to population ratio is less in deprived regions.(3, 4, 16, 17)

Existence of specialists with the same specialty in the region

This variable, belonging to human resources category in factors inside governmental health system and ranked as the fourth variable, has a negative relationship with distribution of specialists. Allocation of specialists to the areas already having the same specialists not only results in density of physicians in the area but also rise maldistribution of specialists.

Beds available for types of admission

In addition to “medical equipment” variable belonging to Equipment and technologies category inside INHS, this variable is also classified in the same category and is ranked as the fifth priority. There are many studies focusing the relationship between the beds and distribution of specialists. (3, 4, 10, 15, 18)

Studies have highlighted other variables like “number of graduates”, “capita income”, “type of hospitals”, “age structure”, “sex of physicians”, “economic factors” and “induced demand” affecting the distribution of physicians, but they were not referred as top variable priorities by our focus groups.(4, 10-12, 18-20)

Although “number of population” assigned to Cultural and social category a subset of outside INHS factors was referred as the most important factor, ranking the categories showed that “human resources” category was the most critical among the 11 categories.

Conclusion

The results of this study showed the frequency of contextual factors in the distribution of specialist doctors across the country. But considering the relative importance of the elicited criteria, the most important and influencing factors were from inside of the governmental health system. The findings also pointed out that “the number of population in an area” and “the place of hospital in relation to health system services level”, taking the score of 1 and 38 respectively, were considered as most and least important determinants of specialist distribution. Thus, taking in to account the resulted items and the relative importance of them in policy-making processes can be informative.

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Child consumers' food label reading habits and health

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Abstract

Background: The purpose of this study is to evaluate food label reading habits of child consumers (356 primary school students and between the ages of 12-14) and to determine the factors which may have an effect on the adoption of these habits.

Method: The study was carried out in 15 primary education schools in five different districts of Ankara province. The sampling group of the study consisted of 356 students (between the ages of 12-14). The data was collected through the questionnaire form developed by the researcher.

Results: The students of the teachers who emphasized the importance of reading package and who carried out studies on it paid attention to whether the products bear food labels or not ($\chi^2=25.484$, $p< 0.01$) and that they always read the package information ($\chi^2=15.860$, $p< 0.05$). Their parents who read information reported that they paid attention to food labels on the food they would consume ($\chi^2=35.572$, $p< 0.01$).

Conclusion: Considering that children will participate in the society as mothers, fathers, teachers or as adults, for raising a healthy generation, starting nutrition education in early age may help bringing up conscious consumers.

Key words: Child consumer, primary school, nutrition, nutrition education, food label reading.

Introduction

In pre-school period families can partially keep their children's nutrition under control. However, when the children start going to school, they are out of family control and begin to have a further interaction with the environment. In this period, like in many other cases, the children have the opportunity to decide on the foods they will consume on their own and to apply these decisions more easily.

Assisting children to gain proper nutrition habits by giving them nutrition education from early ages is important in terms of allowing the children to choose proper and healthy foods on their own (1). It was stated that, in addition to cultural factors, socio-economical status and the environment have a significant role on the food choice (2,3,4). It was reported that if the child learns to choose the proper food in an early age, he can not be affected from the environment so seriously, otherwise the environment is one of the most significant factor in the food choice (5).

Food labels guide individuals to make proper food choices, to decide buying the product and informing the consumers about how to store the food (6-11) and serve as one the most significant components of nutrition education education (12). According to Grunert et al. (13), the degree of use of nutrition information depends on product category and usage is a question of interest in healthy eating. A positive link was also found between nutrition label use and healthy food choices in Barreiro-Hurlé et al. study (14). It was also emphasized that assisting children in making healthy food choices and acquiring food label reading habits are important for a healthy diet and raising healthy individuals for the future (15-17) and for the elimination of the factors that cause some diseases (18).

In Turkey, there is no obligation for labeling foods to indicate their nutritional values. However, most of the companies use nutritional labels on foods although it is somewhat limited. In Turkey, the following information is obligatory to be found on food packages: "The name of the food, ingredients, production and expiry date, company name, address, production place, quantity or weight, production permission date and number, batch and/or serial number, country origin, communication info".

In literature review it was found that there were limited number of studies on the status of reading information on food packages, food label reading status, food label reading habits and information levels on food labels among child consumers with primary education level (19,20). Therefore, the purposes of this study are:

1. To determine which information written on the packages is read by children,
2. To determine whether the food label has any effect on children for buying the food,
3. To determine whether there is a relationship between genders, emphasize of the teachers on the importance of food labels and food label reading habits of children according to food label reading habits of the parents.

Material and methods

Descriptive method based on screening was used in this study which was conducted to determine the food label readings of primary school children.

Sample

The study was carried out in 15 primary education schools in five different districts of Ankara province. The sampling group of the study consisted of 356 students (between the ages of 12-14). The data was collected through the questionnaire form developed by the researcher. Previous researches were also examined when preparing the questions in the questionnaire form.

The research was carried out under the supervision of Ministry of Education of Turkey. After receiving permission from the National Education Directorate of Ankara, the study was conducted.

Research Instrument

This questionnaire form was first administered to 35 students in September 2011 as a pilot study and after the application; insignificant changes were made in questions. The questionnaire form consisted of 17 multiple choice questions. The validity of the questions was tested and found to have a Cronbach's Alpha score of 0.742. The data was collected in October-December 2011 period, through face to face interviews with the students in the classroom. Also food shopping habits of children's

parents and whether their teachers supply information on food labels are asked to the children.

Whether food label reading habits of the students who were included in the study varied according to gender and practices of their teachers and parents towards the importance of food label reading was tested by Chi-square (X^2) test. In addition, the data was presented in numbers and percentages. In the study SPSS 16.5 software was used.

Results

The distribution of the students according to gender is equal (50.0% female, 50.0% male). It was found that educational status of the mothers were lower than those of the fathers (31.5% of the mothers were primary school graduates, 38.7% of the fathers were university graduates). It was found that the teachers of the students did not carry out a study about the importance of food label reading (79.2%) (Table 1).

Table 1. Child consumers profile (n=356)

	n	%
<i>Gender</i>		
Female	178	50.0
Male	178	50.0
<i>Age</i>		
12	152	42.7
13	94	26.4
14	110	30.9
<i>Educational Status of Mother</i>		
Illiterate	6	1.7
Primary school	112	31.5
Secondary school	60	16.9
High school	100	28.1
University and higher education	78	21.9
<i>Educational Status of Father</i>		
Illiterate	4	1.1
Primary school	48	13.5
Secondary school	46	12.9
High school	120	33.7
University and higher education	138	38.7

Food package and label information reading practices of children and parents

When Table 2 is analyzed, it is clear that before buying a product, among the information given on the package, 77.5% of the students read production

and expiration date, 65.2% read ingredients, 43.8% read the name of nutrition material and 34.8% read the food label. Also the ratio of the children who claimed that information on food label is affective on the purchasing decision is determined as 43%.

It was observed that 56.7% of the parents go to shopping with their children, 42.7% discuss this information on food packages with their children and the information that 75.3% of the parents read on the product influence their purchasing decision (Table 3).

It was found that the children of the families who read package information also read information on the package and food label information when they shop on their own (Table 4). In addition, the children of the parents who read package information reported that they paid attention to food labels on the food they will consume ($\chi^2=35.572$,

$p<0.01$) and to indication of food additives in the package ($\chi^2=12.796$, $p<0.05$).

It was found that there was a significant difference between the food label reading habits of the students of the teachers who emphasized the importance of reading package information and who carried out studies on this subject and other students ($\chi^2=19.496$, $p=0.000$). The students of the teachers who emphasized the importance of reading package information and who carried out studies paid attention to whether the products bear food labels or not ($\chi^2=25.484$, $p=0.000$) and that they always read the package information ($\chi^2=15.860$, $p=0.003$).

In addition, male students were found to be more sensitive in reading the information on the package when compared to female students ($\chi^2=15.816$, $p=0.001$).

Table 2. The information which child consumers read on the package (n=356)

	Reads		Does not read	
	n	%	n	%
The name of the food	156	43.8	200	56.2
Ingredients	232	65.2	124	34.8
Production and expiry date	276	77.5	80	22.5
Firm name, address, production place	90	25.3	266	74.7
Net quantity / weight	76	21.3	280	78.7
Production permission date and number	110	30.9	246	69.1
Batch and/or serial number	34	9.6	322	90.4
Country origin	28	7.9	328	92.1
Using Instructions	44	12.4	312	87.6
Food label	124	34.8	232	65.2
Storage instructions	56	15.7	300	84.3
Consumer contact information	46	12.9	310	87.1

Table 3. The attitudes of parents in food shopping (n=356)

	n	%
<i>The parents</i>		
Always go to shopping with their children	202	56.7
Sometimes go to food shopping with their children	144	40.4
Never go to food shopping with their children	10	2.8
<i>During the shopping; The parents</i>		
Discuss the information on the package with their children	152	42.7
Sometimes discuss the information on the package with their children	130	36.5
Never discuss the information on the package with their children	74	20.8
<i>The information on the package</i>		
Have an effect on parents' purchasing decision on the product	268	75.3
Does not have an effect on parents' purchasing decision on the product	40	11.2
Sometimes have an effect on parents' purchasing decision on the product	48	13.5

Table 4. Package information reading status of child consumers and their parents

The child consumers read food label	The parents read food label										X ²	p
	Always		Sometimes		Never		Do not know		Total			
	n	%	n	%	n	%	n	%	n	%		
Always	56	37.8	38	28.4	4	9.5	4	12.5	102	28.7	21.670	.01*
Sometimes	60	40.5	56	41.3	20	47.6	16	50.0	152	42.7		
Rarely	16	10.8	16	11.9	10	23.8	6	18.8	48	13.5		
Never	16	10.8	24	17.9	8	19.0	6	18.8	54	15.2		
When first buying the product	30	20.3	36	26.9	6	14.3	4	12.5	76	21.3		
Before consuming the product	68	45.9	32	23.9	12	28.6	10	31.3	122	34.3		
After purchasing the product	14	9.5	34	25.4	18	42.9	12	37.5	78	21.9	54.537	.000**
Every time he buys the product	30	20.3	20	14.9	4	9.5	-	-	54	15.2		
Never	6	4.1	12	9.0	2	4.8	6	18.8	26	7.3		

* $p < 0.05$ ** $p < 0.001$

Discussion

Food labels are information guides which indicate information about the food in the package. They inform the consumers about the composition of the food, additives, and type of the food (full-fat, light etc). The findings in this study indicate that the students first read production and expiration date of the product, and then the ingredients on the package (Table 2). It was reported that the consumers read the additives on the packages, the information about the ingredients (21) and energy and nutrition properties (22) were important for the consumers and they sometimes read diet suggestions (23). In previous studies carried out in Turkey it was found that the consumers would like to see food labels on packages (24). Unfortunately there are some drawbacks about food labels in Turkey and food labeling is not compulsory for all kinds of foods (25). The majority of the manufacturing firms put food labels on the packages. However, the provided information are rather limited and detailed information is not indicated. In recent years, in Turkey, legal arrangements began to be made about food labels. The studies for making labeling in compliance with European Union standards continue.

The results of this study indicated that the students sometimes read the food packages and expression of food labels and the ingredients were important for them. However, it was striking that the ratio of the students who had these views was rather low. Unlike previous studies it was found that male students were more sensitive in reading package information than female students. ($\chi^2=15.816$, $p=0.001$) (26,19).

It was found that the students of the teachers who emphasize the importance of reading food labels in their courses read the food packages, pay attention if the products bear food labels or not, and they always read the information given on the packages ($\chi^2=19.496$, $p=0.000$). In previous studies, which stressed the importance of reading food labels, it was underlined that teaching the importance of food label reading and the provision of nutrition education may help the consumers to buy proper foods for a healthy diet and for the prevention of various diseases (1,11,15-18,27-29).

It was reported that food label reading ratio increased after the education provided to individu-

als; and education had an effect on healthy food preferences of both child and adult consumers (19,30-36). A positive link was also found between nutrition label use and healthy food choices in Barreiro-Hurlé et al. study (14).

In this study, it was found that the children of the parents who go to shopping with their children and who read food labels during the shopping were more sensitive in reading information on the packages and that they always read this information (Table 4). In the study of Falciglia et al. (32) it was reported that warning of the parents to their children about nutrition was effective in choosing healthy foods. Kelly et al. (5), Chan and McNeal (37) and Bassett et al. (38) reported that discussing the food with children during shopping had a positive effect on children and children choose healthy foods after these warnings.

Conclusion

As Grunert et al. (13) point out, one of the problems in increasing use of nutrition labels and hence healthy consumer food choices, lies with the fact that even if people are able to use nutrition labels, they may just not do so because of a lack of motivation. How to motivate individuals to make use of nutrition labels requires both the governmental bodies, food manufacturers, retailers, and possibly researchers present some solutions to this problem.

Considering that children will participate in the society as mothers, fathers, teachers or as adults, for raising a healthy generation, starting nutrition education in early age may help bringing up conscious consumers.

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Microeconomic analysis of health care services delivered to patients under urologic tumor surgeries

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Abstract

Introduction: Considering the current competitive condition of markets, health care organizations are trying to measure and manage their expenditures. Therefore, doing activities in order to access financial information for critical decision-making and to maximize productivity is very important matter for these organizations.

Objective: This study is aimed to determine favorable or unfavorable financial variances of health care services delivered for patients under urologic tumor surgeries in Shahid Hashemi-nejd teaching hospital in Tehran.

Method: This cross-sectional study was conducted in 2011. Cost centers in studied hospital were divided into: final, intermediate and overhead centers and they also were classified in two direct and indirect service categories. Needed Data related to cost and incomes were gathered through studying documents and information of patients' clinical records. Also, financial documents of fiscal units of hospital were gathered and recorded in informational sheets and standard costing questionnaire of Iran ministry of health. Activity-based costing (ABC) method was used in order to calculate the ultimate costs of urology cares delivered to patients according to cost topic and service type. Finally financial variances in health cre was calculated using paired T-test and P-value.

Findings: Human and non-human costs of final centers were calculated 13% and 87% as a share of total operational costs, respectively. Average cost and income per inpatient-day was 1992377 RLS and 1687387 RLS among final centers, respectively. According to the paired T-test and P-value, unfavorable financial variance was significant between ultimate

average cost with income of Pathology, radiology, ICU departments and hoteling services ($p < 0.05$); also it wasn't significant for laboratory, ultrasound, pharmacy, operating room and counseling departments ($p > 0.05$). The maximum average cost and prices received per patient belonged to cholecystectomy surgery with 38767365 and 33723760 RLS, respectively; also the minimum cost and received price was calculated for orchiectomy surgery with 4308061 and 33723760 RLS, respectively. In general, unfavorable financial variance was significant for urologic tumor surgery ($p < 0.01$).

Conclusion: Since units of delivering urologic surgeries had unfavorable financial variance in studied hospital and they didn't have any safety margin, thus it's essential to re-arrange prices of delivered services, and hospital manger should reduce costs of delivering services through using human and capital resources efficiently.

Key words: Hospital economy, costing financial performance, urology surgery

Introduction

With consideration to current competitive conditions within markets and lack of budgets, health care organizations are endeavouring to measure and manage their costs. Thus they provide adequate supports in order to get financial information for critical decision-makings and to enhance their profitability (Grandlich, 2004). Nowadays, in most of the developing countries, the range of delivering services has improved and its distribution is very important considering the socio-economic developments (Tourani, 1995). Hospital, as an organization to deliver important health care services to public, plays a very important role

not also in retaining physical and mental health of patients but also in participating in educational and medical researches (Pournajafzade, 2009). In this sense, health care managers are trying to deliver better and affordable services to patients (Demeere et al., 2009). Moreover, in today's world, health systems are of the largest parts of world economy. Approximately, 8 percent of gross domestic product (GDP) is allocated to health care expenditures worldwide (Anonymous, 2000); this is about 5.52 percent in Iran (WHO, 2011).

Hospital services are among the components of health systems which are considered as the most important reason for growth of expenditures in most of the countries; this growth happens in public sectors much faster than the others. Almost 50 to 80 per cent of health budgets are allocated to hospitals along with allocation of huge range of educated and professional workforces (New Brander). Furthermore, the importance of paying attention to hospitals is raised at the time that they are considered as the largest and most costly operational units of health care systems. Taking this point into account, resources should be used in hospitals after having their cost and ultimate prices per unit analyzed and after comparing collected data in order to use the outputs of proceeding analyses (Abolhallaj, 2007). Due to population increase and demographic changes in recent years, demand for health care services has increased and this will cause deficit in this sector. Having costs properly controlled is very essential point in order to prevent probable problems at the time of facing lack of resources. Also, having enough information about ultimate cost of delivered services is very important in order to implement costing system and to calculate unit cost of services which paves the way to reach the certain goals (Esmaeeli, 2009).

Activity-based costing (ABC) method, proposed by management and counting pioneers (Cooper and Kaplan), is a special costing model that identifies activities in an organization and assigns the cost of each activity with resources allocated to all products and services (Rajabi, 2008). Cost analysis is very important in adopting health policies and strategies, and it helps decision-makers in their attempt to determine appropriate strategies to reach health care goals through comparing ultimate health services costs with their real costs. In the health sector,

costs of services are determined based on the health care tariffs which are defined with consideration to economic status of society (Amrane, 2003). ABC clarifies the relationship between costs and activities and provides managerial information in form of ABC financial criteria. Since this method indicates activities done by human resources, facilities and equipment as tangible as possible, thus it is mostly used by financial managers (Hassanabadi and Najjar Sarraf, 2011). It is a professional method for calculating real ultimate cost of product through allocating overhead costs to product unit according to each activity's share in production process (Rajabi, 2008). Costing and analyzing costs are very important in order to perceive organizational conditions and to re-arrange costs and adopt strategies to prevent operational losses. We indicated how the result of this microeconomic costing can help elucidating the strengths and weaknesses of current way of resources allocation in the facility, identifying the inefficient cost centers, and inferring solution to enhance the facility's performance. We hope that the results of this study be useful to managers of health-care settings and encourage the decision makers in the healthcare industry to take the advantages of conducting similar micro costing analyses.

Material and Methods

This applied Cross-Sectional study conducted in 2011 in Shahid Hashemi-nejd teaching hospital affiliated to Tehran University of Medical Sciences. Financial Needed Data were collected through observing hospital documents available in financial, administrative, intermediate (including laundry and sterilization), diagnostic and operating room units and documents of patients' records, interviewing with experts and heads of each unit and finally by completing standard costing forms available on Iran Ministry of Health. These forms were distributed within units and personnel of each unit were clarified about the aim of study. Also, these forms are included variables regarding number of human resources working in each operational unit, outputs of units, human resource costs (salary and frequent and infrequent benefits), non-human resources (including energy and general costs, general and specific consumable materials of units, nutrition, medication, medical equip-

ment, number of capital equipment and working space of each unit ...).

Cost Modeling Approach (Top-Down) in Activity Based Costing method was used in order to calculate of service costs happened in each unit of hospital. The two general services and overhead units were classified as indirect service units, also intermediate and final units were categorized as direct service units (Assefzade and Rezapour, 2009). Criteria for Cost sharing vary among countries. Cost sharing criteria for amortizing administrative unit costs, hospital storages and drugstores was direct spending percentage, and square feet was used for prorating costs happened in repairing and maintenance units and housekeeping matters. Finally, the number of nursing personnel was used for prorating nursing, kitchen and tailoring affairs and support staff, and patient-day was used as cost sharing unit for prorating archiving and laundry costs.

By the time that the share of intermediate service units was determined from indirect costs, the share of urology tumor surgeries from all costs of these units was allocated to the final service units (urology tumor surgical centers) based on their outputs. Finally, sum of all amortized costs from overhead and allocated costs from intermediate units allocated to cost topics. (Ebadifard Azar and Rezapour, 2012b). moreover, In this study designed cost profiles for all patients under urology tumor surgery in order to comparing cost & Revenue per patient or service.

In This study, straight-line method was used for calculating depreciation cost of capital equipment in studied centers (Ebadifard Azar and Rezapour, 2012b):

$$\text{Depreciation cost of Asset} = \frac{A - B}{C}$$

Which:

A= Current value of assets,

B= Estimation of dismantled value of assets,

C= Useful life of assets

In this study, Human and non-human resources of patient care units and their equipment depreciation costs were considered as direct costs, and prorated costs from indirectly service-providing units

were considered as indirect costs. for calculating the amount of fixed and variable costs in intermediate and final centers Following formula was used:

Fixed cost of each unit= human resource costs+ general material and instrument cost+ +(depreciation and repairing costs + energy cost)*75% of costs amortized from general and overhead units + share of nursing office from costs + {(share of nursing unit from sterilization+ laundry+ tailoring+ all of the diagnostic units+ operating room+ intensive care unit (ICU)*85%}

Variable cost of each urologic surgery unit=All costs related to the urology surgeries –its fixed cost

After studying the patients' records in each unit and creating an income profile for them, tariff of health services accompany with costs paid for them were calculated for each patient. Finally, financial favorable and unfavorable variance was calculated using paired T-test and SPSS software. Also, Following formulae were used for determining break-even point condition in studied units:

$$B - e.U = \frac{FC}{Sp.U - Vc.U},$$

$$B - e.V = \frac{FC}{1 - (Vc.U / Sp.U)}$$

Which:

Sp.U is Service fee per service unit in ward = unit income/inpatient-day

Vc.U is Average Variable Cost of each service provided in each unit = Vc/inpatient-day

FC is fixed costs of each ward (unit)

B-e.U is Service volume which should be provided in order to keep the unit in break-even point condition

B-e.V is unit revenue in break-even point

Findings

Among studied urology surgery units, Omid and Shafa units had the maximum and the minimum bed occupancy rate (BOR), respectively. Also BOR for studied hospital was reported 81%

which 4.79% of it belonged to surgical wards (table 1). Moreover, unit Omid had the highest rate of direct (28.6%), indirect (51%) and total operational costs; as 79.6% of total operational costs were reported for this unit. On the other hand, unit Shafa formed 20.4 per cent of total operational cost and 6.7 per cent and 13 per cent of direct and indirect costs, respectively. Medication and general consumable material costs had the maximum and the minimum rate among direct costs, respectively. Also, 38%, 0.12%, 10%, 40%, 6.3% and 0.49% of total direct costs relating to urologic tumor surgeries belonged to human resources, general consumable material, specific material, medication and medical equipment, costs of patients' nutrition, depreciation and general energy costs, respectively. In general, 35% and 65% of total operational costs relating to urology surgeries belonged to direct and indirect costs, respectively (table 2).

The other costs were estimated as 22000RLs for one dish in kitchen department, 29298RLs for each meter of tailored fabric in tailoring unit, 1990RLs for one kilogram clean clothes in laundry, 9556RLs for each package in sterilization de-

partment, 371266RLs for each sample in pathology department, 70911RLs for each test in lab, 164584RLs for each stack of film in radiology unit and 107160RLs for each test in ultrasound unit.

Furthermore, the cost per service unit was estimated 2005407RLs and 1943058RLs for units Omid and Shafa, respectively. On the contrary, the income per service unit was calculated 1732290RLs and 1517414RLs for these units, respectively. Total cost for units Omid and Shafa relating to urologic surgeries was estimated 1343622601 RLs and 343921236RLs, respectively; also total operational income was accounted 1160634300RLs and 268582278RLs for them, respectively. Both units had received subsidies in order to compensate their deficit; mentioning that unit Shafa had received the highest rate of subsidy.

Moreover, average hoteling cost per patient and inpatient-day was appraised 3393633RLs and 592984RLs in final centers, respectively. Also, average non-hoteling cost was estimated 8008690RLs and 1399393RLs in these centers, respectively. Total cost per patient and inpatient-day was accounted 11402323RLs and 1992378RLs in final centers for

Table 1. Performance indexes of studied hospital regarding each final center in the first semester of 2011

Unit	Number of active bed	Total active bed days	Total occupied bed days	Tumor surgery occupancy bed days	Empty bed days	BOR	Share of tumor surgeries in BOR
Omid	32	5504	4453	670	1051	80%	15%
Shafa	32	5952	4686	177	1266	78%	3.77%
Whole hospital	124	23030	18622	892	4408	81%	4.79%

Table 2. Direct and indirect costs of studied hospital(in RLs)

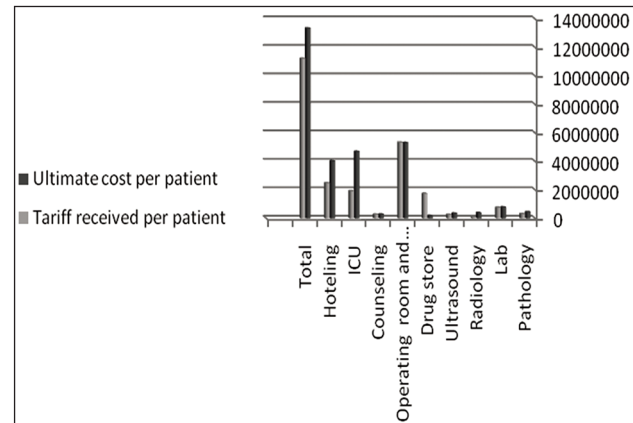
	Center's direct costs							Indirect cost
Direct services unit	Human resource	General material	Medical consumable material and medication	Nutrition	Equipment depreciation and maintenance	Specific material	General and energy	Amortized costs from other centers(overhead+ intermediate, ICU and operating room)
Omid unit	180310647	541657	199255615	26866202	19976268	44886991	2301586	859463635
Shafa unit	43365249	181306	37999911	10116876	5297238	14293675	577798	228789183
Total	223675896	722963	237255526	36983078	25273506	59180666	2879384	1088252818

direct services relating to urologic surgeries, respectively. Average income of these centers was calculated 9656869RLs and 1687387RLs per patient and inpatient-day, respectively (table 3).

In addition, the highest amount of fixed, variable and average cost was reported for Omid unit compare to Shafa having the lowest rate of mentioned costs. In order to be placed in break-even point, Omid and Shafa units had the maximum and the minimum service unit with 831 and 255 inpatient days, respectively (table 4). Furthermore, regarding non-hoteling services, operating room and anesthesia unit estimated to have the highest average cost; on the contrary, the lowest average cost belonged to ECG unit. The highest rate of average cost per inpatient-day was accounted for ICU with 2881955RLs in both tumor surgery wards. Also, the lowest average cost per inpatient-day belonged to ultrasound in Shafa and ECG unit in Omid ward. Regarding non-hoteling services, operating room and anesthesia unit estimated to have the highest average income per patient and the lowest rate was accounted for ultrasound unit in Shafa and ECG in Omid unit. In both units, ICU had the highest average income of non-hoteling services per inpatient-day with 1210200RLs (table 5).

Results showed that services delivered in operating room and anesthesia unit formed the highest

average ultimate cost, and the lowest rate of it was appraised for counseling services per patient. ICU and counseling services had the maximum and the minimum financial variance, respectively (table 6 and graph 1). Also, findings indicated that, among tumor surgeries, only RPLND had favorable financial variance; mentioning that radical cholecystectomy and radical orchiectomy surgery had been shown to have the highest and the lowest unfavorable financial variance, respectively (table 7).



Graph 1. Comparing average ultimate cost and received tariff in studied hospital

Table 3. Average hoteling and non-hoteling cost along with total cost and income in tumor surgeries units(RLs)

Average	Shafa(RLs)	Omid(RLs)	Mean(RLs)
Hoteling cost per patient	4020748	3259986	3393633
Hoteling cost per inpatient day	590618	593609	592984
Non-hoteling cost per patient	9206992	7753314	8008690
Non-hoteling cost per inpatient day	1352439	1411798	1399393
Total cost per patient	13227740	11013300	11402323
Total cost per inpatient day	1943058	2005407	1992378
Total income per patient	10330091	9513396	9656869
Total income per inpatient day	1517414	1732290	1687387
Amount of subsidy	425644	273117	5/349380
Total operational cost	343921236	1343622601	-

Table 4. Break-even point condition of units delivering direct services

Final center	Fixed cost (RLs)	Variable cost (RLs)	Service unit(tumor inpatient-day) (RLs)	V _c U(RLs)	S _p U(RLs)	B-e. U inpatient-day	B-e. V(RLs)
Omid unit	943808129	399814472	670 days	596738	1732290	831	1430012317
Shafa unit	246397029	97524207	177 days	550984	1517414	255	384995351

Table 5. Average cost-income of non-hoteling services for studied units (related to tumor surgeries)

Center	Non-hoteling services	cost		income	
		Average cost per patient (RLs)	Average cost per inpatient-day (RLs)	Average income per patient(RLs)	Average income per inpatient-day(RLs)
Shafa	Pathology	371266	54536	273480	40172
	Laboratory	952471	139911	702061	103128
	radiology	279536	41062	99499	14616
	Ultrasound	85850	12611	34864	5121
	Operating room	4599277	675600	5092245	748013
	ICU	1330133	2881955	558554	1210200
	ECG	35100	5156	35100	5156
	Ct scan	176736	25961	176736	25961
	Drug store	1461535	214689	1461535	214689
	Echocardiography	113885	16729	113885	16729
Omid	Pathology	365180	66495	255307	46489
	Laboratory	660444	120260	690655	125761
	radiology	344698	62766	82258	14978
	Ultrasound	31876	5804	36365	6622
	Operating room	3856197	702173	4388188	799043
	ICU	779545	2881955	327349	1210200
	ECG	28483	5186	28483	5186
	Ct scan	148000	26949	148000	26949
	Drug store	1633243	297396	1633243	297396
	Echocardiography	34672	6313	34672	6313

Table 6. Financial variance test for urologic tumor surgery in studied hospital

Services	Ultimate cost per patient(RLs)	Tariff received per patient(RLs)	Financial variance diversion(RLs)	P-value
	Mean	Mean	Mean	
Pathology	442434.89	315416.83	-127018.06	0.004
Lab	778388.4	758588.36	-19800.04	0.789
Radiology	379497.94	96090.05	-283407.89	0.000
Ultrasound	338086.53	259545.61	-78540.92	0.467
Drug store	176483.83	1743430.53	-21253.3	0.944
Operating room and anesthesia unit	5301630.87	5332150.86	30519.99	0.969
Counseling	278333.33	274054.05	-4279.28	0.945
ICU	4684096.66	1916150	-2767946.66	0.001
Hoteling	4019346.94	2480317.76	-1539029.18	0.000
Total	13339449.01	11225923.23	-2113525.69	0.135

Discussion and Conclusion

Costing and cost analysis is very important for health care sector and also for management of its organizations and entities, micro-economically. The importance of cost analysis is due to its role in accountability of health care managers in front of costs and resources, efficiency measurement, priority setting, predicting future costs, determining

the relationships between current costs and capital expenditures, re-arranging costs and changing the pattern of investments(Assefzade, 2010). Our results indicated that bed occupancy rate of studied hospital was 81 per cent which 4.79 per cent of it was belonged to tumor surgery wards. Rezapour reported BOR for Shohadaye Haftom-e Tir hospital as 72 %(Rezapour, 2007). In another study carried out by this author in one of the teaching hospitals

Table 7. Financial variance diversion of urologic tumor surgeries in studied hospital

Urologic tumor surgeries	Number of patients	Average cost of delivering services per patient (RLs)	Average Revenue received per patient (RLs)	Financial variance diversion (RLs)
Radical cholecystectomy	9	38767365	33723760	-5043605
Radical nephrectomy	31	15933812	12627278	-3306534
Radical prostatectomy	8	18355532	15429558	-2925974
Radical Orchiectomy	9	4308061	383738	-470675
Partial Cholecystectomy	1	27908797	23964431	-3944366
Partial nephrectomy	3	11337406	8569282	-2768124
Adrenalectomy	1	16558481	12450107	-4108374
RPLND	2	11844050	11864840	+20790
Big TUR-BT	41	7181759	6471467	-710292
Small TUR-BT	43	6000628	5234930	-765698

affiliated to Qazvin University of medical sciences, he calculated BOR as 63%; mentioning that low bed occupancy results in unproductivity and it increases cost per service unit and reduces safety margins of wards (Rezapour et al., 2010). Also, in a study conducted in Imam Khomeini hospital, results showed that increasing BOR to 80 per cent adds 20500000RLs to inpatient wards income, but increasing costs without using public funds can cause deficit for the hospital. Therefore, they concluded that the hospital can't continue its activity only through increasing percentage of BOR; it also needs to increase health care tariff (Abbasi moghadam, 2005). According to the ministry of health, bed occupancy rate was reported around 80 per cent among Iranian hospitals in 2004. Also, statistics showed that at most 55% of hospital beds were occupied in the year of study (News, 2011). Brownils believes that low BOR is an important reason for increased hospital costs (Brownils, 1992). Since, on one hand, tumor surgeries are very expensive and, on the other hand, tariffs determined for these services by ministry of health is very low and it brings more detriments to health care centers, thus this loss can be decreased through increasing BOR, bed turnover and efficient use of capital resources in studied wards.

Also, the amount of fixed and variable costs in direct service units relating to tumor surgeries was 70.5% and 29.5%, respectively. In Rezapour's study which conducted in a hospital of Qazvin university of medical sciences, he argued that 78.5 per cent of final center costs were fixed and the remained were variable (Rezapour et al., 2010).

Studies show that, on average, 70% and 30% of health care organization costs belonged to fixed and variable cost, respectively (Ebadifard Azar and Rezapour, 2012a). Effective use of capital factors amortizes fixed costs among inpatient admission unit or number of extra services and reduces average ultimate cost which it puts health center in descending part of long-run average cost curve (LRAC) and it finally saves hospital from decreasing returns to scale.

According to this study's results, direct and indirect costs formed 84.8 per cent and 15.2 per cent of total operational cost of final and intermediate centers, respectively; while the amount of these costs in direct service centers relating to tumor surgeries was 35% and 65%, respectively. Unlike indirect costs, direct costs are easily traced to projects or activities. What is important is the specific role of amortized costs from indirect service units ((Khatami, 1997), (Imanee, 2007), and (Rezapour et al., 2010)). In another same study, direct and indirect cost relating to tumor surgeries in direct service centers were accounted 40% and 60%, respectively (Rezapour and Mirzaabbasi, 2010). Furthermore, human and non-human resources formed 60.5% and 39.5% of costs in the studied hospital. Also, 38 and 61 per cent of costs in tumor surgery care centers belonged to human and non-human costs, respectively. In a related study carried out in hospitals of Qazvin University of medical science, human and non-human costs were reported as 76.1% and 23.9%, respectively (Rezapour et al., 2010). Also, study done in Kohgiluyeh Boyer Ahmad province indicated that 46.5% to 61.5%

of its teaching hospital costs belong to human costs. In some other studies, it has been shown that human costs form the most part of operational cost in the hospitals ((Rajabi, 2008), (Esmaeeli, 2009), (Mashadsary, 2007), (Lievens et al., 2003), and(New Brander)).

According to the international standards, 55% to 65% of total hospital operational costs are allocated to human resource costs (Assefzade and Rezapour, 2009). Human resources play an important role in health care organization and hospital economy. Thus, good management should be considered in this area. In this study, although, the amount of human resource cost relating to tumor surgeries was more than non-human costs, it was in consistent with international standards considering the hospital as a whole unit.

The ultimate cost of intermediate and diagnostic centers were calculated in this study as well. In laundry unit, the ultimate cost of one kg clean clothes was 1990RLs, also each package of sterilization unit costs about 9556RLs. In a study done by Kazemi et al., they reported ultimate cost of one set of clothes and jeans (two sets equal one kg) 1127RLs and each bed sheet (two bed sheets equal one kg) 1076RLs; while each single-use clothes and jeans costs 18000RLs and each single-use bed sheet also costs 4000RLs which it shows that using single-use clothes and bed sheet is not economical in the hospital (Kazemi et al., 2008).

Moreover, average ultimate cost per patient was calculated 442434RLs in pathology unit; also, average tariff received per patient was 315416RLs which this had caused unfavorable financial variance about 127018RLs and loss of 18290678RLs. Furthermore, unfavorable financial variance was accounted 19800RLs in laboratory department per patient. In a study carried out by Mousavi (2010), he argued that the difference between average ultimate cost per service unit with received tariff is 189000000; showing the loss for studied hospital(Kazemi et al., 2008). Average ultimate cost was 379497.94RLs in radiology unit, received tariff per tumor patient was calculated 96090.05, financial variance between cost and income was 283407.89 per patient and hospital loss was calculated 41944367RLs. This study indicated a hug loss in hospital radiology unit during 6 first month of financial year with 446000000RLs (Kazemi et al.,

2008). In another same study, there was a significant difference between government tariff for services with hospital costs ($p=0.002$)(Mashadsary, 2007); also it wasn't significantly different in this study ($p=0.789$). Although the results of Mashhadsary's study (29) didn't show any significant difference in radiology unit, our study indicated a significant difference in this unit ($p=0.000$). These discrepancies show deficit and economic inefficiency within units of studied hospital. In another study carried out by Mousavi (2010), average cost of performing an ultrasound test was accounted 29999RLs and received tariff was more than the costs and it created a profit about 84700000RLs(Mousavi et al., 2010). Unfavorable financial variance in intermediate and diagnostic centers creates a considerable loss for studied hospital. Following reasons can be traced for proceeding issues:

- Low tariffs; they are not based on the cost-recovery methods and are not determined according to the proper accounting methods.
- Weaknesses in management efficiency which results in decreasing outputs and increasing costs per service unit in some areas. Work and time measurement can be used by management in order to overcome these problems.

Regarding cost-income condition of direct services relating to urologic tumor surgeries, in both studied units(Shafa and Omid) cost per in-patient was more than their income and this had caused them to receive subsidy in order to compensate their costs(273117RLs in Omid unit and 425644RLs in Shafa unit). Also, Shafa unit had more costs and specific income in comparison to Omid which it is due to existence of less tumor active beds and cost of consumable material and medication prices along with medical equipment depreciation per tumor active bed in the latter unit.

In consistent with our study, in a study carried out by Rezapour in one of the hospitals affiliated to Qazvin University of medical sciences, he argued that all units of studied hospital, except surgical unit, had loss(Rezapour et al., 2010). Agyar (2007) calculated patient's bed-day cost 33.94TL whereas received tariff was 14.41TL per patient (Evren et al., oct,2007). In Rezapour's study, surgical ward was the only one with 1.6 safety margin

which also had operational profitability and could place in break-even point (Rezapour et al., 2010).

According to the findings, none of the final centers of delivering direct services had safety margin which it is due to unfavorable financial variance and diversity of surgical operations in studied wards along with sort of mismatch between inpatient-day tariffs with hoteling cost. Furthermore, average ultimate hoteling and non-hoteling cost and income was 4019346.94RLs and 2480317.76RLs per patient in studied wards, respectively. Also, financial variance was calculated -1539029.18RLs per patient; showing loss in studied hospital.

Also, in the other wards with no hoteling services including operating room and anesthesia ward, average ultimate cost was lower than tariff received per patient and it made profit around 30519RLs per patient for hospital (totally 4516958RLs profit). Also, average ultimate cost and tariff received from patients was calculated 4684096RLs and 1916150RLs per patient in ICU unit, respectively. Financial variance diversion of cost and income was accounted -2767946.66RLs; showing loss for this unit. Most part of these costs was allocated to equipment repairing and human resource costs needed for launching and maintaining that equipment.

According to the findings, total average ultimate cost and tariff received per patient was 13339449RLs and 11225923RLs, respectively: indicating financial variance diversion of about -2113525.69RLs per patient. Moreover, unfavorable financial variance for hoteling and non-hoteling services delivered in pathology, radiology and ICU units was significant. On the contrary, this variance diversion wasn't significant for services delivered in operating room, anesthesia, laboratory, ultrasound and counseling department ($P=0.135$). In a study carried out by Nasirypour et al. in order to calculate the ultimate cost of clinical laboratory services delivered in Valiasr Hospital in Tehran using activity-based costing method, they concluded that there exists a difference about -36% between average ultimate cost with tariffs announced by ministry of health for related services (New Brand-er). Also, Mosavi argued that there is a considerable difference between average ultimate cost of medical services delivered in some Para-clinical units with tariff announced for those services; resulting in loss in the studied units (Mousavi et al., 2010).

Furthermore, urologic tumor surgeries were significant regarding unfavorable financial variance ($P<0.01$). Tsai et al. found a significant difference between costs paid for laser eye surgery with proper pricing of services using comparative-T and P-value tests (Tsai, 2005). Another related study argued the financial loss for hospital due to finding significant difference between ultimate services cost with tariffs announced for public and private hospitals (Shaban khamse, 1999); this finding also was confirmed by other researchers (Antikainen et al., 2005, Cinquini et al., 2007, Moreno, 2007). Agyar, in his study done in urology unit of Akdeniz hospital, expressed that those costs calculated using ABC method were more than what was calculated by traditional methods which it refers to accuracy and comprehensiveness of ABC method (Evren et al., oct, 2007). Also Yereli indicated that ABC method can provide more appropriate information for managers and help them analyze and interpret costs and appropriately decide for budgeting and planning (Yereli, 2009); the study done by Tseng in China is in approve of proceeding findings regarding the benefit of ABC method compare to traditional methods (Tseng, 2011).

In general, studied hospital was facing with deficit and operational loss in its units which this issue can be traced to low price of medical tariff compare to ultimate cost of services or weaknesses in technical and managerial efficiency. Following clues are suggested in order to improve productivity and to decrease service costs in studied units:

- Proper management and control of human resources
- Appropriate management of provision and maintenance of medical equipment and medication
- Appropriate management of capital resources and asset of hospital
- Analysis of financial variance of costs and budget
- Annual review of tariffs and considering flexibility in allocating budget and implementing ABC method

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Investigation of self-perception and individual characteristics in relation to gender and professional training in late adolescence: Turkish University students

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Abstract

Background: In late adolescence, the adolescents show effort to get to know themselves better and unify their personality through different routes. Gender and professional training is significant in developing self perception and individual characteristics as well as social comparison, which represents one of these routes.

Objective: The current trial was performed to investigate the association between self-perception and the individual characteristics in university students in late adolescence, thereby providing an assessment with respect to gender and professional training.

Method: The study population consisted of the students at a state university and 833 students, who were selected via simple randomized sampling, represented the study sample. Data were collected using Data Forms, the Sociotropy-autonomy scale (SAS) and the Social Comparison Scale (SCS) and assessed by percentage, standard deviation, Pearson's correlation analysis, t-test, one-way ANOVA and the Bonferroni tests.

Results: The mean age of the participating students was 20.97 ± 1.86 and 67.3% were females ($n=561$). 34.9% of the participants were medical students ($n=291$). The mean SCS score, the mean sociotropy score of SAS and the mean autonomy score was 81.29 ± 15.4 , 65.22 ± 16.8 and 72.37 ± 16.3 , respectively. While a positive significant correlation was detected between the individual achievement sub-dimension ($r=.159$; $p<0.01$) and SCS and autonomy ($r=.074$; $p<0.05$), a negative significant correlation was detected between the sociotropy sub-dimensions of disapproval anxiety ($r=.098$; $p<0.01$) and pleasing others ($r=-.088$; $p<0.05$). Gender was observed to be significantly associated with SCS ($F=24.12$; $p=0.000$), Sociotropy ($F=5.11$; $p=$

0.024), Autonomy ($F=15.64$; $p=0.000$). There was a significant difference between the adolescents' mean self-perception score (SCS) and the field of training ($F=3.96$; $p=0.008$), and between the professional training and the mean sociotropy dimension score ($F=10.94$; $p=0.000$).

Conclusion: The results revealed that the university students in late adolescence exhibited moderately sociotropic personality characteristics and an above-moderate level of autonomous personality; self-perception was observed to have a positive correlation with autonomous personality characteristics and a negative correlation with sociotropic personality characteristics. Gender and professional training were detected to have an influence on self perception and personality characteristics.

Key words: Late adolescence, self-perception, sociotropy-autonomy.

Introduction

Late adolescence starts at the age of 18 and ends with the unification of the sense of identity. Social connections and comparisons are important for the adolescent to identify self perception and his/her personality characteristics during this period. The greatest difficulty in approaching the adolescents is the inter-individual variability in the time of onset for development with the developmental process also being completed at different times for each adolescent. In this respect, the developmental process may show variability even between the adolescents, who are in the same year of their professional education (Derman, 2008; Sramova, Lasticova, Fichnova, & Hamranova, 2008).

The adolescent shapes self-perception and personality characteristics also via social comparisons. Self perception refers to the judgmental conclusion

the person reaches about himself/herself based on the feedback from the social environment (Beyazsaçlı and Bulut Serin, 2012; Şahin, Basım, & Çetin, 2009). Review of the literature shows that general self-perception and many of its components (academic self-perception, self-respect) are often discussed together with the individual's academic life (Şahin, Basım, & Çetin, 2009; Baumeister, Campbell, Krueger, & Vohs, 2003; Brunner, Lüdtke, & Trautwein, 2008; Marsh, and Craven, 2006; Wang, 2006; Özbay, Örsel, Akdemir, & Cinemre, 2002).

Self-perception may be defined as a combination of the senses of self-respect, self-confidence, acceptance of the perceived self-concept and worthiness as a form of perceiving and comprehending his/her personality. In adolescence, self-judgment is largely based on social comparisons, standard norms, social similarities, inter-individual interactions and social approval. The literature reports that late adolescence additionally involves transition into individual beliefs, self-definitions, which may also be expressed as interiorized standards, and the self-perception undergoes a differentiation process in line with this transition (Özbay, Örsel, Akdemir & Cinemre, 2002; Özkahraman, Yildirim, Şahin, & Altun, 2011).

A person's self-perception plays a key role in the development of the personality. Personality is defined as the sum of the consistent and restructured characteristics that determine a person's reactions to certain situations, the connections with inner and outer environment, which distinguish the person from the others. In addition to the genetic characteristics achieved congenitally, individual perception and interpretation, and the social environment such as the family and school are also highly determinative in development of the personality (Somer, 1998; Şahin, Basım, & Çetin, 2009; Erdoğan, Şanlı, Şimşek, & Bekir, 2005).

Based on Beck's theory, the personality has two dimensions: sociotropy and autonomy. According to this theory, sociotropy is defined as a person's ability to positively interact with others while autonomy is a person's ability to protect and enhance his/her independency and his/her individual rights (Şahin, Ulusoy, & Şahin 2003; Dasch, Cohen, Sahl, & Gunthert, 2008; Sato, 2003; Sato and McCann, 2007; Kaya, Aştı, Acaroğlu, Kaya, & Şendir, 2006; Shahr, Soffer, & Gilboa-Shechtman, 2008; Lindsay and Scott 2006; Gürşen Otacıoğlu, 2008).

University represents a new beginning for the students. The academic, personal and social changes introduced by the university life may render this life a complex period of transition to professional life (Erdoğan, Şanlı, Şimşek, & Bekir, 2005). Profession becomes one of the most significant elements of the human personality during and after the period of training (Gülcan and Cengizhan 2009; Özdemir, Özdemir, Akça, Ediz, & Akça, 2002).

Given this information, we can say that self-perception and personal characteristics become evident through social comparisons, and gender and professional training may be predictive variables.

The current trial was performed to investigate the association between self-perception and the individual characteristics in university students in late adolescence, thereby providing an assessment with respect to gender and professional training.

Methods

Selection and Description of Participants

The study population consisted of the students at a state university (n=4320) and 833 students, who were selected via simple randomized sampling, represented the study sample. Faculties and colleges offering undergraduate education were included with two-year departments being excluded from the trial. The trial was initiated after obtaining consent from the ethical committee, study permit from the faculties and colleges and informed consent from the participants.

The hypotheses of this descriptive and correlational trial are as follows:

1. Late adolescents have high scores of self-perception and autonomous personality.
2. Self-perception is correlated with personality characteristics in late adolescents.
3. Gender affects self-perception and personality characteristic in late adolescents.
4. Professional training affects self-perception and personality characteristics in late adolescents.

Data Collection

In the current trial, sociodemographic and professional training-related data were collected using Data Forms; data on self-perception were collected using the Social Comparison Scale (SCS) and

data on personality were collected using the Sociotropy-Autonomy Scale (SAS).

Social Comparison Scale (SCS): This is a self-rating scale based on 1-6 Likert scoring, which measures how a person perceives himself/herself at various dimensions compared to others. A higher score on the scale indicates that the person perceives himself/herself more favorably. A validity-reliability trial by Sahin and Savasir performed in Turkey revealed a *Cronbach alpha inner* consistency coefficient of $\alpha.79$ (Şahin and Savaşır, 1997; Şahin and Sahin, 1997). The *inner* consistency coefficient for this trial is $\alpha.93$.

Sociotropy–Autonomy Scale (SAS): this is a 5-point Likert type, 60-item scale that contains the personality characteristics of dependence on and independence from others and determines the two basic characteristics of personality: sociotropy (SD) and autonomy (AD). High scores obtained from each dimension on the scale indicate that the personality characteristics for that particular dimension are evident. A validity-reliability trial of the scale was performed by Sahin and Savasir in Turkey. The sociotropy dimension included the sub-groups of disapproval anxiety (DA), separation anxiety (SA) and pleasing others (PO) while the autonomy dimension included the subgroups of individual achievement (IA), freedom (FD) and preference for solitude (PS); the *inner* consistency coefficient of the scale was $\alpha.94$ and $\alpha.95$ for sociotropy and autonomy, respectively (Şahin and Sahin, 1997). As for the current trial, similarly, the *inner* consistency coefficient was $\alpha.94$ and $\alpha.95$ for sociotropy and autonomy, respectively.

Statistical Evaluation

Data assessment was conducted using the computer. In assessing the sociodemographic data and data on professional characteristics of the students, percentages, and standard deviation were used; Pearson's correlation analysis was used to determine the correlation between self-perception and personality characteristics while t-test and one-way ANOVA tests were employed for comparing of the gender and the professional education status to self-perception and personality characteristics. Bonferroni test was used for further analyses.

Results

The mean age of the students in late adolescence participating the trial is 20.97 ± 1.86 ; and 67.3% of them were females ($n=561$). 34.9% ($n=291$), 30.9% ($n=257$), 17.9% ($n=149$) and 16.3% of them ($n=136$) were studying at the medical school, faculty of nursing, faculty of law and pharmacy school, respectively. 27.6% of the students were in the 1st year at their university ($n=230$) (Table 1).

Results on self-perception and personality characteristics

The mean score for self-perception (SCS) was 81.29 ± 15.4 among the students. For the personality characteristics (SAS), the mean score for sociotropy and autonomy was 65.22 ± 16.8 and 72.37 ± 16.3 , respectively. These scores indicate that the students exhibit a moderately sociotopic personality and an above-moderate level of autonomy in personality characteristics.

Table 1. Demographic Characteristics

Demographic Characteristics		N	%
Gender	Woman	561	67.3
	Man	272	32.7
The Continuing Education Department	FHS Nursing	257	30.9
	Medical Faculty	291	34.9
	Law Faculty	149	17.9
	Pharmacy Faculty	136	16.3
The Continuing Education in The Classroom	1st class	230	27.6
	2st class	203	24.4
	3st class	183	22.0
	4st class	217	26.1
Total		833	100

As for the sub-dimensions of sociotropic personality, the mean scores were 30.72 ± 8.6 , 19.41 ± 6.6 and 15.08 ± 4.3 for concern over separation, disapproval anxiety and pleasing others, respectively, while for the sub-dimensions of sociotropic personality, the mean scores were 30.50 ± 7.7 , 28.57 ± 6.8 and 13.29 ± 4.6 for individual achievement, freedom and preference for solitude, respectively (Table 2). Based on these results, separation anxiety was the most evident among sociotropic personality characteristics and individual achievement was most evident among autonomous personality characteristics.

Table 2. The mean score of students SOSOTÖ and SCS

	X	Sd
SCS	81.29	15.46
SAS		
Autonomy (AD)	72.37	16.37
Individual achievement (IA)	30.50	7.71
Freedom (FD)	28.57	6.80
Preference for solitude (PS)	13.29	4.63
Sociotropy (SD)	65.22	16.81
Separation anxiety (SA)	30.72	8.62
Disapproval anxiety (DA)	19.41	6.61
Pleasing others (PO)	15.08	4.31

Results on self-perception and personality characteristics

Reviewing the correlation between the SCS and the SAS and its sub-dimensions, there was a statistically significant positive correlation between SCS and autonomous personality characteristics ($r=.07$, $p<0.05$) and the sub-dimension of individual achievement ($r=.16$, $p<0.01$). There was a negative correlation between SCS and the sub-dimensions of sociotropic personality and this correlation was significant for disapproval

anxiety ($r=-.10$, $p<0.01$) (Table 3). These results suggest that as the self perception became more favorable, the students exhibited more autonomous personality characteristics.

Results on the correlation between gender and professional education and self-perception and personality characteristics

Significant correlations were detected between gender and the SCS total score ($t=2.70$; $p=0.007$), the sociotropy dimension ($t=2.37$, $p=0.018$) and the sub-dimension of separation anxiety ($t=5.05$, $p=.000$). These results show that females (female: 82.30 ± 13.74) perceive themselves more favorably compared to males (male: 79.22 ± 18.33). We also observed that female adolescents ($X=66.18 \pm 15.99$) exhibited more sociotropic personality characteristics and experienced a higher level of separation anxiety relative to males ($X=63.23 \pm 18.27$) (Table 4).

Assessment by the field of education also revealed statistically significant results on self-perception and personality characteristics. There was a significant difference between the mean score on self-perception (SCS) and the field of education ($F=3.96$; $p=0.008$). This significance (Bonferroni) was detected to be between the nursing students and the medical students (mean difference 3.90) ($F=3.96$; $p=0.01$) and in favor of nursing students (Table 4).

There was a significant difference between the field of education and the sociotropy dimension mean scores ($F=10.94$; $p=0.000$). This significance (Bonferroni test) was detected to be between the nursing students and medical students (mean difference: 3.77) ($F=10.94$; $p=0.04$); and between the law students mean difference 9.51) ($F=10.94$; $p=0.000$) and pharmacy students ($F=10.94$; $p=0.01$). Nursing students were determined to have a more sociotro-

Table 3. Comparison of mean scores SCS and SAS

	SCS	AD	IA	FD	PS	SD	SA	DA	PO
SCS									
AD	.07*								
IA	.16**	.89**							
FD	.01	.88**	.65**						
PS	-.01	.76**	.52**	.56*					
SD	-.06	.37**	.27**	.47**	.17**				
SA	-.01	.32**	.29**	.40**	.08*	.91**			
DA	-.10**	.27**	.13**	.39**	.18**	.88**	.65**		
PO	-.09*	.39**	.31**	.42**	.25**	.75**	.53**	.57**	

pic personality compared to the other students (Table 4). There was a significant difference ($F=6.04$; $p=0.000$) between the field of education and the autonomy dimension mean scores. This significance (Bonferroni test) was observed to be between medical students and pharmacy students (mean difference 5.09) ($F=6.04$; $p=0.01$). Medical students were detected to exhibit more autonomous personality characteristics compared to pharmacy students. As presented in Table 4, a significant difference was detected in all of the sub-dimensions of autonomy and sociotropy by the field of education.

By the year of education, significance was detected in the total SCS and the disapproval anxiety sub-dimension of SAS ($F=2.91$; $p=.034$ and $F=4.15$; $p=.006$). Students were observed to perceive them-selves most favorably in the first year

and least favorably in the second year with the mean score for the sub-dimension of disapproval anxiety decreasing as the year of education increased (Table 4).

Discussion

In Turkey, where 90% of the population is Muslim, the cultural and traditional structure, the family pattern may influence the autonomy gained by the child. Particularly, the sociotropic characteristics of the girls are supported in this country. In this context, the current trial investigating self-perception and the personality characteristics and evaluating them with respect to gender and professional education is original in that there are no similar trials performed in Turkey.

Table 4. The Gender and Professional Training comparison with SCS ve SAS mean scores

Demographic Characteristics		SCS	SD	SA	DA	PO	AD	IA	FD	PS
Gender										
Woman	X	82.30	66.18	31.76	19.44	14.98	72.36	30.49	28.71	13.15
	Sd	13.74	15.99	8.20	6.50	4.11	15.14	7.19	6.44	4.56
Man	X	79.22	63.23	28.58	19.35	15.30	72.38	30.53	28.26	13.58
	Sd	18.33	18.27	9.08	6.84	4.69	18.69	8.70	7.48	4.77
t		2.70	2.37	5.05	0.19	1.01	0.02	0.07	0.90	1.26
p		.007	.018	.000	.847	.317	.985	.940	.367	.206
The Continuing Education Department										
FHS Nursing	X	83.08	69.14	33.50	20.41	15.22	74.55	31.14	29.80	13.61
	Sd	12.81	14.98	7.43	6.33	3.98	14.77	6.79	6.18	4.61
Medical Faculty	X	79.17	65.36	30.28	19.53	15.54	73.62	31.09	28.83	13.69
	Sd	15.43	17.38	8.71	6.90	4.39	16.30	7.72	6.91	4.59
Law Faculty	X	83.24	59.62	27.87	17.73	14.01	69.66	29.78	27.17	12.70
	Sd	17.75	18.39	9.40	6.87	4.89	17.80	8.88	6.83	4.72
Pharmacy Faculty	X	80.33	63.63	29.52	19.11	15.01	68.52	28.84	27.21	12.47
	Sd	16.88	15.17	8.24	5.85	3.85	16.88	7.72	7.18	4.55
F		3.96	10.94	16.26	5.39	4.35	6.04	3.71	6.99	3.39
p		.008	.000	.000	.001	.005	.000	.011	.000	.017
The Continuing Education in The Classroom										
1st class	X	83.04	66.15	31.09	20.31	14.76	72.40	30.23	29.11	13.06
	Sd	14.76	18.59	9.48	6.94	4.67	13.34	8.40	7.38	4.55
2st class	X	78.76	66.95	31.32	19.91	15.71	73.02	30.92	28.59	13.50
	Sd	14.39	15.43	7.86	6.22	3.87	15.66	7.19	6.71	4.76
3st class	X	81.94	64.81	30.59	19.10	15.12	73.60	31.01	28.93	13.65
	Sd	13.86	16.14	8.32	6.55	4.15	15.21	7.44	6.63	4.64
4st class	X	81.27	62.96	29.88	18.26	14.81	70.67	29.98	27.66	13.03
	Sd	18.03	16.46	8.59	6.51	4.39	15.72	7.65	6.31	4.58
F		2.91	2.29	1.16	4.15	2.16	1.23	0.89	1.96	0.93
p		.034	.076	.321	.006	.090	.298	.441	.118	.421

The mean score of SCS obtained from the students indicates a favorable self-perception. With respect to gender, the SCS mean scores showed that females perceived themselves more favorably relative to males and showed a statistically significant difference to males.

A trial by Dasch et al performed in university students demonstrated that females perceived themselves less favorably relative to males (Dasch, Cohen, Sahl, & Gunthert, 2008). This finding that is in contrast to ours may be attributed to different cultural features. Based on the 2011 data from the Republic of Turkey, The General Directorate of Woman Status, the rate of females attending undergraduate education is 29.6% in the education year of 2009/10. This rate indicates the low number of women attending undergraduate education in Turkey and considering that the females in the trial were included in this minority and that they could have felt privileged, the fact that they perceived themselves more favorably is a conceivable result.

The scores obtained for both dimensions of the SAS shows that the students exhibit a moderately sociotropic personality and an above-moderate level of autonomy in personality characteristics. A trial by Kaya et al showed that university students exhibited an above-moderate level of autonomy in personality characteristics (Kaya, Aştı, Acaroğlu, Kaya, & Şendir, 2006). Similarly, in a trial by Sahin et al performed in 189 university students, the students exhibited an above-moderate level of autonomy in personality characteristics (Sahin, Ulusoy, & Şahin, 2003). These trials are important in that they indicate an above-moderate level of autonomy in late adolescence in our country when gender is not taken into consideration.

Assessing the association of gender with personality characteristics, females were detected to exhibit more sociotropic personality characteristics and to have a significant difference to males. In addition, females had a higher mean score for separation anxiety relative to males.

In a trial by Dasch et al, the scores for sociotropy were detected to be significantly higher in females relative to males (Dasch, Cohen, Sahl, & Gunthert, 2008). In their trial, Serinkan and Barutcu detected higher scores of autonomy and lower scores for sociotropy in males compared to females (Serinkan and Barutcu, 2006). While all these results are

expectable considering that the sociotropic personality characteristics of girls are supported during the process of development in our country, they still are significant in that they exhibit similarity also in different cultural features.

In dynamic respect, given the girls give up freedom for the sake of keeping love and thus have a higher level of concern over separation, the finding in the current trial that females suffered separation anxiety more than the males did is considered an expectable finding.

Assessing the mean self-perception score of adolescents by the field of education, we observe that the nursing students perceive themselves more favorably. Considering collectively the fact that all of the nursing students were females and findings that females perceived themselves more favorably, this finding is expectable.

By the year of education, students were observed to perceive themselves most favorably in the first year and least favorably in the second year with the mean score for the sub-dimension of disapproval anxiety decreasing as the year of education increased. In their trial in students, Keskin and Yildirim detected no association between the SAS and the current year of the education (Keskin and Yildirim, 2008). These results may be related to inter-individual variability in the time of onset for development with developmental process also being completed at different times for each adolescent and the fact that the developmental process may show variability even between the adolescents, who are in the same year of their professional education. The fact that the mean score for the sociotropy sub-dimension of disapproval anxiety decreased as the year of education increased may be explained by the decreased requirement for approval as well as the gradually increasing unification of the sense of identity.

A positive correlation was detected between self-perception and the autonomous personality characteristics and the individual achievement sub-dimension ($r=.16$, $p<0.01$). There was a negative correlation between the self perception and the sub-dimensions of sociotropic personality characteristics and this correlation was significant for the concern about disapproval. The results reveal that as the self-perception became more favorable, the students exhibited more autonomous persona-

lity characteristics while they exhibited more sociotropic personality characteristics as self-perception became less favorable.

While individuals with high self-perception give importance to their own judgment about themselves, those with poor self-perception attribute importance to what others think about them. Thus those with a more favorable self perception exhibit more autonomous personality characteristics (Tutar, Altınöz, & Çakıroğlu, 2009). In line with this literature finding, the current trial demonstrated that a favorable self-perception increased autonomy and particularly, individual achievement increased in direct proportion to this.

Conclusion

All the pre-specified hypotheses were confirmed by the trial results. The university students in late adolescence in the trial have an above-moderate level of autonomy in personality characteristics. As their self perception becomes more favorable, individuals exhibit more autonomous personality characteristics. The gender, the field and the year of undergraduate education affect self-perception and personality characteristics.

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Family planning services: an implementation of the service quality gaps model

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Abstract

Intoduction: The current study aimed at defining the width of 4 gaps in the quality of family planning services.

Methods and materials: The study sample consisted of 500 women seeking care from 51 health center under the supervision of the Shahid Beheshti University of Medical Sciences. Data were collected using a questionnaire. Participants' perception and expectation from health care centers were assessed using SERVQUAL scale, which has been previously translated to Persian.

Results: Health care providers-Clients gap with respect to either expectations or perceptions were trivial (P -values >0.2). Generally, more than 90% of expectations of both clients and providers were perceived to be met by health centers. Satisfaction index indicated than 27% of participants were satisfied, 64.5% dissatisfied, and another 8.0% strongly dissatisfied. The dimension of responsiveness remained to be independently and statistically significantly associated with willingness of participants to seek family planning care from their health centers in the future. No matter how satisfied with other dimensions of the Outpatient Service Quality, clients who were strongly dissatisfied with the responsiveness of their health care centers were 12% less likely to be willing to seek care from their health centers in the future (P -value=0.026).

Conclusion: We observed that more than 90% of the clients' expectations from family planning services are currently being met by health centers and that among different dimensions of the outpatient service quality. Willingness to come again to a health center was strongly and statistically significantly associated with the extent to which the health care providers were responsive (as perceived by clients). Family planning services provided by

health centers were found by clients to be easy to use. Usability, however, did not provide any predictive ability above or beyond SERVQUAL scale.

Key words: Family planning, service quality, gap model, SERVQUAL.

Introduction

Family planning services are frequently used and important services for women of reproductive age (Mosher et al., 2004). These services are crucial in enabling women to meet their fertility goals (Sonfield, 2003). Learning more about family planning service quality is important for ethical reasons, as receiving high-quality care is a basic right of patients. In addition, one of the main motivators behind this area of research is the notion that family planning service quality influences contraceptive and reproductive health outcomes. Studies in diverse international settings, where family planning service quality has long been an area of intense focus for research and intervention activity, have linked service quality to contraceptive adoption, prevalence and continuation (Becker et al., 2007). Quality of care in family planning is a difficult concept to measure since it is inherently multi-factorial with many factors being subjective in nature. Because family planning programs were developed largely in response to rapid demographic growth, their evaluation has concentrated on fulfillment of quantified goals such as numbers of new users, coverage, or prevalence. Such measures give no indication of the relative satisfaction or dissatisfaction of users (Sai, 1997).

The deep and sweeping vista the client centered approach opened up is to make health care providers more receptive to the need of clients and responsive to clients' situations beyond just their immediate health problems. The clients' outlook

is not simply a matter of individual preferences rather mediated through the social and cultural environment (AbouZahr et al., 1996).” Providing high-quality care mandates providers to appreciate their clients’ needs, attitudes, and concerns (Bertrand et al., 1995, Kols and Sherman, 1998). Policymakers and program managers can find ways to make reproductive health and family planning services more client-centered. (Creel et al., 2002). Before being given a service, clients have expectations from what they are to be provided with and after being given a service they have perceptions of what have already being provided with. The ideal client-centered approach is the one in which providers expect what their clients expect and they perceived what their clients perceived. Similarly, the ideal client-centered approach is the one in which the clients perceived what they expect from the services they have been provided with.

The current study aimed at defining the width of 4 gaps in the quality of family planning services provided by health centers in Tehran, capital of Iran: first, women’s expectation-perception gap; second, providers’ expectation-perception gap; third, clients-providers expectation gap; and finally, clients-providers perception gap.

Methods and materials

We conducted a cross-sectional study to evaluate the quality of family planning services provided by urban health centers of Tehran under the supervision of the Shahid Beheshti University of Medical Sciences.

The purpose of this research was to assess the differences in perception of quality among 2 roles i.e. health care providers (executives and frontline employees) and outpatients, in relation to the dimensions of tangibility, reliability, responsiveness, assurance, and empathy.

As formulated in Figure 1, the following perception differences (gaps) were assessed:

Gap 1: Differences between health care providers’ and outpatients’ expectations of service quality that an excellent health care center should provide.

Gap 2: Differences between health care providers’ and outpatients’ perceptions of service quality.

Gap 3: Differences between outpatients’ expectations and perceptions of service quality.

Gap 4: Differences between health care providers’ expectations and perceptions of service quality.

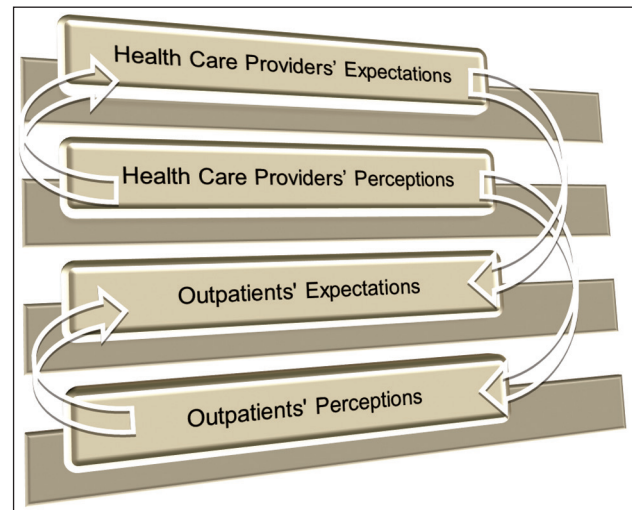


Figure 1. The gap model of health care services in this study

Study population

The study sample consisted of 500 women seeking care from 51 health center under the supervision of the Shahid Beheshti University of Medical Sciences. The women selected by stratified random sampling method with each health center as a stratum. All 147 health care providers (frontline employees) working in health centers were also recruited along another 18 participants including family planning experts, family health managers, the deputy of health, and manager of the department of population and family planning, ministry of health, treatment, and medical education.

Measurements

Data were collected using a questionnaire. The questionnaire had 5 main components. Component 1 included demographic data including age, gender, and educational level. Component 2 and 3 each consisted of 19 questions covering participants’ expectations and perceptions from health care services provided by health centers. Component 4 consisted of 6 questions regarding the importance of each dimension of the health service quality. Attitude of participants with respect to the quality of family planning services they were given in their health centers were obtained in component 5. Times participants sought care from their health centers and as well as their waiting times were also recorded.

Definitions of terms

Participants' perception and expectation from health care centers were assessed using SERVQUAL scale, which has been previously translated to Persian. Scores on this scale were used for measuring perceptual gaps. As such, we quantified service quality gap on both providers' and consumers' sides. Service quality has previously been shown to be multidimensional (Griffith et al., 2002) and the Service Quality Gaps Model and the SERVQUAL scale proposed by Parasuraman et al have increasingly attained popularity as tools for evaluating service quality (Griffith et al., 2002, Parasuraman et al., 1985, Parasuraman et al., 1993, Parasuraman et al., 1988). SERVQUAL scale has been shown to be valid and transportable to Iranian population. Currently, the scale is frequently used among Iranian for variety of purposes including but not limited to health care services (Aghamolaei and Zare, 2008, Siadat, 2008, Hassanzadeh et al., 2010, Siadat et al., 2008, Shahin and Dabestani, 2010, Mohammadnia et al., Kebriaei and Akbari, 2006, Tabibia and Moayer, GHOLAMI et al., 2011, Akhtari-Zavare et al., 2011, Nekoei-Moghadam and Amiresmaili, 2011). Herein, the assumption underlying the Service Quality Gaps Model, is that service quality is determined by measuring 4 gaps on both service providers' and consumers' sides. SERVQUAL measures 5 basic dimensions of service quality:

1. The tangible aspects of the service,
2. The reliability of the service provider,
3. The assurance provided by the service provider,
4. The responsiveness of the service provider,
5. The service provider's empathy with customers.

It is notable that all these dimensions are interrelated and significantly affect the perception disparities among the affected groups. Studies have also shown that dimensions may vary within the healthcare industry, depending on the specific application area (Lam and Woo, 1997, BSc, 1999). For the current study another 6th dimension was also added to SERVQUAL scale. This dimension quantifies the magnitude to which participants perceived it simple to utilize family planning services given by health care centers. Participants

were asked to express the degree to which they agreed with the following statements:

1. Family planning instructions are easy to learn,
2. Family planning instructions are easy to utilize,
3. Family planning services are easy to access,
4. Information given about family planning is easy to understand.

Degree of satisfaction was measured by dissatisfaction index calculated as follows:

$$\text{Dissatisfaction index (\%)} = 100 \times \frac{\text{Total expectation score} - \text{Total perception score}}{\text{Total expectation score}}$$

Clients were then classified as satisfied (dissatisfaction index < 0), dissatisfied (dissatisfaction index 0 to 25%), and strongly dissatisfied (dissatisfaction index > 25%).

To assess a participant attitude towards returning back to the specific health centers to seek family planning services, she asked to express the degree to which she agreed with the following statements. The attitude was then computed by summing scores of three statements.

1. The quality of the family planning services provided by health care centers was good.
2. I was satisfied by the quality of the family planning services provided by health care centers.
3. I will refer to this health care center for family planning services.

For each client willingness to come again to her health center was calculated by summing scores for each item. We used cut-point of 12 to categorize clients to those who were (willingness score > 12) and were not (willingness score ≤ 12) willing to come again to their health centers.

For the health care providers, they were asked to respond to their expectancies of service quality that their health center should provide and to their perception of the service quality actually delivered at their health center.

All respondents were asked to mark their extents of expectations and perceptions on a 7-point scale ranging from 1 (much below my expectation/perception) to 7 (much beyond my expectati-

on/perception). They were also asked to mark the extent to which they believed a dimension of service quality was important on a 7-point scale from 1 (not important at all) to 7 (extremely important).

Statistics

Data are presented as frequencies (%) and mean (SD) for categorically and continuously (or ordinal) distributed variables, respectively. Statistical significances of the gaps under the investigation were tested using the analysis of the covariance; as such, we ran a series of general linear regression models for repeated measures. Models were adjusted for age and levels of education. Components of the attitude of the participants for the quality of family planning services were assessed using generalized linear regression models. Poisson function was used to link the clients' expectation-perception gap to their attitude. Two nested logistic regression models were developed with willingness to return to the health center as outcome. Model 1 incorporated SURVQUAL scale items and model 2 incorporated usability in addition to Model 1. Clinical usefulness of the usability was assessed by following strategies:

Goodness-of-fit-How effectively a model describes the outcome variable is referred to as its goodness-of-fit. We used following measures of goodness-of-fit: Bayesian information criteria and Akaike information criterion (AIC). Difference in AIC >10 was considered significant (Akaike, 1974).

Discrimination- Discrimination is quantified by Harrell's C statistic. It measures the probability that a randomly selected person willing to come again to her health center, has a higher risk score than a randomly selected person not willing to come again to her health center (Harrell et al., 1996)

We set the statistical significance level at a two-tailed type I error of 0.05. All statistical analyses were performed using STATA version 12 (STATA, College Station, Texas USA).

Results

Mean age of the clients was 30.9 (6.9) years and those of health care providers was 37.5 (8.2) years. Among women seeking care from health centers, 28.4% had at least 12 years of education, with 59.2% having academic degree, and another 12.4%

postgraduate degree. Among health care providers 23.0% had at least 4 year academic education and 77.0% had postgraduate education. About 13% of participants self-reported to be employed. Condom was used by 41.6% of women as a contraception method, oral contraceptive pill by 17.6%, intrauterine device (IUD) by 25.4%, injectable contraceptive (Depot Medroxy Progesterone Acetate, DMPA) by 4.0%, vasectomy by 1.6%, tubal ligation by 1.0%, and Withdrawal (natural method) by 7.6%. About one percent of participants were not using any contraception method. During 2007, majority of participants (65.4%) visited the health centers at least 11 times, with 5.4% having one visit, 16.1% 2-5 visits, and 13.1% 6-10 visits.

Table 1 presents expectations of Outpatient Service Quality (participants believed A Health Center Should Offer) and Perceptions of Outpatient Service Quality (participants believed The Specific Health Center Actually Delivers to clients). Health care providers-Clients gap with respect to either expectations or perceptions were trivial and statistically not significant, neither before nor after adjustment for education levels (P -values>0.2). Generally, neither expectations of clients nor those of health care provider were met by the health centers as indicated by significant differences between the expectation and perception; this implied to almost all dimensions of the Outpatient Service Quality and each components of each dimension.

Table 2 shows the perceptions as a fraction (percent) of expectations. Generally, more than 90% of expectations of both clients and providers were perceived to be met by health centers. Expectation-perception gaps were 5.9% (95% CIs: 4.8-7.0%) and 8.0% (95% CIs: 6.2-9.9%) for clients and health care providers, respectively. The observed gap was slightly wider for health care providers (P -value=0.06). However, when the effects of age and education were taken into account, the gap observed to be wider among clients [12.7% (95% CIs: 9.8-15.6%)] than health care providers [9.1% (95% CIs: 4.6-13.6%)]; the difference was not statistically significant, though (P -value=0.254). The widest and the narrowest expectation-perception-gaps observed were those of tangibility and usability, respectively (P -values<0.001).

Table 1. Expectations of Outpatient Service Quality (A Health Center Should Offer) and Perceptions of Outpatient Service Quality (The Specific Health Center Actually Delivers)

	Exp.	Perc.	Gap	Sig.	Exp.	Perc.	Gap	Sig.
Tangibility								
Excellent health centers should have modern looking equipment	6.44	4.73	-1.71	0.000	6.41	4.96	-1.42	0.000
The physical facilities at excellent health centers should be visually appealing	6.04	4.89	-1.61	0.000	6.46	4.96	-1.53	0.000
Personnel of excellent health centers should be neat in appearance	6.64	6.26	-0.38	0.000	6.73	6.15	-0.58	0.000
Total	5.71	4.75	-0.96	0.000	5.88	4.80	-1.08	0.000
Reliability								
When a patient has a problem, excellent health centers should show a sincere interest in solving it.	6.72	6.20	-0.52	0.000	6.84	6.30	-0.54	0.000
Excellent health centers should provide their services at the time they promise to do so	6.59	6.23	-0.36	0.000	6.71	6.16	-0.55	0.000
Total	6.20	5.79	-0.39	0.000	6.39	5.86	-0.52	0.000
Responsiveness								
Personnel of excellent health centers should tell patients exactly when services are provided.	6.49	6.24	-0.24	0.000	6.45	6.13	-0.28	0.000
Personnel of excellent health centers should give prompt services to patients.	6.49	6.20	-0.29	0.000	6.56	6.12	-0.52	0.000
Personnel of excellent health centers should always be willing to help patients.	6.48	6.30	-0.18	0.000	6.67	6.22	-0.44	0.000
Total	5.99	5.76	-0.22	0.000	5.98	5.61	-0.37	0.000
Assurance								
Behaviors of personnel in excellent health centers should instill confidence in patients	6.58	6.34	-0.24	0.000	6.76	6.43	-0.33	0.000
Patients should be able to feel safe while they receive services from personnel of excellent health centers .	6.61	6.38	-0.22	0.000	6.64	6.20	-0.44	0.000
Personnel of excellent health centers should be consistently courteous with their patients.	6.68	6.48	-0.20	0.000	6.82	6.38	-0.44	0.000
Personnel of excellent health centers should have the knowledge and skills to respond to patients' requirements.	6.56	6.41	-0.15	0.000	6.74	6.36	-0.38	0.000
Total	6.24	6.03	-0.20	0.000	6.46	6.08	-0.38	0.000
Empathy								
Excellent health centers' operating hours should be convenient to all patients and their families.	6.34	5.97	-0.38	0.000	6.38	6.00	-0.38	0.000
Excellent health centers should give patients individual attention.	6.21	5.83	-0.38	0.000	6.41	5.86	-0.66	0.000
Excellent health centers should have the patients' best interest at heart.	6.37	6.22	-0.15	0.014	6.45	6.20	-0.42	0.000
Total	5.70	5.41	0.29	0.000	5.87	5.42	-0.43	0.000
Usability								
Excellent health centers' instructions should be easy to learn	6.41	6.32	-0.09	0.000	6.45	6.40	-0.05	0.604
Excellent health centers' services should be easy to use	6.27	6.34	-0.07	0.0262	6.13	6.05	-0.07	0.483
Excellent health centers' services should be easy to access	6.32	6.14	-0.17	0.040	6.27	5.91	-0.36	0.001
Excellent health centers' services should be easy to comprehend	6.43	6.38	-0.05	0.299	6.32	6.13	-0.18	0.050
Total	5.96	5.88	-0.08	0.035	5.77	5.61	-0.05	0.024
Total Outpatient Service Quality	5.97	5.59	-0.37	0.000	6.06	5.56	-0.05	0.000
Exp., expectation; Perc., perception; Sig., P- value								

Table 2. Dissatisfaction index for clients and providers across dimensions of Outpatient Service Quality

	Observation (n)	Mean (%)
Clients		
Tangibility	490	15.4 (13.3-17.5)
Reliability	493	5.6 (4.1-7.2)
Responsiveness	484	2.6 (0.9-4.3)
Assurance	488	2.3 (1.0-3.6)
Empathy	487	4.0 (2.3-5.7)
Usability	486	-1.7 (-4.0-0.6)
Total service quality	440	5.9 (4.8-7.0)
Health Care Providers		
Tangibility	165	17.3 (14.2-20.5)
Reliability	165	7.3 (4.5-10.0)
Responsiveness	165	5.9 (3.6-8.3)
Assurance	165	5.4 (3.4-7.4)
Empathy	165	7.2 (4.8-9.6)
Usability	165	0.6 (-2.7-4.0)
Total service quality	165	8.0 (6.2-9.9)

Satisfaction index indicated that 27% of participants were satisfied, 64.5% were dissatisfied, and another 8.0% were strongly dissatisfied.

As shown in Table 3, among both clients and health care providers, increasing levels of education was associated with increased expectation-perception-gap. The effect of education on expectation-perception-gap was more prominent among clients (P-value for interaction=0.035).

As compared to clients who were satisfied by health care provided by their health centers (dissatisfaction index < 0), strongly dissatisfied clients (dissatisfaction index > 25%) were 32% less likely

to return to their health center for seeking family planning care. As shown in Table 3, in the univariate Poisson regression model, all dimensions of SURVQUAL scale predicted the clients' come-again willingness to their health care centers. When we included all 6 dimensions of the SURVQUAL scale simultaneously in the Poisson regression model, the dimension of responsiveness remained to be independently and statistically significantly associated with willingness of participants to seek family planning care from their health centers in the future (Table 4). No matter how satisfied with other dimensions of the Outpatient Service Quality, clients who were strongly dissatisfied with the responsiveness of their health care centers were 12% less likely to be willing to seek care from their health centers in the future (P-value=0.026).

With willingness to come again to health center as outcome variable we build two nested logistic regression model. Model 1 incorporated the five components of the SERVQUAL scale and the model 2 included the dimension of the usability in addition to model 1. The AIC, BIC, and Harrell's C index of the model 1 (AIC 119, BIC 144, Harrell's C index 0.850) did not improved by adding usability (AIC 121, BIC 150, Harrell's C index 0.848). The best model was the model incorporating responsiveness and assurance (AIC 111, BIC 127, Harrell's C index 0.834).

Discussion

We studied the gap between provider-centered and client-centered approaches in the field of family planning cares. Quantified herein, is the width of the gap in four dimensions of women's expectation-perception gap, providers expectati-

Table 3. Effect of education levels on gap between expectations from and perceptions of outpatient service quality

	Education level	Mean gap (95% Confidence Interval)
Clients ^a	≤12 years	-0.31 (-0.38,-0.24)
	12-16 years	-0.60 (-0.75,-0.45)
	≥17 years	-1.76 (-2.34,-1.18)
Health care providers ^b	≤12 years	-0.27 (-1.07,0.53)
	12-16 years	-0.46 (-0.57,-0.35)
	≥17 years	-1.19 (-1.65,-0.73)

a. Covariates appearing in the model are evaluated at the following values: age (years) = 30.79.

b. Covariates appearing in the model are evaluated at the following values: age (years) = 37.53.

Table 4. Effect of dissatisfaction index¹ on the clients' attitude towards returning to their health center in the future

	N	(%)	Relative risk (95% CIs)	P value
Tangibility				
Dissatisfied ²	365	55.7	0.98 (0.92-1.04)	0.497
Strongly dissatisfied ³	202	30.8	0.88 (0.83-0.94)	0.000
Reliability				
Dissatisfied ²	505	76.8	1.03 (0.97-1.09)	0.373
Strongly dissatisfied ³	72	10.9	0.79 (0.72-0.87)	0.000
Responsiveness				
Dissatisfied ²	420	64.7	1.00 (0.96- 1.05)	0.903
Strongly dissatisfied ³	66	10.2	0.77 (0.71-0.84)	0.000
Assurance				
Dissatisfied ²	491	75.2	1.00 (0.95-1.05)	0.882
Strongly dissatisfied ³	36	5.5	0.73 (0.65-0.82)	0.000
Empathy				
Dissatisfied ²	450	69.0	1.00 (0.95-1.05)	0.922
Strongly dissatisfied ³	60	9.2	0.83 (0.76-0.90)	0.000
Usability				
Dissatisfied ²	425	65.3	1.00 (0.95-1.04)	0.941
Strongly dissatisfied ³	35	5.4	0.82 (0.73-0.91)	0.000

Dimensions were introduced to a univariate model each at a time.

Dissatisfaction index <0

Dissatisfaction index less 0-25%

Dissatisfaction index more than >25%

on-perception gap, clients-providers expectation gap, and clients-providers perception gap. We studied predictability for clients' dissatisfaction of previously determined five dimensions of the care as measured by SERVQUAL scale (i.e. tangibility, reliability, responsiveness, assurance, end empathy). We also tested the hypothesis that a sixth dimension of usability can improve discriminative predictability of the SERVQUAL scale for separating those who are from those who are not satisfied with family planning care provided health centers.

We documented a modest gap (< 10% of expectations) between what is expected from and what is perceived of the family planning care provided by health centers. The gap did exist from both clients' and providers' points of view. Providers' expectation-perception gap was wider than clients'. However, when we take into account the effect of education, the difference between providers and clients was no longer statistically significant. We observed that the gap between clients' and providers' expectations

was negligible; the same applies to the clients' and providers' perceptions.

Our finding of interest was that the education was associated with the expectation-perception gap among both clients and health care providers. Education level modified the difference between clients and health care providers in respect of the magnitude of the expectation-perception gap. In the light of increasing trends in the level of literacy, particularly among women (Goldstein, 2004, UNESCO, 2002), our finding should be looked upon as an alarm to the health care providing system. As developing countries fast-forward to the future of development, they will face clients' expectations of an ever-escalating nature. Development naturally increases the availability, accessibility, and affordability of the information technologies (Edejer, 2000). Becoming acquainted with modernistic and post-modernistic health care systems, the clients' will envisage new horizons and bring more unexplored territories into health care providers view.

Table 5. Effect of dissatisfaction index¹ on the clients' attitude towards returning to their health center in the future

	N	(%)	Relative risk (95% CIs)	P value
Model 1				
Tangibility				
Dissatisfied ²	365	55.7	0.98 (0.92-1.05)	0.566
Strongly dissatisfied ³	202	30.8	0.93 (0.87-1.00)	0.062
Reliability				
Dissatisfied ²	505	76.8	1.02 (0.96-1.09)	0.511
Strongly dissatisfied ³	72	10.9	0.91 (0.82-1.01)	0.089
Responsiveness				
Dissatisfied ²	420	64.7	1.01 (0.95-1.06)	0.847
Strongly dissatisfied³	66	10.2	0.88 (0.79-0.99)	0.026
Assurance				
Dissatisfied ²	491	75.2	1.00 (0.94-1.06)	0.929
Strongly dissatisfied ³	36	5.5	0.89 (0.78-1.02)	0.09
Empathy				
Dissatisfied ²	450	69.0	1.01 (0.95-1.07)	0.819
Strongly dissatisfied ³	60	9.2	0.96 (0.87-1.07)	0.489
Usability				
Dissatisfied ²	425	65.3	1.00 (0.95-1.05)	0.999
Strongly dissatisfied ³	35	5.4	0.96 (0.85-1.08)	0.500
Model 2				
Total Service Quality				
Dissatisfied ²	282	64.5	0.96 (0.91-1.07)	0.723
Strongly dissatisfied ³	37	8.5	0.68 (0.63-0.75)	0.000

Model 1 included dimensions of Outpatient Service Quality simultaneously.

Model 2 included Total Outpatient Service Quality only.

Dissatisfaction index <0

Dissatisfaction index less 0-25%

Dissatisfaction index more than >25%

Table 6. Contribution of dissatisfaction in different dimensions of the Outpatient Service Quality to the willingness to come again to health center

	Odds ratio (95% CIs)	P-Value
Tangibility	0.66 (0.25-1.73)	0.394
Reliability	0.84 (0.28-2.54)	0.752
Responsiveness	0.19 (0.06-0.65)	0.008
Assurance	0.37 (0.12-1.11)	0.076
Empathy	0.59 (0.20-1.68)	0.319
Usability	1.75 (0.66-4.66)	0.264

Participants who were not satisfied by responsiveness and assurance were respectively 81% and 63% less likely to be come again to their health center.

In the univariate analysis, all dimensions of Outpatient Service Quality predicted the clients' willingness to come again to their health care centers. However, when the dimensions of Outpatient

Service Quality were simultaneously introduced into a multivariate model, only the dimension of responsiveness remained independently associated with the clients' willingness to come again to their health care centers. This finding might have had its root in the fact that items of the SRVQUAL scale are highly correlated. Adding usability to SERVQUAL scale for identifying clients who would not come again to their health centers, neither did improve the fitness of the SRVQUAL nor the predictive discriminatory capacity of it.

Quality of care in family planning is a difficult concept to measure since it is inherently multi-factorial with many factors being subjective in nature. Because family planning programs were developed largely in response to rapid demographic growth, their evaluation has concentrated on fulfillment of quantified goals such as numbers of new users, co-

verage, or prevalence. Such measures give no indication of the relative satisfaction or dissatisfaction of users (Sai, 1997). Family planning programs seeking high volume tend to have many new acceptors with low continuation rates, and a choice of methods limited to those considered highly effective and easy to distribute. In recent years, however, community pressure for greater attention to users' needs and disappointment with results of programs oriented to obtaining high rates of new users have prompted greater attention to satisfaction of family planning clients and to quality of services (Diaz and Halbe, 1990). The reproductive health approach to family planning shifts the focus of service provision from macro-level demographic objectives to meeting clients' needs (Sai, 1997). Little field experience exists to date, however, to indicate how to implement this approach. It has been shown that the client-centered intervention was successful in enhancing service providers' knowledge and improving the content of information exchange between providers and clients (Costello et al., 2001). Concern for client's rights in the provision of reproductive health services in the developing world has prompted intense efforts by international experts to promote client-centered models of communication as a replacement for more provider-centered approaches. Nonetheless, the usefulness or feasibility of cross-cultural transplantation of client-centered models of communication has not been examined. Findings of a study from Egypt suggest that, as in more developed countries, client-centered models of communication are likely to produce better client outcomes than provider-centered models, with no substantial changes in the structure of services (Abdel-Tawab and Roter, 2002). Despite the importance and frequency of use of family planning services, and a vast literature on accessibility of services, data are scarce regarding their quality. Further research in this area is an important priority, given interest in and attention to health care quality generally in the United States and the evidence of problems with quality across diverse health services. It is important for the family planning field to learn whether quality problems exist and, if so, to develop strategies to address them (Becker et al., 2007).

Limitations and strength

The study client sample was confined to women. We had no data on availability of other choices from which to seek family planning services. Having no other choice might have confounded the association between expectation-perception gap and willingness to come again. Less than three percent of the clients self-reported to be unwilling to come again to their health center; we, therefore, might have not had sufficient statistical power to capture the impact of individual dimensions of the out-patient family planning service quality.

Conclusion

We observed that more than 90% of the clients' expectations from family planning services are currently being met by health centers and that among different dimensions of the outpatient service quality; the widest gap belongs to dimension of the tangibility indicating some deficits in infrastructures. Willingness to come again to a health center was strongly and statistically significantly associated with the extent to which the health care providers were responsive (as perceived by clients). Family planning services provided by health centers were found by clients to be easy to use. Usability, however, did not provide any predictive ability above or beyond SERVQUAL scale.

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Elderly injury prevention perspectives: A qualitative study of elderly people in different socioeconomic strata within a Safe Community in Shanghai

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Abstract

Injuries represent an important cause of health problems among elderly people. The study has explored the perspectives and ideas of elderly people from different socioeconomic groups in terms of their injury-related issues. This paper examines a Safe Community accredited by the WHO Community Safety program. The community has three different residential sections labeled as Section-A, Section-B and Section-C, representing high, medium and low socioeconomic status of the residents respectively. Three focus group discussions (FGDs) were organized from three residential sections separately with 8 to 12 elderly people (> 60years) in each group. Elderly people from Section-A were more concerned about emotional abuse whilst those from Sections B and C thought that fall and traffic injuries were most common injuries. In Section-A, the most frequent risk factors were age, mental status and other people's unsafe behavior. In Section-B risk factors were age, environment and safety procedures. In Section-C, risk factors were environments, age and disease. For injury prevention, the elderly in A and B Sections thought that education should be improved while in C Section they emphasized environmental improvements. The perspectives and needs in terms of injury prevention among elderly people from different socioeconomic levels were not the same. When local governments develop their injury prevention plans and strategies, those differences should be considered.

Key words: Elderly, focus group discussion, injury, socioeconomic, safe community, China.

Introduction

The health of elderly populations is an important emerging public health problem. Elderly adults are at higher risk for many types of injuries that can lead to longstanding pain, functional impairment, disability, and death. Injuries amongst the elderly have several social, familial and economic effects beside the health issues. The problem is worsening, with the rates of such injuries rising in many areas, as is the number of elderly people in both developed and developing countries (1). Injury including poisoning is the fourth leading cause of death in China, after circulatory system diseases, cancer and respiratory system diseases (2).

The ageing population in China over 60 years old reached 167 million in 2009, which means that one in every eight Chinese person is classified as elderly. The number of elderly people in China is growing fast, in conditions of an underdeveloped economy and a need for better relevant social security and welfare services (3). The average life expectancy in China is 81.73 years (male 79.42 and female 84.06). In Shanghai the elderly people constitute almost 23 percent of the total registered 13.79 million population (2). Elderly adults are at higher risk of different type of injuries, with associated high socioeconomic burden. Overall, as with other developing countries, the injury situation of the elderly population in China is of serious concern, but scientifically underexplored (4,5).

A growing body of literature has demonstrated that characteristics of communities where people live, such as family stability, housing conditions, income and wealth, crime, unemployment rate, segregation, and political empowerment, influence

health outcomes and behaviour (6-8). Social inequalities in injury mortality exist for both persons and places. Policies or interventions aimed at preventing or controlling injuries should take into account not only the socioeconomic characteristics of people but also of the places in which they live (6). The statement is also very pertinent for elderly people.

The World Health Organization (WHO) has been promoting community-based injury prevention through its international "Safe Community" model (9-11). So far, in mainland China, 32 communities have been designated as the members of the International Safe Community Network. For each designated community and those which are on the waiting list for inclusion, elderly injury prevention is one of the projects which has been given most attention. The results of a review of the application reports of the 32 designated communities showed that the most common strategy for elderly injury prevention was environmental improvement or renovation, such as the installation of handrails in bathrooms, using of slip-proof mats and night lights, etc. (12). Little attention was paid to the difference in the needs of elderly people from different socioeconomic groups. On the other hand, policy makers have implemented all the injury prevention measures. To the best of the authors' knowledge, no studies have been undertaken which have examined the perceptions and opinions of elderly people themselves, in relation to injury problems. The purpose of this study therefore was to explore the perspectives and ideas of the elderly from different socioeconomic groups in terms of injury-related issues. Specific research questions are: (1) What are their concerns, in terms of elderly injury, and what are the most common injuries in their daily life? (2) What do they think about risk factors which may lead to injury occurrence and how do injuries affect their daily life? and (3) what are their suggestions in relation to elderly injury prevention?

Methods

Focus group discussions (FGD) were used to communicate with elderly people face to face. The interviewed elderly people (over 60 years old) came from a Safe Community in Shanghai. With reference to the socioeconomic gradient in Shanghai city, the Safe Community was divided

into three different residential Sections labeled as Section-A, Section-B and Section-C.

In Section-A there are many high grade expensive apartments associated with a relatively high social economic status. These apartments were purchased at a very high price (more than 50 000 RMB), thus indicating a high socioeconomic status of the residents.

In Section-B the apartments are not as expensive as those in Section-A, but their value is in the middle level in terms of social economic status. The prices of these apartments are not so high (20 000 – 50 000 RMB) as those in Section A. However the residents must purchase their apartments, which indicate a medium socioeconomic status of the residents.

In Section-C the residents live in very old, humble houses or apartments. The apartments were allocated by the government many years ago. Nowadays some of these apartments are for sale at a very much lower prices (less than 20 000 RMB) compared with Section A and B, indicating low socioeconomic status of the residents.

Each residential area has a residential committee. The committee is very familiar with the neighborhood and with the residents. The residential committee has a list of elderly persons in each building and it is responsible for their well being, such as by the delivery of messages, giving information, responding to enquiries etc. Those persons also have very strong and active social relationship with the residents.

In current study, when the study objective was explained to the residential committees, they provided the list of potential elderly respondents. Those potential elderly people were then approached for inclusion in the focus group discussions. From each committee the elderly people recommended which respondents should be finally selected/ included in the current study.

Given the different socioeconomic conditions within the three residential sections, it was felt that it would be best for focus groups to comprise only individuals from the same residential section. Doing so would help to ensure that the individuals within each group are of similar socioeconomic background and status. Taking such factors into account should facilitate discussion within the focus groups. Therefore three focus groups were organized from three residential sections separately, that is, A-, B- and C- Sections. Each focus

group consisted of 8 to 12 elderly people.

Each FGD lasted for around 90 minutes and was recorded after getting permission from all participants. The FGD had a leader who was from community office and who not only had the professional skills to control the discussion but also was familiar with injury prevention and community safety issues. Two research assistants were present to record and to take notes of the conversations. Among the general questions included in this FGD, specific questions were included which would more closely reflect the study purpose. All the questions were open ended.

Data analysis

The recordings of the focus group discussions were transcribed. Category development was based on thematic framework theory (13, 14). Maxqda qualitative analysis software was used to code, index and summarize the transcribed text. The information arising from the analysis was also complemented with the observational notes made during the focus group sessions (15).

Finally the Chinese version of the analyses were translated into English. Two highly skilled injury researchers with advanced knowledge of writing and speaking both Chinese and English did the translation. To help ensure high accuracy, a translation and back-translation method was used for the language conversion.

Ethical issues

The study received ethical permission from the ethical committee of the Fudan University, China (International registration number: IRB00002408&FWA00002399). Considering the illiteracy problem of the prospective study population in some socioeconomic sections, the current study had sought 'verbal consent' of the study participants, approved by the ethical committee. To receive permission from the participants the study team explained to the elderly adults that the FGD recording would only be used for research purposes. The study will therefore only refer to their comments, without mentioning their names and any other personal information. Only core researchers can access the records. Rights of withdrawal and data protection methods were also explained to the FGD group members.

Results

The mean age of the respondents was 69.56 years (Section-A: 68.6 ± 3.0 ; Section-B: 69.7 ± 7.4 ; Section-C 70.4 ± 8.9). The majority of the respondents were female (28 out of 34 participants).

FGD analysis

Injuries amongst the elderly

Section-A: The elderly people thought that emotional abuse was the most common problem, followed by traffic injuries and falls. Examples of statements from the elderly in Section-A were as below:

"I seldom go to the farm market. However when I go to the market to buy food I found that the ground was wet every time and difficult to walk."

"I would say that when crossing the road, pedestrians follow the traffic rules. But there are some bicycle or moped-riders who don't care about the traffic lights. They kept driving when the red light was on. It was very unsafe and likely to cause injury."

"I feel that for elderly people respect is the most important. As long as we get the respect of society we feel very happy, otherwise we feel very upset, especially with bad words and behavior. This makes me sad and disturbed which often leads me to be more vulnerable to injuries."

Section-B: The elderly think that falls, collisions, traffic injury, and being hit by falling objects from high buildings are the most common problems. Statements from the elderly in section-B were as below:

"The most common injures are falls, being hit by falling objects, collision, physical and emotional violence In most of the cases the elderly do not take any preventive measures."

"For example when we went to the farm market there were some problems. The surface of the ground is very slippery. When we walk on the slippery road we are very scared of falling like the women in very old days with very, very small feet".

"There is fear of thieves who normally come during the night. They look for money and even hurt or kill people. We have suggested installing a camera in front of the door which would make us feel much safer."

Section-C: The elderly thought that falls, traffic injuries, poisoning, being hit by objects

falling from high buildings, and suicide are most common. Statements from the elderly in Section-C were as below:

“When we walk on the street, if the cars go fast we become scared and more likely to get fall injuries, even fractures.”

“He just talked about the kitchen. Since we are getting older sometimes I can easily forget the things what I am doing, especially since last year. Taking the example of boiling water, sometimes when I remembered to turn off the gas there was only half of the water left. If I found it later it might have lead to fire and burn injuries.”

“Particularly on some roads there are so many cars. If you went in the afternoon you could see the fast driving. Even when turning they do not slow down. It is very dangerous.”

Risk factors

The most frequently mentioned risk factors by the elderly were age, diseases, social and psychological factors, living environments, and other people's bad behaviours. Those factors lead to most of the injuries occurring among the elderly, including falls traffic accidents, emotional abuse and suicide etc. (Table 1).

Table 1. Risk factors of injury from the perspective of elderly people

	Risk Factors				
	Age related factors	Disease related factors	Social psychologic factors	Environmental factors	Bad behavior of others
A Section	Memory decline, Physical function decline, Limited the ability of daily living		Lack of respect leading to feeling lost, The impulse to take things too hard, Feel inferior due to role change	The interval of traffic light is too short, The elevator is closed during a certain time period of a day, Slippery ground, Noise, Poor management of pets, Family dispute.	Not give seats to elderly in the bus, Not respect for the elderly, Violation of traffic rules, Objects thrown down from high buildings.
B Section	Memory decline	Infectious disease		Slippery floor, Road occupied by vendors, Security issues , Road congestion, Covers missing, Uneven ground, Too many cars, Loud horn sound, Drip of air conditioning, Hangers drop from buildings, Security window not high enough, House decoration, Unclean water, Family dispute.	Violation of traffic rules
C Section	Physical function decline, Memory decline, decreased perception	Osteoporosis, Dementia, Diseased difficult to cure	Changes in family roles, Lack of care, Feel lonely, Pessimistic	Many vehicles, Noise, Limited space, Poor surrounding environment, Uneven roads, Poor management, Security issues, Road occupied by vendors, Slippery and wet road surface, Poor lighting.	Not respect for the elderly, Violation of traffic rules, Park in undesignated areas, Not in accordance with the provisions of kitchen fume emissions, Unauthorized access of electric wires, Objects thrown down from high buildings.

Section-A: Age, mental status, other people's unsafe behavior are the main risk factors which may result in injuries amongst the elderly. Psychological distress was mentioned many times.

"Unharmonious situations within the family may result in a lot of mental and physical harm. For example property disputes, house disputes...."

"The interval of traffic lights is too short to let the elderly pass through easily. I need to pick up my grandson from school every day at 3:50 pm since his parents are still in their office. As my knee joints are not functioning very well, every time when I walk half of the crossing of the road, the traffic light changes and becomes green which puts me in a difficult situation."

"When we cross the road we behave very well but some other people do not obey the traffic laws, which may result in us being injured."

"Another point is about noise. During the night, even at midnight, loud sounds of car horns come from the street and neighbourhood which affect us a lot. Sometimes when people come back to parking bays, the drivers keep sounding their horns to draw the attention of the security people, which generates a lot of noise. We can not sleep well and in morning we can feel dizziness, which increases the chance of falling."

"In our neighbourhood many people walk with dogs. When the dogs bark, we, elderly people, are easily threatened and become vulnerable to injury, especially in the elevator."

Section-B: Age and environment were considered as the two main risk factors. The elderly were more concerned about safety measures.

"Some stores along the road put their goods or articles on the side of pedestrian roads. It is difficult for pedestrians to go through. The eyesight of the elderly is not good and it is much easier to get hurt there."

"There are a lot of cars coming to our neighbourhood every day. When a car horn sounds suddenly, the elderly can be easily frightened and fall."

"If the public places such as the food market and commercial areas are very crowded the elderly people are highly vulnerable to fall injury."

Section-C: Environments, age and disease were the top three concerns. Their main concerns were safety measures which were not well installed and well maintained.

"Our neighbourhood is very old with uneven pedestrian paths. On those roads it is very easy for the elderly to fall and get fractures."

"Big cooking stoves are constructed at the bottom of stairs and these affect the whole building inside with dangerous carbon monoxide and other gases which leads to air poisoning."

The impact of injuries on elderly people's daily life

Irrespective of socioeconomic strata, almost all participants identified physical suffering and individual and family inconvenience as being problems associated with injuries. However they were most concerned about the impact on their family, especially on children. They stated that their injuries disturbed children's daily life, brought mental burdens to the children and put the family in difficult situations, including family disputes because of injury issues and many other personal issues. Respondents from Section-b and Section-C also mentioned the economic burden of their injuries to their families.

Injury prevention

Section-A: The elderly people suggested that health education and paying attention to psychological factors should be considered in relation to injury prevention. The focus should be put on advocacy and the mobilization of society to care for and respect elderly people.

"I feel it is important to educate the whole society with respect to the elderly. The government should take the responsibility to organize these kind of activities or education."

"There are some very simple methods to remind people about safety issues such as putting a note on the stove or washroom. For example, don't forget to turn off the gas', 'beware of slipping' etc."

"There should be separate lanes for pedestrians and vehicles. Sometimes pedestrians and vehicles use the same road, which is very dangerous."

"Pet owners should hold authorization certificates and be trained about handling pets at public places. This would also control the number of dogs in the neighbourhood"

Section-B: The elderly people suggested helping the elderly to raise their awareness of injury

prevention, especially to paying attention for self-protection. For example, they should use slip-proof mats and install handrails in washing rooms.

“I’d suggest installing a camera at the entrance, which will make us feel safer.”

“To use slip-proof mat is a good idea.”

“The best way to prevent falls of the elderly in kitchens is not to let them cook.”

“I think less work for the elderly is the best prevention.” “Family harmony is the best way to prevent domestic violence.”

“Every family wants peace, wants security. The government needs to think from a wide perspective about how to educate people. Every family should actively participate in those activities.”

Section-C: The elderly suggested that the government should invest more in injury prevention, including road renovation, environmental improvement, installation of handrails and distribution of slip-proof mats to elderly people.

“Firstly, in terms of the environment, the government needs to create better conditions. Secondly, we need safety awareness, we need to involve and educate ourselves.”

“I hope that local government will pay more attention to road conditions, regardless of whether it is flat ground or sloping. Some of the road barriers should be clearer. In this way some fall injuries could be avoided.”

“When talking about injury prevention, publicity, publicity, and yet more publicity.” “Local government has done a few things regarding prevention of injuries of the elderly. The first thing is the installation of gas alarms. The second is the

distribution of slip-proof mats. And the third is installation of hand rails.”

The main findings of the prevention concepts are listed in table 2.

Discussion

The current paper has tried to explore the perception of daily life elderly injuries, risk factors and preventive aspects in relation to the elderly people through qualitative analyses. To the best of the authors’ knowledge, this is first qualitative study with elderly people from three different socioeconomic strata which focuses upon injuries. Elderly people have identified injury problems which are relevant to them, such as road conditions, reckless driving, burglary, short durations of traffic lights and emotional harm. Middle and low income elderly people mentioned that their injuries have immense economic and relationship impacts on their family members. In relation to preventive measures, the elderly people have mainly criticized the government authorities. They point out that the authorities have publicity stunts instead of having practical injury prevention activities. Irrespective of socioeconomic status, elderly people have emphasized the need for injury prevention awareness and for respect from family members and from society.

Focus group discussions are frequently used to obtain knowledge, perspectives and attitudes of people about issues, and to seek explanations for phenomena in a way that would be less easily accessible in response to direct questions, such as in one-to-one

Table 2. Intervention need to be conducted from the perspective of elderly people

	Personal attitude and awareness	Government intervention	Personal protection	Social participation
A Section	Publicity and education, Psychological counseling	Improve the safety facilities, Improve road conditions, Ensure security, Strictly punish illegal or bad activities or behaviors	Self-learning, Self-education, Participation in exercise	Respect, care for the elderly
B Section	Publicity and education	Improve the safety facilities, Improve road conditions, Ensure security, Strictly punish traffic violation and road occupation	Use of non-slip mats, Install handrails	Change behaviors which may cause harm to elderly people
C Section	Publicity and education	Improve the safety facilities, Improve road conditions, Ensure security, Strictly punish traffic violation and road occupation	Use of non-slip mats, Install handrails	Change behaviors which may cause harm to elderly people

interviews (16, 17). Focus groups show dimensions of understanding that often remain untapped or inaccessible by other forms of data collection (17, 18). Focus group discussions are particularly advantageous when the researcher wishes to find out, from the participants' perspectives, those issues which are most salient to them. Allowing participants to give information in their own linguistic style can lead to the identification of important phenomena of which the researcher had been unaware. Additionally, focus group methodologies may lead to the production of more elaborated accounts than would otherwise have been possible (19). During group discussions, attitudes and perceptions can be identified and developed through interaction with others in the groups (17). Using such methodologies in this study was successful in identifying salient factors affecting elderly people's risk for injuries.

Another important reason for using a focus group methodology in this study is that in China the illiteracy rate is still high compared with more developed countries (20). In JiangSu province, the study catchment area in the Shanghai neighbourhood, the illiteracy rate was 35.85% among people aged 65 years old and over, especially with females, where the rate was 52.80% (21). Therefore if questionnaires had been used, participants would have required help from other people when answering the questions: it would have been unrealistic to ask the elderly to fill in the questionnaires by themselves. Focus group interviews therefore enable the elderly to voice their own thinking about injuries and risk factors in a more satisfactory manner than might be achieved if other people were required to assist them.

Irrespective of elderly economic status, fall and traffic injuries were most mentioned as the most common injuries in elderly people by all three groups. The elderly in Section-A and Section-C especially mentioned psychological harm and their personal feelings, which could contribute to their feeling suicidal. According to the data of diseases surveillance and death-reporting system in Xuhui District of Shanghai during 2002-2006, the five leading causes of injury were fall, suicide, traffic injuries with motor vehicles and without motor vehicles, and poisoning which in total accounted for 97.76% of death by injury (22).

The current study showed that the elderly had considerable levels of awareness about the com-

mon injuries. However it must be noted that the causes of death are different for the elderly of different age groups as well. Study results have suggested that for the elderly aged 60 to 69 years old, the top two leading causes of death were suicide and motor vehicle traffic injuries. By contrast, in the elderly aged over 70, falls are the main reason with a mortality of 56.36/10⁵ (22). People from expensive residential areas tend to have a higher level of education and have considerably more stable work and important responsibility in work. After their retirement, they become more sensitive to psychological issues in their lives. This may be one of the reasons why the elderly people from Section-A are more concerned with psychological harm. This shift in focus might be explained by Maslow's 'Hierarchy of Needs theory', which suggests that when people's physical needs are relatively satisfied, they are more concerned with social needs and feelings of belonging (23).

Age and environments were considered as the most common risk factors for all the three groups. With aging, physical functions, such as the ability to maintain balance, can decline and this can lead to the elderly being more vulnerable to certain injuries. The elderly made special mentions of road conditions. Some were road maintenance issues; some were more complicated issues which need more investigation, for example the duration of traffic light sequencing. In relation to the environment, the elderly have noticed very detailed factors which would be very useful for intervention planning.

Lack of safety procedures were thought as a big risk for B and C groups. This is a concern for both the home and public places.

Comparing the elderly's statements with actual conditions is problematic. The statements and findings reflect that although several types of elderly injuries exist, the participants can focus upon the most common injuries (1). The findings of the risk factors of elderly injuries (table 1) have certainly supported the existing epidemiology of elderly injuries. However their statements are somewhat different. Lack of knowledge and awareness of injuries issues may be an explanatory factor for such situations. It should be noted, however, that as a result of the Safe Community movement, elderly people in the designated communities are being made increasingly more aware of injury issues (12).

Little differentiation was observed within each focus group discussion session. However, some important variability was found between sessions, which could be due to some specific exposures and experiences of the respondents (24). The main limitation of the study was that the study had participants from three different socioeconomic strata and three different FGDs. A common FGD from participants from all the three sections might be expected. However, considering the socioeconomic difference and cultural issues such joint FGD could not be organized.

FGDs have some inherent limitations, such as small sample sizes and the fact that they may be non-representative in nature. Therefore generalization of the findings is problematic. However as a preliminary method for investigating complex motivations and to identify a degree of consensus on the specific topic, an FGD approach was deemed the most appropriate research method for the current study. Participants were not randomly selected: recruitment of the study participants was deliberately made from three socioeconomic sections. In Shanghai, people live within distinctly separated socioeconomic strata. Therefore, depending upon the local socio-demographic conditions, selection of three sections (A, B & C) and their elderly inhabitants was an appropriate study design in the current context.

Using three different FGDs fulfilled the study objectives and has provided further evidence that socioeconomic status determines the risk factors of elder injuries. (8 -10, 14, 22, 25).

In the present study, elderly people from different socioeconomic neighbourhoods were interviewed in order to gain information about their knowledge and perception of injuries. Participants in this study were selected on the basis that they should be able to say something on the topic from their own perspective. The fact that within each focus group, respondents were within the same age range and from similar socioeconomic backgrounds should have helped ensure that they were comfortable in their discussions with the interviewer and with each other (26).

The findings have some very important policy implications. The elderly from middle class society believe that regular physical activities such as cooking, induce health hazards and more vulnerability to

injuries. However the literature indicates that regular work and physical activity are very effective for elderly people in relation to their health and safety promotion and for better livelihood (27, 28). Therefore, actions to eradicate such adverse notions should be implemented in order to improve the chances of a healthy life in elderly people. The Safe Community movement is an intensive alliance between the community, its people and stakeholders. In this context, Safe Community policy makers can take immediate steps to change the perceptions of the elderly so that they come to realise that physical activities are very important for their good health. Respondents also emphasized improving awareness. It is important to note here that most of the elderly respondents stated similar opinions about the need for interventions such as separate road use, slip-proof mats and reminder notes. In addition to physical, mental, social and economic effects, injuries can also have negative affects on family relationships. In China, which has a growing elderly population, policy makers should prioritize injury prevention activities as well as introducing awareness campaigns targeting elderly populations of different socioeconomic strata.

Conclusion

The perspectives and needs in terms in relation to injury prevention among elderly people from different social-economic levels are not the same. When local governments develop their injury prevention plans and strategies, those differences should be considered.

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Economical behavior analysis of public hospitals at Lorestan Province in benefiting from resources & presentation of services

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Abstract

Background: The real goal of this study was analyzing economical behavior of public hospitals of Medical Sciences University- Lorestan province in benefiting from resources and presentation of services.

Materials: This study was applicable-studies type based upon explanatory-analytical method which was performed in 2011. Research population includes 7 public hospitals of Medical Sciences University-Lorestan province. Cab-Douglas estimation logarithm of production function was used in this study for evaluation the economic behavior of public hospitals of Medical Sciences University-Lorestan province. All required data were collected on panel form (Time & Cross-sectional series) for a period of 11 years (1999-2009) through a field method. EVIEWS 5 Economic software was used for estimating of production function.

Results: The inputs of nurse (0.63), other personnel (-0.25), doctor (0.13) and bed (-0.08) have respectively the highest effects on production (the number of hospitalized patients) in concerned hospitals according to the findings of this study. There was a significant coefficient for all inputs except for hospital beds from statistical viewpoint ($p < 0.05$). Model determining coefficient had a very good limit ($R^2 = 0.99$). Furthermore total coefficients of production factors were lower than 1 (0.51) which was a sign of reducing production against the criteria.

Conclusions: According to the results, there is a great role for nurses in upgrading hospital production (hospitalized admissions). Also there was not a significant relation between the increase of hospital production and increasing the number of hospital beds. Low level of efficiency from production factor of hospital bed (low level of occupation of hospital beds) is the most important factor of meaningless efficiency coefficient of hospital bed and a reduction in production in comparison with the criteria.

Key words: Economic behavior, Hospital, Production function, Production input.

Introduction

Health & Therapeutic section is the most important sub-divisions of services in economy in a way that its function could be considered as one of the indexes of development and social welfare of a country. Therefore in most under-developing countries we have 5 to 10 percent of governmental costs allocated for this section (1). Any lack of efficiency and effectiveness of this section may cause a reduction in efficiency of other economic sections and reducing of public social welfare and further political problems (3). Therefore pay attention to economic benefits from production resources in health & therapeutic sector is the most important worries of policy makers and managers of Health System in all countries.

From among different parts of Health & Therapeutic Sector, we have hospitalization services as

the most important growth factor of costs in most countries which is quicker than other parts (4). More than %6.4 of domestic gross production in Iran is allocated to the relevant costs of Health & Therapeutic sector and about %40 of governmental health costs are related to hospitalizing cares (5). But in spite of allocated volume of resources for hospitals, right now there is a gap between the growths of available resources and required ones (6). Presence of any gap between available resources and required ones in Health & Therapeutic Section makes it inevitable to have economic benefits from resources. As a result health economy is a special field of study in economics which is really considered by economists and physicians.

Non-economic management of hospital will waste more resources like money, human forces, building and equipment. Such a waste means any creation of special level of products or obtained ones is possible even by applying lower resources (7). By applying economic principles and then evaluating the economic function of hospitals it is possible to modify any processes and continue the activities and have economic management of hospital industry as the high costs part of Health & Therapeutic sector (8).

As a servicing agency, hospital is obliged to use economic analysis for optimized benefit from its own production resources and facilities (6). The most important factors of production or production inputs in hospitals are physicians, nurses, other personnel, hospital beds and equipment (9). Furthermore production function is one of the most important economic tools in determining the role of all production factors (physician, nurse and bed and ...) in submission of hospital services. In fact we have production function may specify any relations between production and producing factors or inputs in a mathematical form as well (10). As a result production function is the most important economic tools for analyzing of economic behaviors of services agencies (like hospitals).

In order to submit a flexible form for production function of hospital, Sntisa specifies that benefiting from production functions in Health & Therapeutic Section is really common especially through Cobb-Douglas & Translog models and as an economic tool in analyzing any production relations (11) Meyer et al. used production function of hospitals

for evaluating the effects of Information Technology (IT) on hospital outputs. They believed that production function of hospital is a decision-helping tool that could be used for rationalizing the financial supply of hospitals (10). Also in another study about economy criteria and output of hospitals, Masayuki stated that: "Production function of hospitals is applicable through the production factors coefficients and output tension in comparison with the relevant criterion". He believed that production function of hospitals is a suitable tool for judgment any tension of production factors, economic output and efficiency of production resources (12).

In their study about production function of Medical Sciences University' hospitals at Qazvin province, Reza Pour & Asefzadeh stated that "estimation of production function of hospital is an economic tool for submission of hospital services" (6). From their point of view and as an economic tool, production function may assist better understanding of any relations among production factors with hospital services (6). In addition and in order to provide an estimation of production function of affiliated hospitals to Medical Sciences University at Uromieh province, Hadian stated that production function is a fundamental tool for making principle and scientific decisions for benefiting and combination of resources (13). Therefore any programming for increasing/ decreasing of production volume of hospital services and/or investment in developing of resources should be applied with complete knowledge about production function and any effects of production factors on the product. By the way there is not any complete study about estimating the production function of any hospitals at Lorestan province. The real goal of this study is benefiting from production functions and evaluation of economic behavior at related public hospitals to Medical Sciences University of Lorestan in benefiting from resources and further services.

Materials

The present study is applicable type which was performed in 2011 and on explanatory-analytical basis. Economic method and regression estimation of production function was applied in this study for evaluation of economic behavior of public hospitals related to Medical Sciences University of Lorestan

province for benefiting from production inputs and presentation of services. Research population includes 7 public hospitals related to Medical Sciences University – Lorestan province which has been studied completely without any further sampling. Study data were panel data in a way that their relevant data of a 11-years period from 1999 up to 2008 were applied with 6-months separation of 7 public hospitals at Lorestan province. It was possible to have 154 observations for performing of regression estimation. The real reason of benefiting from panel method was great advantages of this method in comparison with cross-sectional data and/or timer serial data. “The special priority of mentioned method was combination of cross sectional data with time serial ones with lower possible number of observations (13)”. Also we used data collection form for further collection of required data. The mentioned form includes different variants like total number of physicians, total number of nurses, number of other personnel, number of active beds, total number of hospitalized persons and occupation coefficient. The above-mentioned information was collected for all hospitals through a period of 11-years and registered in Excell2007 software with a separation of once per 6 moths. In order to draw relevant diagrams, we used Excell2007 software as well. Finally and in order to estimate regression model we used special economic Eview5 software accordingly.

The mentioned production function of this study is a two-end Cobb-Doglas logarithm one. The reason of which is the compatibility of this model with research data and further responding of repeating application of which in other similar studies (6 – 13,14).

Following is the form of mentioned model:

$$\text{Ln}(Y_{it}) = \beta_0 + \beta_1 \text{Ln}(\text{Bit}) + \beta_2 \text{Ln}(\text{Phit}) + \beta_3 \text{Ln}(\text{Nit}) + \beta_4 \text{Ln}(\text{Lit}) + e_{it}$$

Where:

$\text{Ln}(Y_{it})$ = Nepr logarithm of active beds' number in hospital i through t

$\text{Ln}(\text{Phit})$ = Nepr logarithm of physicians' number at hospital i through t

$\text{Ln}(\text{Lit})$ = Nepr logarithm of other personnel number at hospital i through t, And

e =Regression sediments related to hospital i through t

Then in above-mentioned logarithm form of Cobb-Doglass we have:

β_0 = Fixed amount of model (Width from the origin)

β_1 =Bed production tension

β_2 = Physician production tension

β_3 =Nurses production tension

β_4 =Other personnel production tension

Results

According to the findings of this study it was revealed that nurse inputs (0.63), other personnel (-0.25), physician (0.13) and bed (-0.08) have respectively the highest effects on production (the number of hospitalized patients) in concerned hospitals There was a significant coefficient for all inputs except for hospital beds from// There was a significant coefficient for all inputs except for hospital beds from statistical viewpoint ($p < 0.05$).

Model determining coefficient had a very good limit ($R^2 = 0.99$). Furthermore total coefficients for Dorbin Watson test was 2.02 and in an acceptable

Table 1. The results of regression estimation of production function

Variant	Coefficient	Numerical amount of effect coefficient (Production tension)	t data	P test
Width from function origin	-	6.700	9.222	
Bed	β_1	-0.083	-0.037	5.524
Physician	β_2	0.132	2.011	0.046
Nurse	β_3	0.635	2.98	0.003
Other personnel	β_4	-0.256	-1.99	0.048

$R^2 = 0.99$

$DW = 2.02$

range. The results of any estimation of production function are included in Table 1 as well.

All coefficients β_1 , β_2 , β_3 and β_4 are respectively the effect coefficient of bed, physician, nurse and other personnel at concerned hospitals. According to the obtained results in table 1, following is the production function of concerned hospitals:

$$\ln(Y) = -0.083 \ln(B) + 0.13 \ln(Ph) + 0.63 \ln(N) - 0.25 \ln(L) + e$$

In all above-mentioned functions we have y as the number of hospitalized admissions, B as the number of active beds, Ph as the number of physicians, N as the number of nurses, L as the number of other personnel. Also total number of significant coefficients of production factors was equal to 0.51.

Discussion & Conclusion

According to the findings of the study, production tension against production factor of physician in concerned hospitals is equal to 0.132 which is significant from statistical viewpoint ($P < 0.05$). The mentioned coefficient means that %1 increase in number of physicians may cause an increase of %0.132 in number of hospitalization admissions. Regarding a positive and significant situation of production tension against physician input, the result of present study is similar with the result obtained by Reza Pour & Haghparast (equal tension 0.57) (14), Reza Pour & Khalaj (equal tension 0.058) (15) and Hadian et al. (equal tension 1.08) (13), Somanathan (equal tension 0.18) (16). Also it is in contrast with the result obtained by Sabbagh Kermani (equal tension -0.18) (9) and Reza Pour Asef Zadeh (equal tension -0.55) (6). The major reasons of any discrepancies in mentioned coefficient and different studies are any differences in type of hospitals and wideness of research population. For instance, Sabbagh Kermani has studied production function estimation of Iranian hospitals by the use of cross sectional data of 287 excellent hospitals of country (9). Furthermore in a study by Reza Pour and Asef Zadeh about estimation the production function of Educational – Therapeutic Hospital of Medical Sciences University – Qazvin province, they consider a relation between negative input tensions of physician with additional physician force.

They have stated that: “Although physicians have a great role in therapeutic system, but employment of high number of physicians is a non-economic and non-efficient input accordingly”.

Production tension against production factor of nurse in considered hospitals is equal to 0.635 which is significant from statistical viewpoint ($P < 0.05$). The mentioned coefficient means that %1 increase in number of nurses may cause an increase of %0.635 in number of hospitalization admissions.

Regarding a positive and significant situation of production tension against nurse production factor, the result of present study is similar with the result obtained by Reza Pour & Haghparast (equal tension 0.33) (14), Reza Pour & Khalaj (equal tension 0.37) (15) and Hadian et al. (equal tension 3.4) (13), Sabbagh Kermani (equal tension 1.72) (9), Reza Pour & Asef Zadeh (equal tension 0.29) (6) and Somanathan (equal tension 0.67) (16). According to the results of the mentioned studies, it is obvious that there is a positive effect of nurse production input on hospital production even by excluding the type and wideness of research environment. From the viewpoint of further effects of nurse input, Hadian et al. (13) made a study about estimation the production function of affiliated hospitals of Medical Sciences University- Uromieh province which shows the highest rate of production tension against nurse production factor. The present study has studied also production factor of nurse with the highest rate of effects in production of considered hospitals. As a result it is proposed to consider any increase of number of nurses as the first alternative in order to increase the volume of services accordingly.

The coefficient of active bed production factor on production function of concerned hospitals was equal to -0.083 which was not significant from statistical viewpoint ($P < 0.05$). Such a meaningless variant shows that any increase in number of hospitalization admissions in concerned hospitals has no relation with increasing the number of hospital beds. The most important reason of which is low level of occupation coefficient of beds in considered hospitals. Regarding the obtained results this is necessary to say that production increase (hospitalization admissions) in mentioned years was not due to the increase of active hospitals beds but because of betterment in efficiency of current beds (or the

same increase in occupation coefficient of bed). Therefore it is recommended to increase bed occupation coefficient for further increase of output at considered hospitals in order to have a continuation in meaningful situation of mentioned coefficient.

Production tension against production factor of other personnel in current model was equal to -0.256 which is meaningful from statistical viewpoint ($P < 0.05$). The mentioned coefficient shows a %1 increase in number of other personnel which may cause about 0.256 reductions in production of services at concerned hospitals. From the viewpoint of negative production factor tension, the result of current study is similar with the result obtained by different studies made by Reza Pour & Hagh Parast (equal tension -0.07) (14), Reza Pour & Khalaj (equal tension -0.018) (15) and Somanathan (equal tension -0.33)(16) and also in contrast with the result of studies made by Sabbagh Kermani (equal tension 0.12) (9), Reza Pour & Asef Zadeh (equal tension 0.73) (6) and Hadian et al. (equal tension 2.8) (13). The reason of negative variant of other personnel is the great number more than necessary of this input. Such a result has been confirmed by a study made by Reza Pour & Hagh Parast (14), Reza Pour & Khalaj (15) and Somanathan (16).

In this study, total tension production factors are smaller than 1 (>1) and equal to 0.51 which is a sign of reducing output against the criterion. In other words, any increase in all production factors equal to a may cause an increase in production lower than a as well. By the way in other studies for estimation of production function at excellent hospitals of country [9], Medical Sciences University's hospitals of Iran [14], Medical Sciences University Hospitals – Qazvin province [6] and hospitals of Medical Sciences University of Uromieh [13], show an increasing output against the criterion. The real reason of decreasing output at considered hospitals in this study is low level of output of production factor of hospital beds (low occupation coefficient of hospital beds) and also applying more than necessary of other personnel that may cause a negative coefficient for both factors of bed production and other personnel.

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Satisfaction of users in primary health care

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Abstract

Introduction: Satisfaction is one of the variables affecting the outcomes of health care and use of services.

Objective: The study aims to determine the degree of satisfaction of patients with primary health care and factors that influence the overall satisfaction of health care.

Methods: Testing of patients' satisfaction with primary health care in three districts (Šumadijski, Zlatibor and Braničevski) is part of the general studie conducted in the Republic of Serbia. The cross sectional study, and, as a research instrument, a standardized questionnaire of the WHO were applied. The survey was conducted on 07th November 2005. in general medicine and occupational medicine of Shumadia, Zlatibor and Branicevo region. Data were forwarded to the Institute of Public Health of Serbia. The methods of statistics were used measures of χ^2 test and Spearman Correlation were used. Creation a database and statistical analysis were carried out in the statistical package SPSS 13.0.

Results: The strongest correlation was observed between the time spent waiting for medical examination and the time a physician devotes to the patient. As the patient spend less time waiting to be examined, there is more time for a doctor to pay attention to the patient in further contact ($R=0.646$). Further, the more time devoted to patient, makes his assessment of the competence of doctors to be better ($R=0.635$). Assessment of non-medical characteristics of doctors by patients also significantly correlated with the assessment of competence ($R=0.618$). More time devoted to patient makes the assessment of non-medical characteristics of doctors more positive ($r=0.574$). More information given to the patient positively correlated with grade of expertise of doctors ($R=0.570$).

Conclusion: The results indicate to the satisfactory quality of primary health care in terms of patients.

Key words: Patients satisfaction , primary health care, questionnaire.

Introduction

The declaration of the World Health Organization Alma Alte says that people have the right and obligation to participate, individually or in groups, in planning and implementing their own health care. In this way, the user who is passive recipient becomes an active participant - a partner in health care and responsibility for their own health is shared with other participants in the protection. (1)

Inclusion of the patients opinion, along with other elements, in to the decisions about organizing and providing of the health care, leads to it's progress. Evaluation of user satisfaction with health care (as a subjective dimension) has extremely great importance, analogous to the one that user, as the main subject, has in health care system. Patient satisfaction is a complex relationship between their perceived needs, expectations from the health service and experience with the services received. (2)

Satisfaction is one of the variables affecting the outcomes of health care and use of services. In order to improve the provision of care, predictors of dissatisfaction must be identified and eliminated. (3, 4)

User satisfaction with the health care is a basic component in evaluating health care quality. (5)

The importance of the patient's opinion and his perception of treatment and care at health facilities, is now recognized in all developed systems of health care. (6)

Measuring of customer satisfaction has a significant role in identifying problems in the health sector, as well as the location of key places to

which these problems can be linked. In this way, along with the objective evaluation of quality, satisfaction contributes to overall evaluation of system functioning and fulfilling its role.(7)

Aim

The study aims to determine the degree of satisfaction of patients with primary health care and factors that influence the overall satisfaction of health care.

Method

Testing of patients' satisfaction with primary health care in three districts (Šumadijski, Zlatibor and Braničevski) is part of the general studie conducted in the Republic of Serbia. The cross sectional study, and, as a research instrument, a standardized questionnaire of the WHO were applied. The survey was conducted on 07th November 2005. in general medicine and occupational medicine of Shumadia, Zlatibor and Branicevo region. The collected questionnaires were processed in health care facilities in a specially-prepared applications, and then submitted to the Institute of Public Health Kragujevac, Department of Public Health Uzice and the Department of Public Health Pozarevac. Data were forwarded to the Institute of Public Health of Serbia. The questionnaire contains 20 closed-type questions with multiple choice option. According to content, issues include socio-demographic profile of the surveyed patients: gender, age, marital status, education level and financial status. The second group of questions relates to the assessment of the availability of primary health care: a existence of permanent GPs, the waiting time for admission to the clinic, availability of doctor in an emergency. The third group of questions related to patient's satisfaction with the work of doctors and continuous assessment of its characteristics: dedication of doctors at work, his professional expertise, attitude toward patients, willingness to listen and inform patients about the state of health and a willingness to listen to personal problems of the patient. The fourth group of questions related to patient's satisfaction with the work of nurses: kindness, willingness to inform about a healthy lifestyle.

The average response rate in this study was 67.8%. The number of patients who refused to participate in the survey was less than 3% (compared to the total number of users who were using health services on the day of research), so the number of valid questionnaires, and therefore respondents was 5317. In the statistical analysis of data, the methods of descriptive and analytical statistics were used. The methods of descriptive statistics were used measures of central tendency (8), measures of variability (SD) and relative numbers. As from the analytical statistical methods, χ^2 test - contingency tables and Spearman Correlation were used. Creation a database and statistical analysis were carried out in the statistical package SPSS 13.0 (Statistical Package for Social Sciences) while, for the tabular and graphical display of results Microsoft Excel was used.

Results

In the sample analyzed, 48.1% were male and 51.9% women. The age range was in the interval from 18 to 94 years. In relation to the age groups, most of the respondents were in the age group 45-54 years (23.5%), followed by age group 65 and over (22.5%). 68.4% of respondents were married. Singles followed with frequency (13.4%), while the smallest number was of those who did not base a marriage. Half of the respondents have completed high school, and one quarter have completed primary school. Nearly one out of seven had a high school degree or higher, while one out of thirteen had an incomplete primary education. Own financial status 47.6% of respondents rated as moderate, while the remaining two quarters of respondents estimated their financial status to be very bad and bad on the one hand (27.0%), and a very good and good on the other hand (25.3%).

Testing of significance of the difference, according to characteristics related to socio-demographic characteristics of respondents: gender, age, marital status, education, financial status, showed no statistically significant impact on satisfaction with primary health care ($p > 0.005$).

Of the total number of respondents, 2/3 had a permanent doctor. Having a permanent physician (continuity) is a factor that has highly statistically significant effect on satisfaction with physicians

($\chi^2=461.424$, $df=4$, $p=0.000$). Among the satisfied patients, dominated those who had their permanent physicians (53.2%), while the most numerous among the dissatisfied people were those who have no permanent doctors (41.2%). The frequency of visits to the doctor in last 12 months is also a factor with an influence on the overall satisfaction with the doctor ($\chi^2=52.162$, $df=4$, $p=0.000$). Almost half of respondents visited doctors regularly (46.5%). No matter of frequency of visits to the doctor, the satisfaction with work of physician was predominant, but it is most pronounced among those who have had six or more visits during the year (80.9%). The analysis showed that the rating of doctors expertise was the factor that influences the level of patient satisfaction ($\chi^2=1565.866$, $df=4$, $p=0.000$). Among the satisfied patients, 94.1% rated the expertise of their doctors as positive. As for the evaluation of accessibility of health care, 34.8% of respondents said that they wait for admission to the clinic too long. The waiting time for admission to the clinic has a statistically significant effect on satisfaction with physicians ($\chi^2=474.867$, $df=4$, $p=0.000$). Among the dissatisfied patients, there is almost twice as many of those who wait long for a medical examination (52.3%), compared to those who do not wait long (23.2%). In other words, fully expressed satisfaction with the physician work expressed 27% of patients with long waiting for examination and 89.1% who do not wait long for examination. In case of emergency, 80.6% of patients can get to their doctor in the same day, while 6.4% of patients can get to their doctor after 2 or more days. The availability of doctors in an emergency is a factor that influences the overall satisfaction of patients with a physician ($\chi^2=449.791$, $df=4$, $p=0.000$). Among the satisfied patients, 86.7% comes to the doctor the same day, while for 3.4% of those patients a doctor is available after 2 or more days. Among patients who feel that their doctors give enough time during the visit, and those who believe that that time is not adequate, there is a statistically significant difference in satisfaction with doctors ($\chi^2=1553.559$, $df=4$, $p=0.000$). Among patients who feel that their doctor devotes enough time 87% were satisfied, and about 13 times fewer patients, or 6.2%, were dissatisfied with the work of doctors. This difference was less

pronounced in patients who feel that their doctor does not devote enough time: 40.8% were dissatisfied, while 15.4% were satisfied with work of doctors. Most respondents (74.2%) believe that their doctor gives sufficient information about the state of their health, while 7.8% has the opposite opinion. Informing patients about the health status by the physician is a factor that has highly statistically significant effect on satisfaction with a doctor ($\chi^2=1511.781$, $df=4$, $p=0.000$). Among patients who were satisfied with the information they received from physicians, 6.1% were dissatisfied with the work of doctors, while among those who are not satisfied with the information, globally dissatisfaction with physician was more pronounced with 36.2%. Every twentieth respondent said that he does not like a doctor regardless of his medical skills, and 79.0% of respondents gave a positive assessment of the personality of their doctor. The analysis showed that assessment of personality of physician, regardless of his medical skills, occurs as a factor that affects patient satisfaction ($\chi^2=1400.644$ $df=4$, $p=0.000$). Among the satisfied patients 89.7% gave a positive rate for personality of their doctors. The doctor takes into account opinions and proposals relating to therapy, laboratory analysis, the need for the specialists and similar in 74.8% of patients. Between respect for patient's opinion concerning the course of treatment and overall satisfaction with the work of doctors, there is high and statistically significant difference ($\chi^2=857.308$ $df=4$, $p=0.000$). Patients whose medical opinion was respected by a doctor were satisfied to 85.2%, while with those whose opinion was not respected, satisfaction was present in 31.7% of cases. Among the dissatisfied patients, there is almost three times as many of those whose opinion was not respected by the doctor. The opinion of patients that a doctor does not take their problem seriously, had statistically significant effect on satisfaction with a doctor ($\chi^2=849.970$, $df=4$, $p=0.000$). Satisfied patients are in 74.2% of the opinion that the doctor adequately approached to their problem. For subjects who did not have the feeling that the doctor did not understand their medical condition 87% was satisfied, while in others the percentage of those who were satisfied was almost two times lower (45.9%). When asked whether they can discuss a

personal problems with their doctor, as well as medical, 78.5% gave a positive response. A chance to talk to their doctor about personal as well as medical problems, is a factor that significantly influences the satisfaction with the doctor ($\chi^2=740.397$, $df=4$, $p=0.000$). Among satisfied, even 87.1% can talk to your doctor about their personal problems. Taking all this into consideration, 76.3% of respondents declared themselves satisfied with their physicians. Dissatisfaction was shown by 8.7% of respondents. When asked where they can obtain advice about health issues from nurses, one third of respondents (33.0%) answered that they do not get it anywhere, but in despite of this only 10.6% of respondents stated that they are not satisfied with the work of nurses, while 73.8% were satisfied. Satisfaction with nurses appeared to be a significant factor for satisfaction with medical doctors ($\chi^2=1475.144$, $df=4$, $p=0.000$), table 1. 85.1% of respondents who were satisfied with the nurses, were satisfied with the work of doctors, too.

The strongest correlation was observed between the time spent waiting for medical examination and the time a physician devotes to the patient. As the patient spend less time waiting to be examined, there is more time for a doctor to pay attention to the patient in further contact ($R = 0.646$). Further, the more time devoted to patient, makes his assessment of the competence of doctors to be better ($R = 0.635$). Assessment of non-medical characteristics of doctors by patients also significantly correlated with the assessment of competence ($R = 0.618$). More time devoted to patient makes the assessment of non-medical characteristics of doctors more positive ($r = 0.574$). More information given to the patient positively correlated with grade of expertise of doctors ($R = 0.570$). As the patient was more satisfied with information received from doctors, the assessment of non-medical characteristics of doctors was better ($R = 0.527$). Other variables showed a statistically significant correlation, but much lower magnitude. Assessment of respect for the opinion of patients by physicians, had positively correlation with sufficient time to be given to the patient ($R = 0.453$), the quantity of the information ($R = 0.453$), assessment of competence ($R = 0.446$) and a positive assessment of non-medical characteristics ($R = 0.413$). Total satisfaction had positive correlation

with the time a physician devoted to the patient ($R = 0.453$), assessment of competence of doctors by the patient ($R = 0.448$), the quantity of the information ($R = 0.443$), total satisfaction with work of nurses ($R = 0.439$) and assessment of non-medical characteristics of doctors ($R = 0.422$), but significantly lower with respect to the patient's opinion concerning the course of treatment ($R = 0.332$). The presence of permanent (chosen doctor), relatively weakly correlated with the studied variables, including the strongest positive association shown with graduation of non-medical characteristics of doctors ($R = 0.340$), the amount of information obtained ($R = 0.316$) and the time that doctor committed to the patient ($R = 0.309$). Variables which affect the estimation of physicians by patients, had a small, but statistically significant and positive correlation with satisfaction with the work of nurses. Out of all measured parameters, the following are emphasized: satisfaction with the time that a physician devotes to the patient ($R = 0.350$), the quantity and quality of information the patient receives from a physician ($R = 0.344$), a shorter waiting period ($r = 0.319$) and positive evaluation of physician competence ($R = 0.316$), image no. 1.

Discussion

The first national survey of customer satisfaction with a health care was conducted in November 2004. , on the territory of the Republic of Serbia. Mean rate of satisfaction with the chosen doctor was 4.16 and nurses 4.18. The smallest percentage of dissatisfied customers was one of Belgrade primary health care institutions 5.8% (health centers, departments of occupational medicine and the Department of Public Health students), and the largest was in Vojvodina, while the highest percentage of satisfied was in Kosovo and Metohija (87.5%) and the lowest in Vojvodina primary health care institutions (84.6%). (8)

Early in 2005. year in the U.S., on a representative sample of 300 patients a survey of patient satisfaction to primary health care was conducted. Statistical analysis showed a statistically significant difference in satisfaction of the patients with different levels of education, but not of different age groups or financial status. (9)

Table 1. Satisfaction of patients with primary health care

Variables	Users N = 5317									
	The level of customer satisfaction									
	Dissatisfied		Neither satisfied nor dissatisfied		Satisfied		Total		χ^2 test	level of significance p
	number	%	number	%	number	%	number	%		
The presence of permanent physicians										
1. Yes	147	6.32	121	5.02	2057	88.66	2325	100,00	461.424	0.000
2. Yes, but visits other	107	7.81	257	18.76	1006	73.43	1370	100,00		
3. No	178	13.04	382	27.99	805	58.97	1365	100,00		
The frequency of visites over the past 12 months										
1. Up to 2 times	152	10.29	272	18.42	1053	71.29	1477	100,00	52.162	0.000
2. 3-5 times	122	10.60	193	15.91	898	73.49	1213	100,00		
3. 6 times and more	158	6.73	291	12.40	1897	80.87	2346	100,00		
Assessment of competence of doctors										
1. Positive	264	6.21	358	8.42	3631	85.37	4253	100,00	1565,866	0.000
2. Undefined	92	13.94	362	54.85	206	31.21	660	100,00		
3. Negative	81	57.04	41	28.87	20	14.09	142	100,00		
Assessment of commitment of time and attention of doctors										
1. Positive	246	6.17	271	6.80	3468	87.03	3985	100,00	1553,559	0.000
2. Undefined	66	8.62	359	46.87	341	44.51	766	100,00		
3. Negative	122	40.80	131	43.81	46	15.39	299	100,00		
Assessment of communication skills of doctors										
1. Positive	230	6.13	218	5.81	3304	88.06	3752	100,00	1511,781	0.000
2. Undefined	61	6.71	375	41.25	473	52.04	909	100,00		
3. Negative	144	36.18	171	42.96	83	20.86	398	100,00		
Trust in physicians and help in solving personal problems										
1. Yes	246	6.21	353	8.93	3356	84.86	3955	100,00	740,397	0.000
2. No	186	17.17	402	37.12	495	45.71	1083	100,00		
Rating of physician's humanity and patient's understanding of the problem										
1. Positive	168	15.29	427	38.85	504	45.86	1099	100,00	849,970	0.000
2. Undefined	44	6.65	126	19.03	492	74.32	662	100,00		
3. Negative	225	7.42	205	6.76	2871	85.82	3031	100,00		
Rating of doctor's personality regardless of his medical skills										
1. Positive	242	6.07	295	7.40	3451	86.53	3988	100,00	1400,644	0.000
2. Undefined	93	11.41	390	47.85	332	40.74	815	100,00		
3. Negative	102	42.68	73	30.54	64	26.78	239	100,00		

Rating of accessibility of health care 1. Positive 2. Undefined 3. Negative	228	12.97	485	27.59	1045	59.44	1758	100,00	474,867	0.000
	107	6.41	200	11.98	1362	81.61	1669	100,00		
	101	6.14	79	4.81	1464	89.05	1644	100,00		
The availability of doctors in an emergency 1. On the same day 2. Tomorrow 3. After 2 or more days	268	6.63	450	11.13	3325	82.24	4043	100,00	449,791	0.000
	79	12.19	188	29.01	381	58.80	648	100,00		
	85	26.23	110	33.95	129	39.82	324	100,00		
Rating of respect of patient's opinion 1. Positive 2. Undefined 3. Negative	253	6.69	307	8.12	3220	85.19	3780	100,00	857,308	0.000
	90	8.92	360	35.68	559	55.40	1009	100,00		
	91	34.34	90	33.96	84	31.70	265	100,00		
Satisfaction with nurses 1. Satisfied 2. Neither satisfied nor dissatisfied 3. Dissatisfied	192	36.00	146	27.40	195	36.60	533	100,00	1475,144	0.000
	50	6.40	355	45.30	379	48.30	784	100,00		
	189	5.10	260	7.00	3280	88.00	3729	100,00		

In terms of satisfaction with established communication, the majority of patients responded that they receive responses to all questions. This finding confirms research published by Byrne, (10) Chang (11) and Greeneich (12), which concluded that patient satisfaction was positively influenced by the style of communication and provided information related to health.

Patient satisfaction in primary health care was analyzed in Saudi Arabia, in Riyadh, the capital of Saudi Arabia. The study also found that 40% of patients were dissatisfied. One third of the dissatisfied found health facility too far away, 19.4% complained that the opening hours of institution was not appropriate, 38.9% objected to the lack of specialists in the institution, 19.4% had a language barrier with the doctor, 63.9% complained of to keep in waiting in an institution, 16.7% of satisfied as well as 38.9% of dissatisfied had the objection that they found that doctor did not completely explain their medical condition and treatment process, in 22.7% dissatisfied could not understand the medical explanation completely. Among satisfied, 74.6% said that the medical center was the first choice when they were sick, and this response was given and 61.1% dissatisfied. (13)

In a sample of 997 Estonians aged 15-74 years, the availability of primary health care, patient-physician relationship, the priorities of patients and patient's satisfaction with physician were analyzed. Of 997 respondents 68% were satisfied with their chosen physician, and satisfaction depended on the assessment of competence of physicians, doctor's explanations, comfort and convenience of the institution. (14)

Gadallah M, Zaki B, Rady M, Anwer W, Sallam, in their study, compared patient's satisfaction with primary health care and identified factors related to satisfaction in two different districts of Egypt, where the improvement of primary health care services was carried out. After service obtained, an a survey of 1108 patients using an interview was conducted . The results reveal that the most frequent users of primary health care were female. Patient satisfaction was high for the availability, latency and performance of staff. Most complaints were related to the possibility of obtaining physician referral for laboratory analysis, there was no relationship between general satisfaction and age, sex and educational level. (15)

VARIABLES									
A	The existence of permanent doctor	A							
B	Rating doctors personality regardless of expertise	R=0.340	B						
C	Assessment competence of doctors		R=0.618	C					
D	Rating doctor's commitment of time and attention	R=0.309	R=0.574	R=0.635	D				
E	Rating doctor's communication skills	R=0.316	R=0.527	R=0.570		E			
F	Rating accessibility of health care				R=0.646		F		
G	The availability of doctors in an emergency				R=0.331	R=0.308		H	
H	Rating respect of the patient's opinion		R=0.413	R=0.446	R=0.453	R=0.453			I
I	Satisfaction with physician		R=0.422	R=0.448	R=0.452	R=0.443		R=0.332	
J	Satisfaction with nurse			R=0.316	R=0.350	R=0.344	R=0.319		R=0.439

Image 1. Spearman correlation - a significance of difference

Statistical analysis in our study did not find the connection between sex, age, marital status, education, financial status and patient satisfaction.

Continuity of care is an important aspect of the implementation of health care. (16, 17) Since continuity is expected to increase patient satisfaction, improve doctor-patient relationships, improve recognition of existing and previously detected health problems, reduce rates of hospitalization, episodes of illness and number of laboratory tests. (18)

Most patients in our study had a permanent GP (45.9%). The most common reasons for changing doctors by patients were: a wish to check the diagnosis, opinion that the other doctor was more professional, polite, or that a time of waiting would be shorter with another doctor. In addition, patients can not use services of doctors who have left to professional training, use a leave because of sickness, maternity leave, or during the holiday season. This all, causes that a patient use services of other general practitioners, leading to a discontinuity in the provision of health care and treatment. Also, our study showed that the patients surveyed rated highly a professional expertise of doctors, which includes the knowled-

ge and ability to apply it, ease in decision-making, accuracy. 84% of users of health services assesses the expertise of doctors as a positive. There is a link between positive ratings of competence of doctors and general patient satisfaction. Waiting time for admission to the clinic influences on satisfaction of the work of general and occupational practice: patients who wait less, are more satisfied. In an emergency, 80.6% of patients can get to chosen doctor at the same day, while 6.4% of patients can get to chosen doctor after 2 or more days. The quality of doctor-patient communication in the provision of health care is linked to, and affects patient's satisfaction. Patients who were satisfied with the physician, in 85.6% declared themselves to have got enough information about their disease. Donabedian says that "the expectations of users should set the standards for what is accessible, acceptable, comfortable and on time. They are the ones who can tell us the extent to which we have heard, informed, enabled them to make decision and treated them with respect". (19)

Gray says that the users are more interested in the way the health care is provided, but for the type of health services provided to them. (20)

Mansour in his research indicates a high correlation of personal physician's characteristics and patient's satisfaction. (21)

Leavey, (22) Cohen, (23) McKinley, (17) emphasize the importance of interpersonal aspects of care and communication. Cohen says that patients attach great importance to encourage to ask questions about their condition and treatment, explaining the choices that are before them, including the right to dissent. (23)

Lochman, (24) Fakhoury, Larson, (25) Crane, (6) suggest that the patient's perception of quality of health care is associated with the ability of doctors to give a patients information regarding their health. Informing the patient is the main factor in the outcome of treatment, as well as patient's satisfaction with health services. Better information can significantly contribute to the quality and provide the effectiveness of services and ensure continuity of care. (26)

Some studies have shown that patients attach great importance to the information received in writing, even more than orally form. (26, 27)

The willingness of doctors to listen to patients and to inform him about the state of health are, in our study, showed a statistically significant factors for overall customer satisfaction with doctor. The results of this survey research has also showed that patients are very pleased when the doctor is ready to listen, to hear their health concerns and to express sympathy about it with them. Patients are encouraged when they are aware of their disease, type, way of treatment, prognosis and possible outcome. Good communication with your doctor affect patient's acceptance of therapy, which is reflected in the outcome and quality of health services.

The survey showed that most respondents of health care, 73.8%, were satisfied with the work of nurse and that humanity, kindness and attitude towards colleagues appeared as a significant factors in patient's satisfaction with physician.

Fosbinder in his research dealt with the nurse-patient interaction, which showed that patients were satisfied with this proposition when the nurses gave them information about the state of health, explained it to them, gave guidance on specific aspects of treatment and taught them the general principles of care. (28)

The commitment of nurses to work, friendly and informal relationship and providing care beyond the expected, caused the patient to have a sense of confidence and trust. (29)

The information of patient contributes significantly to patient's satisfaction with nursing care. (30, 31)

Conclusion

The results indicate to the satisfactory quality of primary health care in terms of patients. By a statistical methodology it was found that variables related to direct patient contact with health care had the strongest impact, and socio-demographic characteristics did not affect significantly. Among the variables related to contact with health service, the most important were those concerning the direct contact between the doctor and the patient. Assessment of the non-medical characteristics of doctors was also an important factor that influenced patient's satisfaction, either directly or indirectly. The factor of availability of doctors to a patient had a lower importance to the patient's satisfaction with a doctor. Patient's satisfaction with the physician had a positive repercussion to the satisfaction with a work of other members of the medical team. Service providers should monitor patient's satisfaction with health service and eliminate the identified problems. This can be achieved by improving verbal communication and asking patients about their experiences, as well as through formal questionnaires. Once the mechanisms for obtaining feedback informations regarding the needs and expectations are established, there remains the task to monitor any changes in requirements due to continue to satisfy the needs of users in the future.

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Phenomenological determination of biopsychosocial effects of diseased child under dialysis treatment on siblings in Turkey

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Abstract

The purpose of this phenomenological study is to determine the biopsychosocial effects of the disease of a child who receives dialysis treatment, on the siblings (n=10).

As result of the study, three themes were determined, which are; Information and Opinions, Changes, Solutions. We found that the siblings do not have enough knowledge about the disease, love the sick child a lot, are hopeful about the future; have physical and psychological changes in their healths, they take the responsibility in terms of caring of the sick child, the necessities of the siblings are put into secondary importance, their academical and social lives are considerably affected, they try to cope with it through activities aimed at relieving the mind, social supports, physical activities, spirituality.

According to the results; each member of the health team shall approach the families in a humanist, integrated and family-centered way in cooperation; they shall also and absolutely approach the siblings as a member of the family unit; fellow support groups shall be constituted and social activities the siblings could participate shall be planned.

Key words: chronic disease; child; chronic kidney failure; qualitative research; siblings

Introduction

Chronic renal failure (CRF) is a disease characterized by endocrine, metabolic and biochemical changes in parallel with a decrease in nephron function. In the case of the End Stage Renal Failure (ESRF) which is the last stage of CRF, glomerular filtration rate (GFR) drops below 10-15% which leads to dialysis treatment (1,2).

During the process of a chronic disease such as CRF, it is known that disease proximately affects parents, siblings and close relatives along with the diseased children (3). Among the family members, siblings are the most ignored family members.

Healthy brothers have some problems such as bedwetting, headache, physical complaints, changes in school performance, regression, risk of injury, sleeping problems, depression, decrease in participation in activities of peers (4,5,6,7,8,9,10,11). There is an increasing sensitivity by professional healthcare personnel to the issue of necessity of supporting siblings' psycho-social needs at the very least of other members of family (12).

The basic philosophy of professional healthcare personnel is the family-centered integrated approach (13,14,15). Therefore in the cases of illnesses perception and life experiences of siblings about disease is very valuable. Professional healthcare personnel should determine real effects of the disease on biopsychosocial areas on siblings and appropriate approaches.

There are very few litterateur examining the effects of chronic renal failure on siblings (5). There is not a qualitative study to search siblings experiences, responses in biopsychosocial aspects during a chronic disease process such as CRF.

Purpose And Approach

The purpose of this qualitative research is to determine the biopsychosocial effects of the disease of the child, who is on ESRF and under dialyses treatment, on healthy siblings to designate holistic nursing approaches.

Research question; what are the biopsychosocial effects of disease of the child, who is on ESRF and under dialyses treatment on siblings?

This is a phenomenological study. Phenomenology, a particular philosophically based approach to research, offers a methodology that can lead to systematic explication of human experiences and human science paradigms. As phenomenological researchers the goal is to systematically examine human experience and from this examination derive consensually validated knowledge. Nursing, as a science has a goal to understand those individuals being cared for in order to know how to care for them. Nursing can thoughtfully choose the research approaches and methods that can lead to human understandings which are most beneficial to persons under nursing care especially understanding which have a direct application to practice (16, 17).

Methods

Sample

The study was done in hospitals of the third largest city İzmir, situated at the west of Turkey. The sample of the study is formed by the siblings of the children under dialysis treatment at Ege University Children's Hospital, Dr. Behçet Uz Pediatric and Surgical Training and Research Hospital, Ministry of Health Tepecik Training and Research Hospital between the dates July 2007- October 2008. Ten siblings, who are selected by sampling methods of homogeneous and criterion among the qualitative research sampling methods, participated the study.

The study inclusion criteria are: a) siblings of kids who are under dialysis treatment at least 3 months by diagnosis of ESRF, b) parents living together, c) no kid in need of active care of parents, d) literate and above 8 years old siblings.

The ages of siblings changes between 12-19 and average of age $15,30 \pm 2,4$. The average of the number of the siblings is $3,6 \pm 1,26$ and 60% are female and 60% are student. Socio economic level of 80% of families are low.

50% of diseased children are between 12-19 years old, 20% of them are not school age children, 40% of them are students of elementary education, 30% don not go to school, and 60% are

female. 60% are under peritoneal dialysis therapy, 40% are under hemodialysis treatment. Kids are under peritoneal dialysis therapy approximately $2,21 \pm 2,43$ years while the ones under hemodialysis treatment takes treatment approximately $5,25 \pm 0,86$ years and the diagnosis time of CRF is approximately $5,70 \pm 4,06$ years.

Data Collection / Procedure

The data in the study, "Family Information Form" which enables to gather general information about the family, semi-structured "Sibling Interview Form" are prepared by the researcher in consideration of literateur. Necessary changes were done in qualitative researches in the light of opinions and suggestions of experienced people. Two siblings were pre-interviewed then interview questions were pre-issued before starting the research.

When it comes to monitoring, the study was explained to the family when parents and siblings above 18 accepted, they were signed written acknowledgement. With families who accepted, Family Information Form was filled out by mutual interview technique. In hospitals siblings were interviewed separately face to face using in-depth interview technique in appropriate rooms. Questions were asked from Sibling Interview Form and semi-structured interview was recorded by recorder. Conversations, through which informations were collected, lasted approximately 30-45 minutes.

To ensure confidence and comfort between researcher and participants before interviews, the first meeting was only acquaintance phase, data collection was left to the second meeting. Some of the siblings could not be met again for the second time so that date had to be collected at the very first meeting. Some of them were interviewed at hospital and some were interviewed at home.

Interviews were completed in a quiet environment without breaks. Interviews were done face to face, sitting at the same level, with active listening interviews were lead with the help of question forms. During the meeting striking situations about the siblings were noted down as observation notes. After every meeting, interview were made to listen to the participant and checked the points they would like to add or remove.

To increase the validity and reliability siblings were interviewed separately and without parents

and their own opinions were collected. At the same time researcher also took down some notes according to observations. To enable the long-term interaction data were not collected at the first meeting but at the second meeting. The data were evaluated by the researcher and three experts. In psychological evaluations opinion of the psychologist was taken. To get the participant confirmation after the meeting record was listened by the participant then confirmation was obtained.

Data Analysis

After meetings were finished, raw sound records were transferred to computer, were listened then converted to Microsoft Word document. To check the written documents recordings were listened again. The data was read over and over again. After reading, codes were found from which every word and sentence may have. The codes composed were passed thematic coding and classified by the researcher and appropriate themes and sub-themes were composed. To increase the validity of the research, the same process was done by two other experts, the data was revised by the experts and researcher. In psychological evaluations opinion of psychologist was taken. Then, all the data was interpreted and turned into report according to the themes.

Ethical Consideration

To conduct the study, written permission was obtained from Ege University School of Nursing Scientific Ethics Committee and head doctors of the hospitals that the study was carried out. Parents and siblings participating the study were told the aim of the study and the methods to collect data and was explained that without specifying the names the data would be used in the study so written permission was gathered from parents and sibling above the age of 18.

Results and Discussion

Three themes were detected belonging to siblings then sub-themes were created. The first theme is Informations and Opinions then sub-themes are Disease, Reasons, Attributed Meaning, The Value Given to Siblings-Sibling Relationships, Future. Sub-themes of Changes: Biological (Health Situati-

ons Changes), Psychological (Emotional Responses, The Worries and Fears), Socioeconomic (Dynamics of Family, Social Life, School- Education, Economical Situation). Sub-themes under Solutions are classified as Overcoming Options, Spirituality.

1. Informations And Opinions

Disease, Reasons, Attributed Meaning

The statements of siblings for the diseased children's disease generally vary: Negative meaning such as bad, he will not heal, the concepts of hard disease and survival of machine-dependent, being forced to be with mother, being under dialysis treatment:

When it is said disease, it pass through my mind that it is a bad thing and the diseased person experience difficult situations. Nothing else.

While most of the siblings acknowledge that they are not knowledgeable about the reasons of the disease of their siblings, the ones who have idea about the reason of the disease expresses the following: - A problem which could have been corrected during pregnancy because it had not been corrected, the disease occurred, - Over-using of medicine for other reasons since very childhood exulcerated the kidneys, - Kidneys are ruined following asthma- bronchitis, -Relative Marriage, -To eat a harmful things, - No reason, self-developed.

It is seen that most of the interviewed children do not have enough information. It is detected that they do not have realistic knowledge about the disease or its reasons. In a mixed type study 15 siblings of kidney diseased children are interviewed and it is detected that 9 of the 15 siblings gave the realistic information about the CRF, 5 of the 9 sibling who will have kidney-transplant are informed by the nurses and the informed children find this briefing very useful (5). While informing the siblings is so important, unfortunately parents and health personnel are insufficient about informing the children, providing open communication in society (5,18). On the other hand it is designated that cognitive developments of siblings of the diseased children are affected (9,19) and their intelligence levels are lower than their peers (7). This situation may affected perception of the disease and information levels of the siblings in the study. General low socio-cultural level may cause deficiencies on siblings' getting information and access to information.

The Value Given to Siblings-Sibling Relationships

Generally the relations between the diseased children and the siblings is positive and good. All the siblings stated that they love and give value to their diseased sibling. They stated that they try to spend time together at such activities playing, going out, wandering, pc playing and cycling. However, for the reasons of treating diseased children over-protecting, fatigue due to the disease, and the worry for the arm may get damaged, the activities they spend time together is limited. Because of the most of the effects and changes in their life, disordered family routines and witnessing what diseased sibling suffer from and saddened by all these, the siblings expressed that having a diseased sibling is hard and bad thing. Some siblings told that they get jealous of their diseased sibling:

I do not know if I told but sometimes I told my mother I wish I were diseased too. Because, I dont know, sometimes I get angry to myself but.. I do not know sometimes it feels like it is discrimination. There are times that I say why do not you tell me, will it be always me who will do it.

Siblings expressed that they get angry when the diseased siblings do not obey, want to perform the prohibited actions due to disease, do the things which are harmful for themselves because of the tolerance shown to them and inconsistent disciplinary practices. In fact this anger usually develops in the siblings who are given the responsibility of taking care of the diseased child. Siblings, who try to perform the responsibilities as required, get angry at when the diseased sibling do not obey the rules originated from the disease. In fact they try to guard the diseased sibling and prevent the possible damages:

... gets very cranky, I am doing my best to to help his/her diet but he/she want s to eat harmful food for his/her health. For example he/she wants to eat sucuk in fact it prohibited due to increasing the blood pressure.

In the study done with fifteen of children who are renal patients and renal replacement therapy (RRT) in various stages (ages of 8-12), similar results are detected. All the siblings in the study are sorry for the diseased sibling, 53% guard the diseased sibling and share his/her worries with the parents. 80% of siblings often feel rejected and express that they are jealous of their diseased sibling (5). The reason of jealousy level seen in few

of the siblings may be explained by the high age level. In a phenomenological study, siblings of 10 oncology patients (above the age of 10), who are diagnosed six months ago, are interviewed. It is detected that their relations are very strong and close and when necessary they may use of protective and defensive roles. They are always responsive and faithful for the needs and wishes of their diseased siblings. In the same study they are detected to fight with their siblings but it is no difference from the ones before diagnosis (20). Also in this study it is expressed that they have regular fights like every healthy siblings can experience.

Future

Most of the children are hopeful that the diseased sibling will heal and they want them to heal. They expressed that they think kidney transplantation is necessary and they want the transplantation happen:

She will be alright. If kidney transplation happens, she will heal, they will see the doctor once in a year. I want the tranplantation.

In the study done with the siblings of 10 phenomenological oncology patients, it is detected that they choose positive look, and think that their siblings will not die. The expression of a sibling who states this is: I do not think she will die. I think She will continue to live with this however never be completely healthy (20).

Even if most of the siblings are hopeful, two elder sisters are not hopeful for the future of their diseased sibling and they think that their siblings will not heal and in the end death will be the result. These two elder sisters live with the idea of the disease and very knowledgeable about the disease. They are quite older and one of them is already responsible of taking care of her sibling and usually goes hospital and has started her higher education in the field of health recently:

Everything is certain about H... Doctor had already said. In a way. It is certain that the end will be dead. I think sometimes will it be okey without her (trying to control herself not to cry).

2. Changes

Biological

Health Situation Changes: All the male children stated that their physical health situations

do not changed, their physical health is are not affected in any ways. However all the female children are affected because of the disease in some ways. Approximately all of them are originated in psychological effects; they stated such symptoms as experiencing tachycardia, not being able to stand to crowd, becoming more nervous:

For example I have tachycardia. Maybe it is because of sadness. Only this.

Here, this table is thought to come out because of different upbringing practices and different roles which are applied to boys and girls. In the study there is no male children who is totally responsible for taking care of his diseased sibling. Even if he accompanies his brother for hemodialysis, he continues his school and does not talk about another responsibilities at home. However, it is known that female children share the responsibilities with their mothers such as taking care of the children and doing housework according to woman roles in society (3). These children may be supposed to have psychological symptoms due to having more responsibilities in accordance with their peers, trying to adapt themselves to the changes of family dynamics, getting sad for their siblings disease and getting stressed out. In a literature research it is seen that there is an increase in experiencing physical symptoms among the siblings of chronic diseased children however, it is due to internalized emotional reactions (4).

Psychological

Emotional Responses: The emotional responses which are detected in siblings' statements are generally evaluated in this way. Negative emotional responses; Depressive feelings, Anger, Ambivalence in Emotions, Isolation and three children separately have Anxiety, Burnout Syndrome and Helplessness. Positive emotional responses which are less in number, Hope, Acceptance, Optimism, Realistic overview.

In a literature research study, a lot of studies are examined which are done during 1970-1995 about the siblings of children with pediatric chronic disease and it is seen that many studies shows that siblings have the symptoms such as behavioral disorders, anxiety, depression, social isolation, low self esteem and somatic symptoms (11). In another study it is detected that 252 healthy siblings' infor-

mation about the disease their siblings have, their attitude to the disease, mood, self-esteem and feeling the social support are related to their behaviours (10). In the interview with 36 children, who have technology-dependent diseased siblings, it is stated that an uncertain life especially at the times of additional stressor (exam, illness etc.) stresses out and depresses the children (19).

All the children in the family try to cope with various developmental stress according to the developmental period they are in. To have a sibling who has chronic disease has an additional stress on healthy siblings (21). Adolescence is a period that considerable emotional turmoils happen in the first place (22,23). Also it is thought that having a sibling who has a chronic disease which may result in death seriously affect the children and create quite emotional responses from depressive feelings to exhaustion.

The Worries- Fears: The issue which children are worried about is their diseased siblings' fistules/catheters get damaged. Another expressed issue is fear of losing their siblings:

In summer sometimes getting worse. I fear whether something will happen.

In a study done with the siblings of children who has ESRF, 40% of siblings worry about their own health, 13% worry about their own kidney, 46% worry about their parents' health(5). In a study done by Nolbris and his friends (2007) it is seen that the children who has siblings with cancer similarly has the fear of losing their siblings (20).

Socioeconomic

Dynamics of Family: When family's basic influence is examined, majority of the siblings express that every member of the family is worried about the diseased child and live under stress. Even if the chronic diseases are the issue of stress which occurs in only one individual of family, in fact they are the sources of tension which cause sadness and stress(18,22).

The most fundamental change in the family, the subject the siblings are most affected is to be separated from parents and siblings. They expressed that they get separated from the family and also other people have to take care of them. These separations are resulted in not being able to spend time together with the family and disconnectedne-

ss among family members. At the same time because the situation of chronic disease change the focus on the routines in the family, quite a lot of changes in the responsibilities and roles of family members happen (19). The siblings are also entrusted to children who stays alone in the house since tender ages. The switches in roles and responsibilities changes depending on the internal family dynamics and the gender and ages of siblings. The ages rise and more responsibilities are taken in charge and female children are given more responsibilities. Many siblings especially females take responsibilities helping housework. They try to express that they are left all the responsibility when parents leave the house. Some of the siblings express that they help their parents for taking care of their siblings. Most of the siblings take responsibilities in taking the diseased siblings to the hospital and accompany them during their stay in hospital. It is detected that they help such maintenance and activities as their dialysis treatment, nutrition, medication, taking to school and hospital. Heaton and his friends (2005) in the qualitative study on 36 technology-dependent children's family stated that in the process of time more responsibilities are given to the siblings, respectively about house, technical and nursing care, supervision, taking care of other siblings, taking the siblings to school and hospital. One of the siblings take care of diseased sibling to give a break to the parents (19). Here the pointed subject is child is required to take care of the diseased sibling totally to enable parents take a breath. However, some of the siblings in the study perform this constantly and they don't have the chance to breath. Even they are made to leave the school and left the responsibility of taking care of their siblings. Basic factors which lead all the responsibility to be left on the child are cultural structure and many children in the family. Two sisters who are left with total responsibility on nursing stated that they feel like they are the mother of the child:

I love him very much. I take care of him how a mother does.

In the phenomenological study of Nobris and his friends (2007) similar expression is detected from siblings of the children who have cancer: Doctors told me that they realized that I am like a parent (20).

Only two brothers stated that their families have no expectances. These are two-children and modern-structured families. In addition to these, being male children can lead to roles special to genders.

When mother father children relations are examined;

The complaint of most of the children is that diseased child is shown more interest and tolerated and in the direction that not enough time spent on them or they are not shown interest. Siblings are the saddest and the most ignored emotionally among the family members during the serious disease period. Because all interest and relevance are directed to the diseased sibling, healthy siblings' needs are thought that they can be neglected and their needs may be ignored (18). In the study children express that they are jealous of the diseased sibling from time to time however, they stated that they understand that their parents have to take care of their siblings because of the disease. On the contrary, in another qualitative study 10 siblings, who have oncologic siblings, are interviewed and they stated that they have difficulties to understand that all the interest is shown to their diseased siblings (20). They also stated that they are jealous of their diseased siblings because of increasing expectances, the tolerance and inconsistent disciplinary practices and have hostile feelings toward their diseased siblings (21). It is detected that healthy siblings may develop positive behaviours such as increasing sensitive behaviours, the ability to empathize with diseased people and others, being patient, and realizing the value of life (18). For this reason it is thought that siblings can understand a lot of attention, which is shown to the diseased child, although they are jealous of their diseased siblings.

While majority of the children generally do not inform negative statements about their fathers' behaviours, they stated that their mothers are sadder and more nervous. Mothers are known to show more emotional responses compared to fathers at the issues of diseases (22).

Social Life: There is no siblings who say his/her social life are not affected. Siblings stated that mutual effects always happen in a field in anyways. However, there are siblings who has a social life and can participate the activities without getting isola-

ted. Some of them stated that they can not see their friends as in the past and they are not as free as their friends. Many of the siblings expressed that they are not able to go a long term housing vacation:

Yes, we were going in the past, but not last year and not this year also. It means disease affected this.

In a research by Heaton and his friends (2005), the siblings of the technology-dependent children stated that they need a vacation. Siblings who have different responsibilities at home expressed that the time they spend for social activities is limited because of the responsibilities at home. They stated that the period at the hospital enable a break from the responsibilities at home for them and they like the opportunities of social activities which are provided at the hospital and they want to go more often (19). In the quantitative study by Labay and Walco (2004) examining the siblings of the children (n=29) who have cancer, it is detected that siblings are found to have more social and academic difficulties compared to the children who have healthy siblings, while there is no increase in behavioral problems rate (8). In another meta-analysis study it is founded that children who have diseased siblings have less peer activities compared to the children with healthy siblings (9). In another study done with the siblings of the children with CRF, it is seen that 14 siblings out of 15 informally met other siblings of the diseased children in their own neighbourhood or during the activities arranged in hospital and all of the children want the activities arranged by the unit to be aimed at both parents and siblings. These activities are stated to help coping with and are advised to other siblings (5). These provided social support groups are not found in the hospitals in which this study is done.

School-Education: In the study it seen that school life of many of the children is affected by CRF. There are female children among the siblings who are made to leave the school because her help to take care of the diseased child is needed and economic difficulties. Although these children actually want to continue their education, they stated that they give up school –two of them voluntarily, and one of them by force- and their education is left half finished thinking that their education will endanger the situation of the family. Children stated that they really want to continue their education:

I wanted to continue my education. I would be a nurse.

Academic and social life of the siblings who continue their education is stated to be affected because of the disease of the diseased child. In the study by Labay and Walco (2004) examining the siblings of the children (n=29) who have cancer, more social and academic difficulties are found compared to children who have healthy siblings (8).

Economical Situation: Vast majority of the siblings stated that they experience economical difficulties along with the disease. Some effects of the increasing economical difficulties on children because of the disease are such as not being able to move a better house, not being able to afford even basic needs, not being able to continue the education, and to move to the village.

In spite of these negative effects, the families still try to not to deprive anything of their healthy children, and the children understand this. The siblings stated that they do not want anything other than compulsory ones. Although many families experience the economical difficulties, some of the children stated that there is no economical influence and that such a problem is not reflected to them.

3. Solutions

Overcoming Options – Spirituality

While some theoreticians think that children also show similar overcoming behaviours to their parents about overcoming stress, some theoreticians state that children have different overcoming options. Children mask out their anxiety through intellectual period, behaving in a mature way or trying to be extremely courageous. Physical and intellectual activities and sharing their experiences with peers in the same situation are the best overcoming options(21,22). In the study children stated that they are trying to overcome their siblings' disease burden with positive solutions appropriate to this characteristic. Talking to their friends is the most used overcoming solution. Others are positive solutions devoted to relieve mind such as going for a walk to take a breath, listening to music and writing(emotions).

Some of them stated that they try to cope with such methods as being alone and crying. To be on her/his own a little bit and live quietly are positive situations however, if this situation result in such

an isolation that can reach to the point of keeping to her/himself, precautions should be taken. Again crying also provide temporary relief, constant application will not provide benefits instead effective overcoming solutions should be found. A few siblings try to cope with these via spirituality. Children tell that they want help from God for their siblings heal. Praying and performing prayer are invocational practices intended for the religion:

I do not remember praying so much, suffering, praying so sincerely. I also do not remember getting up so early in the morning to perform prayer.

Conclusion

In this research we found three themes: Informations and Opinions, Changes, Solutions. Generally it is detected that siblings do not have enough information about the disease, perceive the disease as a hard and bad disease, love the diseased child and give value, are hopeful for the future, experience physical and psychological changes in their health, fear to lose the diseased child as the biggest fear, experience the affected family dynamics, take responsibilities to take care of the diseased child, get seriously affected in their academic and social lives and that their needs become of secondary importance, and that disease has negative economical effects on the family and that siblings try to cope with the situations through activities devoted to relieve mind, through social supports and physical relieves, spirituality and religious practices.

According to the results every member of the health team should concertedly approach the families humane, integrated and family centered; should certainly deal with the siblings as members of family unit; should create peer support groups and should plan social activities which siblings can attend, should support families in plannings to decrease the effects to minimum.

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Effect of education based on health belief model on prevention of urinary infection in pregnant

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Abstract

Background and Aim: Due to the deformations that result from pregnancy in women, the pregnant women are more potential about urinary infection which will lead in prospective effects on the mother and the embryo. This study aims at defining the applicability of the health belief model for educating the preventive methods of urinary infection to pregnant women.

Material and Method: This study is a quasi-experimental, in which 110 pregnant women who referred to the health care center of Behbahan city took part. They were sampled into two groups experimental and control randomly. The data collection instrument included a questionnaire developed based on the health belief model whose validity and reliability was confirmed. After administration of the primary test for both groups and analyzing the results, the educational content was designed based on the health belief model and was offered to the experimental group of the pregnant women during 5 sessions. One month after the educational intervention, both groups once again completed the questionnaire and eventually the results were analyzed by means of the SPSS16 software.

Findings: the average age of the pregnant women was above 25. The average awareness of the employed women was more than housewives ($p=0.026$). The independent T-test proved that prior to the intervention, the average awareness scores, HBM structures and behavioral preventive variables from urinary infection (clothing manners, eating habits, urinary habits, cleaning, and sexual habits) of the pregnant women of both groups were not meaningfully different ($p>0.05$). However, after the educational intervention, there appeared a meaningful difference at the average score of all the above mentioned variables ($p<0.05$).

Conclusion: Developing an educational program based on the health belief model is effective

and useful in upgrading the preventive behaviors from urinary infection.

Key words: Urinary infection, pregnant, Health Belief Model.

Introduction

Urinary infection is known as the second wide spread infection during the pregnancy after anemia.

Existence of bacteria in urine is known as the bacteriuria (3). Urinary infection is included into two groups of symptomatic and asymptomatic (4). Asymptomatic bacteriuria which implies the existence of active and sustainable bacteria in the woman urinary system and has no symptom, is the most wide spread urinary infection during the pregnancy (5).

Urinary infection has been observed along with early birth and low-weight borne children (6,7). Also, urinary infection has been related to high blood pressure due to pregnancy and anemia (2). In case the asymptomatic bacteriuria infection is not cured in pregnant, a third of these women will be affected by advanced acute pyelonephritis which is the most widespread reason for hospitalization of women prior to child birth (8). The pregnant affected by Pyelonephritis even if cured immediately, still there will be a significant number of low-weight child birth among them, which will rise child death, cause anemia, pregnancy intoxication and cause early embryo membrane rupture, respiratory disorders, Sepsis risk and shocks. In addition, the children born from the mothers infected with the Pyelonephritis suffer from psychological and physical growth disorders (9).

Urinary infection may be known as a syndrome like other syndromes which is caused by numerous factors. According to the studies in this field, some factors as clothing manners, eating habits, urinary habits, cleaning, and sexual habits are more prominent (2,8,9).

Health belief model, which is used as the major framework in this study, is one of the oldest health behavioral theories which have been used in designing and evaluating behavioral interventions by various experts in different fields of behavioral sciences, and accordingly, the significance of application of HBM model (Health Belief Model) has been established in several studies (10,11).

The major structure of Health Belief Model (12):

- Perceived sensitivity: this belief that the person may be infected with a disease which may be resulted from a specific behavior.
- Perceived severity: belief in the loss and damage extension of infection to a disease or the harmful status of a specific behavior.
- Perceived benefits: belief in the advantages of the suggested methods for decreasing the risk or intensity of the disease or the harmful status of a specific behavior.
- Perceived barriers: belief in the imagined expenses of following a new behavior.
- Cues to action: the accelerating force which causes that the people feel a need for taking an action.
- Self-efficacy: self confidence is following up with a behavior.

In this regard, this study has been implemented for the purpose of defining the application and usefulness of the health belief model in educating the preventive behaviors from urinary infection in pregnant.

Material and Method

This applied study is a quasi-experimental which is conducted through control-experimental group in 2010. The statistical population included the pregnant that referred to the healthcare centers of Behbahan. The sample volume with 95% confidence rate was 110 people. They were calculated by means of the sample volume formula for comparing the averages of the two groups. The sample was divided into two groups of experimental and control. It is to be mentioned that any pregnant woman who entered the healthcare center for receiving pregnancy healthcare services in case of consent, and the pregnant women who were referred to the center on emergency were excluded from the experiment.

The data collection instruments included the multipart questionnaire which comprised of regulatory factors (demography information)8 questions), Awareness (30 q.), Dimensions of health belief model (41 Q), perceived barriers (5 Q), perceived sensitivity (4 Q), cues to action (3 q), self-efficacy (19 Q), Behavioral (26 Q), Clothing (3 Q), eating habits (6Q), urinary habits (4 Q), cleaning (6 Q), and sexual habits (7 Q)) in form of a checklist.

For evaluating the awareness, multiple questions and for evaluating the dimensions of the health Belief Model the Lickert 3 alternative questions were used. For the Perceived sensitivity, severity, barriers and Perceived benefits, the score 2 was assigned for the most optimum state, at the worst one the score of 0 and NO IDEA was assigned score 1. Self -efficacy and behavioral questions were set based on the ALWAYS, SOMETIMES, RARELY and NEVER scale. In this part, the ALWAYS option had 3 scores, SOMETIMES 2 score, RARELY 1 score and NEVER 0 score. For the cues to action each question had 1 score and the scores were summed up and were classified in three groups of Optimum (more than 75%), Average (50 to 75%), and Weak (less than 50%) based on percentile.

In addition, the reliability and validity of the questionnaire were evaluated by means of methods of content validity and retesting ($r=.83\%$).

Prior to implementing the educational intervention, the mentioned questionnaire was given to the participants to be completed. (First Stage) After the collecting the data and evaluating the information of the questionnaire, the educational program was developed based on the Health Belief Model to be administered by means of lecture method along with question and answer sessions, submission of pamphlets, and booklets, during 5 sessions. (Second Stage) one month after implementing the educational program, the information pertaining to educational units were collected by means of the same questionnaire. (Third Stage) after extracting the data, the information was analyzed by means of SPSS software and $p<0.05$ was resulted as the meaningful level of statistics.

Findings

With the collected data, the findings revealed that there exists no meaningful difference between the control and experimental groups from the demographic factors stand point. (Table 1) according to the results, the average age of the research units was 25 years ± 4.68 . Prior to the intervention, the independent T- test revealed that there existed significant difference between the employed women and the house wives in a way that average awareness score for the employed was [$\bar{X} = 22.5 (\pm 2.67)$] was meaningfully more than that of house wives [$\bar{X} = 20.14 (\pm 3.19)$]. ($p=0.026$)

Prior to the intervention, among the barriers (6.5 ± 2.44), benefits (9.21 ± 1.21), sensitivity (8.98 ± 1.66), perceived severity (7.07 ± 1.49), the least rate related to perceived barriers. On the behavior part, among the clothing (13.09 ± 2.58), eating habits (9.18 ± 2.11), urinary habits (11.68 ± 3.01), cleaning (10.35 ± 1.92), and sexual habits (11.105 ± 2.02), the lowest rate referred to eating habits.

Prior to the intervention, among the awareness score and impediments ($p=0.03$, $r=0.17$) and advantages ($p=0.009$, $r=0.22$), comprehended sensitivity ($p=0.00$, $r=0.32$) and behavior ($p=0.02$, $r=0.19$), there exists a meaningful positive cohesion.

In the structure of the guide line, 68.2% of the pregnant of the study were guided on the preventive measures of urinary infection through their husbands, 71.8% through family (mother, sister and

etc.) and 62.7% through the mass media. The role of each item was separately and individually evaluated on the urinary infection in terms of a single question. It is note worthy that the items are not complementary to each other and accordingly their sum would not equal 100%.

The independent T- test establishes the fact that prior to the educational intervention, there existed no meaningful difference between the experimental and control group in terms of the average score of the intended variables [awareness, sensitivity, severity, benefits, perceived barriers, self-efficacy, and behavior (clothing, eating habits, urinary habits, cleaning, and sexual habits)]. However, after the implementation of educational intervention, between the control and experimental groups, there appeared a meaningful difference in all variables, and regarding the positive low and high limit in all the above-mentioned variables, it can be said that the average score of the various variables in the experiment group was greater than that of control group. The double T- test indicates a meaningful difference between the average score of the mentioned variables in the experiment group, prior and after the educational intervention; and moreover, the average score of the intended variables in the in the experiment group after the intervention is greater than that of the period prior to the intervention, while the double T- test in the control group reveals no difference by a slight change in the average score (table 2 & 3).

Table 1. Relative frequency distribution of subjects under study based on age, educational degree, and employment status

Specification Demographic		Experimental group		Control group		Total		P
		Frequency	Percent	Frequency	Percent	Frequency	Percent	
Age	years 25>	27	49/1	27	49/1	54	49/1	0/64
	25-30 years	20	36/4	21	38/2	41	37/27	
	30 years <	8	14/5	7	12/7	15	13/63	
	Total	55	100	55	100	55	100	
Education	Primary	5	9/1	10	18/2	15	13/6	0/41
	Guidance	11	20/0	6	10/9	17	15/5	
	High school	27	49/1	30	54/5	57	51/8	
	Academic	12	21/8	9	16/4	21	19/1	
	Total	55	100	55	100	55	100	
Employment Status	Housekeeper	48	87/3	52	94/5	100	90/9	0/18
	Concern	7	12/7	3	5/5	10	9/1	
	Total	55	100	55	100	55	100	

Table 2. Comparing the average score of awareness, and HBM structure in the experiment and control groups of pregnant women under study, prior and after the educational intervention.

Variable	Group	before Intervention	after Intervention
		Mean \pm sd	Mean \pm sd
Awareness	Experiment	20/40 \pm 3/04	28/38 \pm 1/20
	Control	20/30 \pm 3/39	20/40 \pm 3/35
	P(independent t)	P=0/88	P=0/00
Perceived barriers	Experiment	6/49 \pm 2/22	8/12 \pm 2/16
	Control	6/01 \pm 2/64	6/05 \pm 2/66
	P(independent t)	P=0/31	P=0/00
Perceived benefits	Experiment	9/25 \pm 1/25	9/94 \pm 0/29
	Control	9/18 \pm 1/18	9/25 \pm 1/10
	P(independent t)	P=0/75	P=0/00
Perceived susceptibility	Experiment	9/10 \pm 1/36	9/92 \pm 0/32
	Control	8/85 \pm 1/92	8/90 \pm 1/89
	P(independent t)	P=0/42	P=0/00
Perceived severity	Experiment	6/96 \pm 1/66	7/83 \pm 0/42
	Control	7/18 \pm 1/30	7/23 \pm 1/34
	P(independent t)	P=0/44	P=0/00
Self-efficacy	Experiment	42/65 \pm 5/34	52/40 \pm 3/10
	Control	41/65 \pm 6/79	41/85 \pm 6/73
	P(independent t)	P=0/41	P=0/00
behavior	Experiment	53/87 \pm 6/96	68/20 \pm 4/40
	Control	54/20 \pm 6/88	54/34 \pm 6/84
	P(independent t)	P=0/80	P=0/00

Table 3. Comparing the average score of behaviors (clothing manners, eating habits, urinary habits, cleaning, and sexual habits) in the experiment and control groups of pregnant women under study, prior and after the educational intervention.

Variable	Group	before Intervention	after Intervention
		Mean \pm sd	Mean \pm sd
How to dress	Experiment	7/58 \pm 1/30	8/87 \pm 0/59
	Control	7/52 \pm 1/67	7/56 \pm 1/67
	P(independent t)	P=0/84	P=0/00
Food habits	Experiment	10/74 \pm 2/30	15/05 \pm 1/80
	Control	10/45 \pm 2/57	10/49 \pm 2/57
	P(independent t)	P=0/53	P=0/00
Urinary habits	Experiment	8/63 \pm 2/41	10/85 \pm 1/32
	Control	9/34 \pm 2/18	9/36 \pm 2/19
	P(independent t)	P=0/10	P=0/00
The cleaning	Experiment	12/10 \pm 2/13	14/67 \pm 1/30
	Control	11/78 \pm 2/30	11/81 \pm 2/29
	P(independent t)	P=0/44	P=0/00
Habits, sexual behavior	Experiment	14/80 \pm 2/59	18/83 \pm 1/80
	Control	15/09 \pm 2/86	15/10 \pm 2/87
	P(independent t)	P=0/57	P=0/00

Discussion

This study was for the first time in Iran that investigates the influence of educational intervention in the field of urinary infection.

The results indicate that the health habits and behaviors have a leading role in the urinary infection. Therefore, being aware of the potential factors of urinary infection, and modifying these habits can decrease the urinary infection in pregnant women to a considerable extent (13). According to the findings of the study by Leila Tabrizian and et al., the factors including wearing pants ($p=0.008$), wearing nylon under wear ($p=0.01$), few times (once a week or less) of changing under wear during a week time ($p=0.042$), not eating sour liquids ($p=0.039$), not eating yogurt daily or every other day ($p=0.015$) and non-clean sexual organs of the husband before intercourse ($p=0.018$) are the foremost potential factors for infecting the subjects with the urinary infection (9).

According to another study of this researcher, not observing some health issues in relation with sexual intercourse is related to the urinary infection. In this regard, in order to prevent the married women from infection to urinary infection, it is suggested to hold the educational courses on healthy sexual relations for this group (14). The results of this section also reveal the fact that there is a relationship between the health behaviors and urinary infection, as well as delay in urinating and urinary infection ($p<0.01$) (8).

According to the scientists, awareness is not sufficient for taking preventive measures, rather ideology and thought about a disease, may be an important factor on preventive measures (15). In the study by Khajouye Shojai and et al., in the field of studying the ideology and performance of pregnant on the nutrition during pregnancy, and also in the study done by Askari Nezhad, and Bakhshi, on investigating the ideology of pregnant women on the pregnancy treatments, reveal the fact that it is needed to upgrade the awareness and ideology of pregnant in order to improve their performance (16,17).

The findings of this study indicate that the average score of the perceived barrier prior to the intervention was 6.49 which increased to 8.12 after the intervention. The increase in the average score of the comprehended impediments implies that

people recognize the impediments which prevent them from taking preventive measures and try to remove them. The studies (both prospective and retrospective) establish that perceived barrier is the most capable dimension in stating and forecasting health protective behaviors (18,19). The findings of this study established that the average score of perceived benefits prior to the education was 9.25 which increased to 9.94 after the intervention. Various studies have revealed the relationship between the perceived benefits and taking preventive measures. In other words, perception of advantages, paves the way (18). The study of Davati on the women in Tehran indicated that the comprehended advantages have the foremost important relationship with taking preventive measures against the sun rays (20). According to the findings of this study, the average score of the perceived sensitivity prior to the intervention was 9.10 which increased to 9.92 afterwards. The health belief model leads the person in a direction to realize their vulnerability to the disease and take risk lowering measures (12). Karmel, after studying 46 cases by means of HBM, concluded that the perceived sensitivity is the most powerful element in predicting the behavior (21). In this study, prior to the intervention, the average score of perceived intensity were 6.96 which increased up to 7.83 after the intervention. It is on the basis that awareness of the seriousness of urinary infection and noting the results and financial loads of treatment, play an important role in upgrading the perceived intensity.

The present study indicates that 62.7 of pregnant women under study were guided through mass media on preventive measures of urinary infection. Therefore, it appears useful to get help from the health belief model which is used for designing educational programs and persuasive messages to increase the awareness and change attitude through the media. Rahimi and Rasouli conducted a study on investigating the awareness of the pregnant women from the sports during the pregnancy, in which it was suggested to the mass media to take measures to increase the awareness of women on the sports during the pregnancy period. Aksari Nezhad and Bakhshi also noted application of mass media as a necessity and have suggested it. Ostovar and et al. have also indicated that the mass media may play a leading role

in educating the sexually transmitted diseases (18,22,23). In addition, our study revealed that 68.2% of the cases learned about the preventive measures of urinary infection from their husbands and 71.8% from their family (mother, sister, etc.). Therefore, it would be appropriate to draw attention to husbands in designing and developing educational programs.

Generally speaking, the results showed that designing and implementing the educational program based on Health Belief Model can be effective in preventive behaviors of pregnant from urinary infection, which is similar to the findings of the study by Moady and et al., in the field of investigating the influence of HBM-based education on the belief of breast self-examination (BSE) among the girl students (24), Kazemi and et al., in the field of investigating the influence of HBM-based education in modifying the pregnant's belief with respect to the environmental disadvantages of Tobacco smoking (25), Solhi and et al., in the field of Tooth and Mouth education through HBM method (26), Seiber and et al., in the field of taking measures in BSE (27), Tressa and et al., in the field of prevention risky sexual relationships (28), and Jefry in the field of dengue (29).

Regarding the fact that this study was for the first time in Iran that investigated the influence of educational intervention on urinary infection, therefore, the foremost limitation of the study was lack of parallel studies for discussion and comparison. On this account, the followings are suggested: Conducting similar studies in this field; Applying other educational models in this field; Recommending control, monitoring and following the educational issues in the implementation of the program Modifying common educational programs in the field of urinary infection and educating the pregnant women by the authorities in charge and upgrading the health through HBM. Optimizing the educational programs of Radio and Television by gaining help from the experts.

Conclusion

Planning an educational program based on the Health Belief Model could be applied for prevention of urinary infection and it may be conceived as a effectively proper solution.

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Association between students' satisfaction and motivation in nursery and midwifery education

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Abstract

The present study aimed to assess the association between students' satisfaction and motivation in nursery education. A total of 378 nursery and midwifery students were included to this correlational study. The data obtained with using Student Satisfaction Scale and Motivation Scale was analyzed by Pearson's Product Moment Correlational Analysis and Multiple Linear Regression Analysis. The results of the present study showed that all factors of the students' satisfaction together significantly predict the intrinsic and extrinsic motivations.

Key words: Student, satisfaction, motivation, education.

Introduction

Providing high quality health care determines the quality of life of individuals, families and community by directly affecting the health and disease status. High quality health care mainly depends on providing a qualified care. The quality of education of health professionals such as nurses and midwives is important, because it will determine the quality of health care they will provide after the graduation. Because improper health care practices are not acceptable and in order to increase the quality of care, successful nurses and midwives should graduate from schools providing nursery education (1). On the other hand, success of nursery students depends largely on an effective education, satisfaction and motivation. Nurses and midwives taking an effective education will help to maintain and improve the community's health (1, 2). For an effective education system, it is of prime importance to keep the education programs up-to-date in accordance with the requirements as well as to increase the satisfaction and motivation of the students (3).

Satisfaction is known as pleasure and is one of the major indicators of the quality of education (4, 5). The satisfaction of the students depends on several subfactors, including school management, quality of education and training, quality of trainers, guidance and support services offered to students, assessment and evaluation systems, and the students' participation in decision making. In this respect, satisfaction can be increased by appropriateness of course content and exam assessment systems, appropriate use of technology for the structures and hardware of the organization, physical environment of the organization, practice areas for students, providing the student's self-confidence, positive student-instructor communication, students' awareness of and participation in meetings and seminars, and improving the social and cultural opportunities (2, 6, 7, 8).

On the other hand, motivation is defined as state of being stirred to action and interacts with satisfaction. Motivation is classified into two groups, intrinsic and extrinsic, and it plays a key role in academic development. In parallel with the student satisfaction, motivation can be increased by the attitudes and behaviors of the teacher to the students, exhibiting positive trainer and consultant characteristics, developing and enabling different learning environments such as in-classroom and out-classroom learning, and contributing to the development of self-confidence. The academic performance would be expected to increase with increasing the satisfaction and motivation (9, 10, 11, 12, 13). By evaluating the current satisfaction and motivation of the students, the changes and innovations that can be made are determined and educational standards are developed. In recent years, the overall quality management studies were focused particularly on improving the quality of education (4, 14, 15).

Purpose

The present study aimed to assess the association between students' satisfaction and motivation in nursery education.

Methods

Design

A correlational study was carried out to reveal the relationship between satisfaction and motivation of the nursery and midwifery students. The correlational research design determines whether there is a relationship between two or more variables. This type of research design usually determines the degree of statistical significance of the relationship and ensures the correlation. The relationship is an expression about the degree of interaction between the relevant variables. A positive correlation indicates that the increase in a variable is compared with the increase in another variable. A negative correlation or relationship indicates that the increase in a variable is compared with the decrease in another variable (16).

Study sample

The study population comprised of 582 students from College of Health within a university from central Anatolia. Although we did not perform sample selection, some students were reluctant to accept to participate to the study and some were not accessible, resulting in a total of 378 students who volunteered to participate to the study. Students' mean age was 21 (SD: 1.67), mean point for acceptance to the college was 318 (SD: 25.4) and mean academic grade was 2.23 (SD: 0.51); the demographical data of the study population are shown in Table 1.

Data collection

Student Satisfaction Scale and Motivation Scale were used as data collection tools in the present study.

Student Satisfaction Scale. The instrument developed by Baykal et al. (2011) is designed to measure satisfaction of the students who are pursuing their education in an educational facility and comprises of a total of 53 items scored on a 5-point Lickert scale (7). Factor analysis of the instrument revealed five factors: (i) instructors, (ii) school management, (iii) participation in decision making, (iv) scientific and social opportunities, and (v) quality of education and training. Confirmatory factor analysis was used to determine the construct validity of the scale. In this context, it was determined if the predicted values are exceeding the theoretical limits before subjecting the subdimensions of the scale to the confirmatory factor analysis. According to the results, values in excess of the theoretical limits have been found. The chi-square (χ^2) values and statistical significance levels were determined [$\chi^2=749.34$, $df=269$, $p<.01$]. Depending on the degree of independence, the low chi-square (χ^2) values indicated that the proposed model is appropriate for the data collected. Moreover, other fit indices for the model also showed appropriateness of the proposed model [GFI=0.94, AGFI=0.96, CFI=0.91, RMSEA=0.08]. Factor loadings from confirmatory factor analysis ranged from 0.48 to 0.72. Within the scope of the standard fit values, this result shows that the values obtained for the same model validates the structure of modeled factor. The internal consistency of the scale was between 0.92 and 0.94 on the basis of Cronbach's alpha coefficient and was 0.97 in total.

Motivation Scale. The instrument developed by Acat and Köşgeroğlu (2006) measures the mo-

Table 1. Demografic distrubation

Characteristic		1	2	3	4	5	Total
Gender		Male	Famale				-
	η	112	266				378
	%	29.6	70.4				100
High School		General	Süper	Anatolian	Health	Others	-
	η	188	64	102	8	16	378
	%	49.7	16.9	27.0	2.1	4.2	100
Class		1.	2.	3.	4.	5+	-
	η	40	84	161	79	14	378
	%	10.6	22.2	42.6	20.9	3.7	100

tivation of students who are pursuing their education in an educational facility and comprises of 24 items scored on a 5-point Lickert scale (4). Factor analysis of the instrument revealed three factors: (i) intrinsic motivation, (ii) extrinsic motivation, (iii) and negative motivation. Confirmatory factor analysis was used to determine the construct validity of the scale. In this context, it was determined if the predicted values are exceeding the theoretical limits before subjecting the subdimensions of the scale to the confirmatory factor analysis. According to the results, values in excess of the theoretical limits have been found. The chi-square (χ^2) values and statistical significance levels were determined [$\chi^2=628.12$, $df=288$, $p<.01$]. Depending on the degree of independence, the low chi-square (χ^2) values indicated that the proposed model is appropriate for the data collected. Moreover, other fit indices for the model also showed appropriateness of the proposed model [GFI=0.90, AGFI=0.91, CFI=0.89, RMSEA=0.09]. Factor loadings from confirmatory factor analysis ranged from 0.34 and 0.68. Within the scope of the standard fit values, this result shows that the values obtained for the same model validates the structure of modeled factor. The internal consistency of the scale was between 0.88 and 0.91 on the basis of Cronbach's alpha coefficient.

Implementation

Both scales, Student Satisfaction Scale and Organizational Commitment Scale, were administered by the researchers to the students comprising the study population. The answering time was about 20-25 minutes. The analysis of data comprised of 4 stages. Details of these stages are presented below:

- I Stage I: Before proceeding to the statistical analyzes, data collection tools applied to the students were assessed by using 5-Lickert system.
- II Stage II: The mean and Standard Deviation values were calculated to determine the overall level of scores obtained from Student Satisfaction Scale and Organizational Commitment Scale.
- III Stage III: Pearson's Product Moment Correlational Analysis was used to determine

the relationship between the scores on Student Satisfaction Scale and those on Organizational Commitment Scale.

IV Multiple Linear Regression Analysis was used to determine if the scores on Student Satisfaction Scale correlates with those on Organizational Commitment Scale. In this analysis, the factors for Student Satisfaction Scale [(i) instructors, (ii) school management, (iii) participation in decision making, (iv) scientific and social opportunities and (v) quality of education and training were used as independent variables and those for Organizational Commitment Scale [(i) intrinsic motivation, (ii) extrinsic motivation, (iii) and negative motivation] were used as dependent variables.

Results

Descriptive Statistics of Data Obtained from the Scales

Table 2 presents the mean and standard deviations of satisfaction and motivation level of the nursery and midwifery students. Student satisfaction with the quality of education and training factor had the highest mean score of 3.45, while the lowest mean score of 2.88 was in the instructors factor. The overall mean satisfaction score of 3.39 indicates a medium-high level of satisfaction. With regard to the motivation levels of students, extrinsic motivation factor had the highest mean score of 3.75, while the lowest mean score of 2.86 was in the negative motivational factor.

Table 2. According student satisfaction and motivation level, mean, standard deviations

Sub Group	n	X	SS
1-Instructor	378	2.88	.86
2-School Administration	378	3.36	.85
3-To make Decision	378	3.27	.92
4-Science and Social Facilities	378	3.40	.76
5-Education and Teaching Attribute	378	3.45	.81
Student Satisfaction Total	378	3.39	.75
1-Intrinsic Motivasyon	378	3.46	.82
2- Extrinsic Motivasyon	378	3.75	.82
3- Negative Motivation	378	2.86	.86

Correlational analysis of the relationship between student satisfaction, motivation level and various variables

Table 3 presents the results of the correlational analysis performed to determine the relationship between student satisfaction, motivation level and various variables. The factor and overall scores on student satisfaction scale were positively correlated with the scores of intrinsic and extrinsic motivation factors ($r=.35$ and $r=.56$) but negatively correlated with the score of negative motivational factor ($r=-.23$ and $r=-.31$). In addition, there was a negative correlation between the instructors factor and the student age ($r=-.34$), while the class level was negatively correlated with the factors of instructors [$r=-.42$], school management [$r=-.12$], scientific and social opportunities [$r=-.10$], overall student satisfaction [$r=-.11$], and intrinsic motivation [$r=-.12$].

Multiple regression analysis of the relationship between the scores of student satisfaction and motivation

Multivariate linear regression analysis was used to determine if the scores of student satisfaction correlates or not with the factors of motivation. In order to perform multivariate linear regression analysis, the possible multicollinearity between the independent variables (student satisfaction factors) were checked by using Variance Inflation Factor (VIF) which revealed no multicollinearity [$VIF < 10$]. Moreover, scatter plots for error terms and independent variables ensure the requirement of homogeneity of variance assumption for the error terms. In addition, distribution of error terms for dependent variable [motivation factors] which is defined as the difference between predicted and observed values is controlled thro-

Table 3. The results of the correlational analysis performed to determine the relationship between student satisfaction, motivation level and various variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
1- Instructors	-												
2- School Administration	.88**	-											
3- To make Decision	.74**	.82**	-										
4- Science and Social Facilities	.73**	.76**	.79**	-									
5- Education and Teaching Attribute	.67**	.69**	.68**	.85**	-								
6- Student Satisfaction Total	.89**	.90**	.88**	.92**	.88**	-							
7- Intrinsic Motivasyon	.50**	.49**	.43**	.55*	.51**	.56**	-						
8- Extrinsic Motivasyon	.42**	.43**	.35**	.47**	.47**	.48**	.66**	-					
9- Negative Motivation	-.23**	-.29**	-.32**	-.30**	-.28**	-.31**	-.38**	-.36**	-				
10-Age	-.34**	.05	-.03	-.02	.01	-.02	.02	-.00	.05	-			
11-Class	-.42**	-.12*	-.09	-.10*	-.06	-.11*	-.12*	-.08	-.03	.50**	-		
12-School Puan	-.02	.03	.03	.01	-.00	.03	.01	-.03	-.04	-.34**	-.42**	-	
13-Academic Performance	-.05	.68	.06	.04	.02	.06	.04	.00	.05	.08	.05	-.05	-

$\eta=378$, * $p < .05$, ** $p < .01$

Table 4. The results of the multiple linear regression analysis that was performed to evaluate the correlation of the all factors of student satisfaction with the level of intrinsic motivation.

Student Satisfaction	B	SH _B	β	t	p
Fixed	1.23	.15		7.49	.00
1- Instructors	.08	.11	.08	.74	.46
2- School Administration	.07	.10	.08	.71	.47
3- To make Decision	-.22	.08	-.25	-2.61	.00
4- Science and Social Facilities	.29	.16	.27	1.73	.08
5- Education and Teaching Attribute	.52	.04	.51	11.70	.00

$\eta=378$, $R=.58$, $R^2=.34$, $F=38.945$, $p < .01$

ugh the inspection of Q-Q plots that show normal distributions.

Table 4 presents the results of the multiple linear regression analysis that was performed to evaluate the correlation of the all factors of student satisfaction with the level of intrinsic motivation. All of the student satisfaction factors were significantly correlated with intrinsic motivation factor [$F_{(5-378)}=38.945, p<.01$]. All of the five factors could explained the 34% of the change in intrinsic motivation score [$R=.58, R^2=.34$]. Moreover, participation in decision making and the quality of education and training were independent variables that correlate with the change in intrinsic motivation score.

Table 5 presents the results of the multiple linear regression analysis that was performed to evaluate the correlation of the student satisfaction factors with the level of extrinsic motivation. All of the student satisfaction factors were significantly correlated with extrinsic motivation factor [$F_{(5-378)}=27.575, p<.01$]. All of the five factors could explained the 27% of the change in extrinsic motivation score [$R=.52, R^2=.27$]. Moreover, all factors, except for instructors, were independent variables that significantly correlate with the change in extrinsic motivation score.

Table 6 presents the results of the multiple linear regression analysis that was performed to evaluate

the correlation of the student satisfaction factors with the negative motivation. All of the student satisfaction factors were significantly correlated with negative motivation factor [$F_{(5-378)}=10.05, p<.01$]. All of the five factors could explained the 11% of the change in intrinsic motivation score [$R=.34, R^2=.11$]. Moreover, the only independent variable that significantly correlates with the change in negative motivation score was participation in decision making.

Discussion

The purpose of the present study was to determine the relationship between student satisfaction and motivation in nursing and midwifery education. For this purpose the study was conducted in three phases to determine: (i) the overall level of satisfaction and motivation levels of students, (ii) The relationship between student satisfaction and motivation and (iii) correlation level between student satisfaction and motivation. The findings of this study can be summarized as follows:

- Student satisfaction was moderate for the nursery and midwifery students, with the quality of education and training factor had the highest mean score and instructors factors had the lowest mean score.

Table 5. The results of the multiple linear regression analysis that was performed to evaluate the correlation of the student satisfaction factors with the level of extrinsic motivation.

Student Satisfaction	B	SH _B	β	t	p
Fixed	1.78	.17		10.31	.00
1- Instructors	.11	.07	.12	1.55	.12
2- School Administration	.20	.09	.20	2.20	.02
3- To make Decision	-.21	.07	-.24	-2.77	.00
4- Science and Social Facilities	.23	.11	.21	2.09	.03
5- Education and Teaching Attribute	.23	.08	.23	2.65	.00

$\eta=378, R=.52, R^2=.27, F=27.575, p<.01$

Table 6. The results of the multiple linear regression analysis that was performed to evaluate the correlation of the student satisfaction factors with the negative motivation

Student Satisfaction	B	SH _B	β	t	p
Fixed	4.05	.20		20.20	.00
1- Instructors	.12	.08	.12	1.36	.17
2- School Administration	-.09	.10	-.08	-.85	.39
3- To make Decision	-.21	.09	-.23	-2.33	.02
4- Science and Social Facilities	-.07	.13	-.06	-.58	.55
5- Education and Teaching Attribute	-.09	.10	-.09	-.94	.34

$\eta=378, R=.34, R^2=.11, F=10.05, p<.01$

- A medium-high level of motivation was found, with the extrinsic motivation factor had the highest mean score and the negative motivation factor had the lowest mean score.
- Student satisfaction was positively correlated with the intrinsic and extrinsic motivation factors but negatively correlated with the negative motivation factor.
- The predictive power of all student satisfaction factors was statistically significant for intrinsic and extrinsic motivations. According to this result, intrinsic and extrinsic motivation levels increases with the increasing student satisfaction. Furthermore, the most important finding in multiple regression analysis was that none of the student satisfaction factors had any effect on motivation level per se, but they significantly affected the motivation level on the basis of combined effect of the factors.

Most of the studies on nursery and/or midwifery students reported a low level of satisfaction (1, 2, 6, 7, 17). The moderate level of satisfaction found in the present study may suggest that it is influenced by several factors including disharmony of the qualities of the university/department the students planned to study and those of they are studying, lack of interactive methods that allow the students to be actively involved in education-training activities, lack of the support from instructors, insufficient counseling, and the traditional management style of the college. On the other hand, the main reason for these situations may be the fact that the instructors, management, the service and physical facilities of the nursery and midwifery departments are still under development.

The present study detected no significant relationship between mean academic grade and the level of satisfaction, as was in the studies of Hu and John (2001), Karemera et al. (2003), and Ansari and Stock (2010) (5, 18, 19). This result may suggest that the students' satisfaction is affected from friendships, social and cultural opportunities, participation in decision making and individual characteristics rather than mean academic grade.

Students' satisfaction level and motivation are usually related to each other (4, 20). Increased level of satisfaction leads to increased motivation. In

the literature, positive teacher-student interaction and learning environment are reported to increase the satisfaction and success through contributing the development of student's self-confidence (9, 10, 11, 12, 13). This result suggests that like all other education and training facilities, providing and improving major factors that increase the satisfaction and motivation of the students such as offering support services, the effective use of teaching techniques and methods, organizing social and cultural activities, re-structuring school management in accordance with student needs, and improving of physical facilities is crucial to improve the quality of nursery and midwifery educations.

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Descriptive cross-sectional study: Analysis on the profiles, healthy lifestyle behaviors and quality of life of surgical nurses working in a province of Turkey

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Abstract

Introduction: Operating room nurses, working in their own isolated world of sterility, high-tech equipment are exposed to biologic, chemical, physical, psychological and ergonomic hazards. However studies conducted in the perioperative field have focused mostly on patients' health and safety and only a few studies have focused on operating room nurses' health behaviours.

Objective: The objective of this study was to determine the profiles, healthy lifestyle behaviours (HLB) and quality of life (QoL), and the correlation between the HLB and QoL of all surgical nurses working in a province of Turkey.

Design: This study was conducted with a descriptive and cross-sectional design.

Methods: The study was conducted in operating rooms of hospitals in the province of İzmir at the west of Turkey. 206 nurses who was working in operating rooms in the province of İzmir were included in the study. Study data were collected through a questionnaire. The questionnaire was composed of three parts: a sociodemographic data form, Healthy Lifestyle Behaviours Inventory (HLBI), and MOS 36-Item Short Form Health Survey (SF 36).

Results: It was determined that the global qualities of life mean score of surgical nurses was 66.10 (SD 14.56) while their general mean score of Healthy Lifestyle Behaviours Inventory was 125.37 (SD 18.41).

Conclusion: Quality of life and healthy lifestyle behaviours of the surgical nurses were found at the average levels. A significant relationship was found between gender and job satisfaction and the Healthy Lifestyle Behaviours Inventory and Qu-

ality of Life scores. There is a need to evaluate the causes of why operating room nurses' qualities of life and healthy lifestyle behaviours were not as high as expected. Hospital administrators need to keep in mind that improving nurses' health and fitness may decrease medical and disability cost, reduce absenteeism, improve job satisfaction, and increase productivity.

Key words: Nursing, profile, quality of life, healthy behaviour, Turkey.

Introduction

Lifestyle related illnesses arising from unhealthy eating habits and lack of physical activity are global problems (1). Some illnesses occur due to factors, which cannot be controlled by a physician. Some of these factors are individual's lifestyle, social conditions, genetic factors and physical environment, but they can be controlled by the individuals themselves. For a healthy lifestyle, individuals control all behaviors that affect their health and make choices appropriate for their own health status by organizing their daily activities (2).

Quality of life can be defined as a person's sense of well-being, which is based on his/her satisfaction from the parts of life that are important for him/her (3,4). *Quality of life* is defined by the WHO (World Health Organization) as an individual's perception of his/her position in life in the context of the cultural and value system in which he/she lives and in relation to his/her goals, expectation standards and concerns (3,5). The relationship between the quality of life and health is that in a quality life, the individual enjoys life fully and has a general feeling of wellness (6).

In international classifications, the health care sector within the service sector has been determined to be a sector with considerably high risk. Some research studies conducted so far have shown that health care workers are exposed to biological, chemical, physical, psychological and ergonomic hazards (7-11).

The perioperative area is one of the most potentially hazardous areas of all clinical environments (12). Surgical nurses usually face a number of risks, such as exposure to bloodborne pathogens, surgical smoke and anesthetic gases and they are at high risk for exposure to bloodborne pathogens from percutaneous injuries (13-16). Studies have shown that the various pressures that nurses encounter in the perioperative area can result in physical, emotional, social and spiritual problems. Physically, continuous exposure to stressful conditions can lead to tension, headache, stomach upset and fatigue. As for the psychological effects, it can cause nurses to display emotions, such as anxiety, fear, anger and experience mood and sleep disturbances, depression and disrupted relationships with family and friends. As a result of these feelings, healthy behaviors may be inhibited and such behaviors as overeating, alcohol consumption and smoking may occur in order to cope with stress. Eventually, these behaviors result in decreased productivity and efficiency and could significantly inhibit the effective functioning of an organization (12). Besides, more evidence is being set forth rapidly day-by-day to suggest that workplace stress plays an important role in several types of chronic health problems, in particular cardiovascular disease, musculoskeletal disorders and psychological disorders (13).

In one study conducted in Turkey, it was determined that surgical nurses were psychologically affected by such problems as work stress, unclear and irregular resting, eating and working hours and often did not have enough time for lunch because of a busy operating room (OR) schedule, usually felt tired because of the anesthetic gases and that these situations had a negative effect on the social and family relationships of the surgical nurses (17).

In the literature, it has been determined that there will be a higher quality care provided by nurses who have total physical, emotional, economic and environmental wellness, who love

their work and who fulfill their responsibilities to themselves, society and their profession (11,18). However, it is necessary for nurses to have a high quality of life in order to be able to provide such a high quality nursing care (19). Unfortunately, national and international studies indicate that nurses do not have a high quality of life. According to a national nursing study and the report of a health survey carried out in Canada, the general health status of nurses is either at an average or low level (20). It has been found in the studies conducted in Turkey that the quality of life levels of nurses are lower than other professional groups and even lower than factory workers (3,21-23). In Fadiloğlu et al.'s study, 73.3% of nurses providing care for dialysis patients defined their quality of life level as "moderate" (22). In Avcı and Pala's study, 60.1% of research assistants and specialists working in the faculty of medicine and in Ergün-Şenuzun et al.'s study, 61.8% of oncology nurses specified their general quality of life as "neither good nor bad" (21,23). It was also determined in Cimete et al.'s study, that 65.7% of nurses working in outpatient clinics, medical and surgical clinics and operating rooms at two university hospitals stated their general quality of life as "neither good nor bad" (3).

According to the results of the studies conducted on healthy lifestyle behaviors in Turkey, the global healthy lifestyle behaviors' score was found to be 115.19 in industrial employees, 117 (SD 17.1) in preventive health service personnel and 139.5 (SD 18.0) in lecturers (24,25). In the study conducted by Erci et al., the total healthy lifestyle behaviors' score of 47 nurses and 68 midwives working in preventive health services were found to be 121.5 (SD 20.9) (26). The healthy lifestyle mean score of 48 surgical nurses was determined to be 116.89 (SD 16.3) in Güner and Demir's study where operating rooms were described as environments that have serious effects on the health of personnel, because of the working conditions (27). In our review of the literature, we could find very few studies about healthy lifestyle behaviors and/or quality of life of the surgical nurses. Thus, the determination of the quality of life levels and healthy lifestyle behaviors of surgical nurses is of great importance in order to make up for this deficiency.

Methods

Objective

The objective of this study was to determine the profiles, healthy lifestyle behaviors and qualities of life of all surgical nurses working in a province of Turkey.

Setting and Sample

This descriptive cross-sectional study was undertaken at a district in the city of Izmir. The research included 206 nurses out of a total of 420 surgical nurses working in Izmir Province. The response rate was 49.04%, although an attempt was made to collect the uncompleted questionnaires. There are two university hospitals, twelve hospitals affiliated with the Ministry of Health and nine private hospitals in Izmir. Researchers went to the operating room departments of all hospitals to hand out and to collect the questionnaires. The questionnaires were attached to a short letter and distributed to all surgical nurses working in Izmir. The letter included details about the research and assured surgical nurses that their responses would be kept confidential and anonymous. Completed and returned questionnaires were considered to be an expression of consent.

- The questionnaire was composed of three parts.
- In the first part, there was a "Demographic Data Form", which contained 48 questions about the surgical nurses' demographic and professional characteristics and satisfaction from their jobs.
- The second part was the 48-item, 6-subscale "Healthy Lifestyle Behaviors Inventory (HLBI)".
- The third part was the "MOS 36-Item Short Form Health Survey (SF 36)".

Data Collection Instruments

Healthy Lifestyle Behaviors Inventory (HLBI)

The Healthy Lifestyle Behaviors Inventory is used to measure the health-promoting lifestyle of an individual. It has 48 items and 6 subscales, was developed by Walker et al. (1987) and adapted to the Turkish society by Esin in 1999 [28,29]. Reverse-language testing, reliability and validity of the factor structure of the inventory have been established previously [29]. The alpha coefficient for the

purpose of determining the internal consistency was found to be 0.91 and the Cronbach alpha reliability coefficient was found to be $r = 0.99$. The subscales of the Inventory are; Self-Realization, Health Responsibility, Exercise, Nutrition, Interpersonal Support and Stress Management. Every subscale can be used independently. A total score from the tool is the indicator of a healthy lifestyle. All items of the tool are positive statements in a 4-point Likert-type scale. They are rated as 1 (never), 2 (sometimes), 3 (frequently), or 4 (regularly). Maximum and minimum scores that can be obtained from the scale are 192 and 48, respectively.

"MOS 36-Item Short Form Health Survey (SF 36)"

The "MOS 36-Item Short Form Health Survey (SF 36)" was developed by RAND Corporation in order to assess the quality of life and was adapted to Turkey by Koçyiğit et al. who translated the tool into Turkish and conducted reverse-language testing validity and reliability studies. It is also a generic tool that has a broad spectrum of measurement [30,31]. The Cronbach alpha reliability coefficient was found to be higher than .70.

The tool composed of 36 statements has three main headings and it is a scale with multiple headings that evaluates 8 health areas under these headings. Quality of life (QOL) was assessed using the Short-Form 36 or SF-36, a generic health status instrument with 36 items comprising eight subscales – physical functioning, role functioning (physical and emotional), bodily pain, general health, vitality, social functioning and mental health. Subscales were: functional status (physical function, social function, physical role limitation, emotional role limitation), well being (mental health, vitality, pain) and general health understanding. In the standard version of the SF-36, all scale questions refer to a 4-week time period. The tool can be used to measure all dimensions of the quality of life as well as the global quality of life. The score for all subscales and global quality of life varies between 0 and 100. A score of 0 shows the worst state of health and 100 indicates the best. In this study, three main dimensions of the quality of life, which are general health understanding, functional status and health, were evaluated as well as the global quality of life [31-33].

Data analysis

The Statistical Program for Social Sciences for Windows 15.0 (SPSS Inc., Chicago, IL, USA) was used in the evaluation of the research data. The answers were summarized and expressed in frequencies and percentages. The Pearson correlation analyses were performed to test the correlation between the two tools. The analysis of variance and t-tests were also used with the aim of determining the relationship between the nurses' demographic data and their HLB and quality of life scores. The statistical significance level was set at $p < 0.05$.

Ethical Considerations

Ethical approval was obtained from the Ege University School of Nursing Ethics Committee. Prior to the start of the research, formal permission was obtained from the medical directors of the hospitals and from all participants in the study. All nurses were informed about the purpose of the study. Participants were assured that they would reserve the right to refuse to participate in or to withdraw from the study at any stage without any negative consequences. The anonymity and confidentiality of participants were guaranteed.

Results

Demographic Data

The age of the surgical nurses ranged from 20-58 years with a mean of 33.41 (SD 7.56) and a median of 32.00. All of them were working full-time at the time of the study and their work experience had a range from 1 year to 37 years with a mean of 12.57 (SD 7.85) (median 12.00) and 67.5% of them had not attended any orientation education.

Of the surgical nurses, 91.7% were female, 35.9% have associate (2-year university) degrees in nursing, 35.4% were working in the hospitals affiliated with the Ministry of Health, 82.5% were working as surgical nurses, 75.8% were working both daytime and night time shifts, 61.2% were married and 52.9% had children (Table 1).

In this study, 57.8% of the participants were working voluntarily in the OR, 92.7% stated that they would chose to work in the OR again if given

the option, 98.6% stated that they were quite satisfied (satisfied and very satisfied) with their profession and 50.5% of them were still attending education programs.

Table 1. *Demographics of Surgical Nurses*

Demographics	n=206	
Gender	Freq	%
Female	189	91.7
Male	17	8.3
Education		
Vocational school	56	27.2
Associate degree	74	35.9
Baccalaureate	71	34.5
Postgraduate	5	2.5
Place of Work		
University Hospital	62	30.1
Hospital Affiliated to the Ministry of Health	73	35.4
Private Hospital	71	34.5
Nurses' Duty in OR		
Charge Nurse	27	13.1
Surgical Nurse	173	82.5
Anaesthesia Nurse	9	4.4
Work Schedule in OR		
Daytime	35	17.0
Daytime and night duty	156	75.8
Other	15	7.2
Marital Status		
Married	126	61.2
Single	80	38.8
Having a child		
Yes	109	52.9
No	97	47.1
Total	206	100.0

A total of 81.6% of the surgical nurses stated that they did not read a professional journal regularly, 51.9% were not members of a professional organization, 71.3% expressed that they went to the movies regularly, 44.2% read a daily newspaper and 79.6% expressed that they went on holidays regularly.

Healthy Lifestyle Behaviors

The surgical nurses' mean level of global healthy lifestyle behaviors were found to be 125.37 (SD 18.41). In the examination of the HLB inventory subscales, the mean score was 36.85 (SD 6.18) for self-realization, 23.66 (SD 4.88) for

Table 2. *Healthy Lifestyle Behaviors (HLB) Inventory Subscale Mean Scores of Nurses*

Healthy Lifestyle Behaviors Inventory Subscale	Healthy Lifestyle Behaviors Inventory Mean Scores (n=206)				
	(Min-Max)	Min	Max	Mean	SD
Self-Realization	(13-52)	24	52	36.85	6.18
Health Responsibility	(10-40)	13	40	23.66	4.88
Exercise	(5-20)	5	20	9.52	3.18
Nutrition	(6-24)	9	24	17.95	3.27
Interpersonal Support	(7-28)	12	28	20.35	3.43
Stress Management	(7-28)	9	26	17.03	3.45
Total	(48-192)	80	188	125.37	18.41

health responsibility, 20.35 (SD 3.43) for interpersonal support, 17.95 (SD 3.27) for nutrition, 17.03 (SD 3.45) for stress management and 9.52 (SD 3.18) for exercise (Table 2).

The relationship between the demographic data of the nurses and their HLB inventory scores is shown in Table 3. A significant relationship was found between the total HLB and age group ($F=2.588$, $p=0.038$), professional satisfaction level ($F=6.981$, $p=0.001$) and place of work ($F=4.953$, $p=0.008$). However, the relationships of the total HLB with gender ($t=0.788$, $p=0.432$), marital status ($t=-0.077$, $p=0.939$), having children ($t=-1.165$, $p=0.245$), education ($F=1.542$, $p=0.205$) and experience in OR ($F=1.859$, $p=0.119$) were not found to be statistically significant (Table 3).

Quality of Life

The quality of life scores of the surgical nurses examined in our study were found (global quality of life) to be 66.10 (SD 14.56) (Table 4). The relationship between the demographic data of the nurses and their quality of life scores is displayed in Table 5. A significant relationship was found between the global quality of life and place of work ($F=4.108$, $p=0.018$). However, the relationships between gender ($t=-1.45$, $p=0.148$), professional satisfaction ($F=2.023$, $p=0.135$) and quality of life scores were not found to be statistically significant (Table 5).

According to the Pearson correlation test, weak, positive linear correlations were found between the HLB and Quality of Life tools ($r=0.321$, $p<0.01$). No statistically significant relationship was found between the nurses' quality of life subscale scores and their demographic characteri-

stics, including educational level, marital status, years of employment or work schedule ($p>0.05$).

Discussion

An Association of periOperative Registered Nurses (AORN) survey found that the mean perioperative nurse was 47.3 years old (34). This value was found to be 30.05 (SD 5.29) years old in Göçmen's study and 33.41 (SD 7.56) in the current study (35). Thus, we can conclude that the surgical nurses are younger in Turkey.

More than half (57.8%) of the nurses in this research chose to work in the OR and nearly all (92.7%) would choose to work in the OR again if given the option. This result is encouraging from the perspective of professional nursing and it probably has a positive effect on patient care.

In the literature, it has been reported that nurses who are satisfied with their jobs are more willing to improve their professional skills and assume more responsibility (8). In this study, almost all of the nurses (98.6%) stated that they were quite satisfied with their profession (satisfied and very satisfied). Likewise, in a study carried out by Özbayır et al. on 150 surgical nurses who were working in hospitals in Izmir Province, job satisfaction levels of nurses were found to be high (80.25) (36). Göçmen found that 71.3% of surgical nurses were satisfied with being a surgical nurse and Hope et al. found that 85.3% of nurses working in hospitals were satisfied with their jobs (35,37). The surgical nurses' high level of job satisfaction increases their willingness to work in the OR. This willingness may have a positive effect on the service and care provided by them.

Table 3. The relationship between the sociodemographic data of the nurses and their scores of Healthy Lifestyle Behaviors Inventory

Socio-demographic Data	Healthy Lifestyle Behaviors Inventory Subscale Scores Mean (SD)						
	Self-Realization	Health Responsibility	Exercise	Nutrition	Interpersonal Support	Stress Management	Total HLB
Age Group							
19-24	36.47(5.52)	22.15(4.84)	8.94(2.65)	16.36(3.30)	19.78(3.86)	16.78(3.30)	120.52 (17.74)
25-29	36.66(5.71)	23.25(4.21)	9.25(2.29)	16.44(3.16)	20.42(3.10)	16.64(3.19)	122.67(14.67)
30-34	36.31(6.56)	23.61(5.05)	9.20(3.15)	18.55(3.01)	20.42(3.47)	17.12(3.66)	125.24(19.26)
35-39	36.25(6.08)	22.41(4.04)	9.93(3.58)	17.61(2.88)	20.06(3.76)	16.54(3.09)	122.83(18.39)
40 and Over	38.26(6.59)	25.67(5.49)	10.19(3.94)	19.95(2.68)	20.60(3.45)	17.82(3.75)	132.52(20.40)
F	0.800	3.129	1.039	10.665	0.255	0.974	2.588
P	0.526	0.016*	0.388	0.000*	0.906	0.423	0.038*
Gender							
Female	125.67(18.64)	36.88(6.12)	23.70(4.90)	9.55(3.26)	18.12(3.26)	20.38(3.48)	17.02(3.38)
Male	122.00(15.65)	36.41(6.88)	23.17(4.75)	9.23(2.01)	16.00(2.57)	20.05(2.90)	17.11(4.18)
t	0.304	0.425	0.390	3.184	0.370	-0.104	0.788
P	0.761	0.671	0.697	0.004*	0.712	0.917	0.432
Marital Status							
Single	37.08(6.26)	23.38(5.17)	9.73(3.25)	17.08(3.42)	20.40(3.73)	17.55(3.84)	125.25(19.72)
Married	36.69(6.14)	23.83(4.70)	9.38(3.14)	18.50(3.04)	20.32(3.24)	16.70(3.14)	125.45(17.60)
t	0.440	-0.638	0.766	-3.088	0.152	1.719	-0.077
P	0.661	0.524	0.445	0.002*	0.880	0.087	0.939
Having a child							
No	36.53(5.56)	23.31(4.53)	9.55(2.70)	16.88(3.24)	20.34(3.46)	17.17(3.21)	123.81(15.76)
Yes	37.12(6.68)	23.96(5.17)	9.49(3.56)	18.89(2.99)	20.36(3.42)	16.90(3.65)	126.76(20.45)
t	-0.668	-0.944	0.140	-4.631	-0.056	0.554	-1.165
P	0.493	0.346	0.889	0.000*	0.956	0.580	0.245
Education							
Vocational School	36.50(6.67)	24.00(4.54)	9.23(2.29)	17.26(3.29)	19.73(3.40)	16.82(3.02)	123.55(16.60)
Associate degree	37.41(5.83)	24.40(4.97)	10.09(3.51)	18.70(2.55)	20.64(3.24)	17.41(3.61)	128.68(18.15)
Baccalaureate	36.36(6.09)	22.43(4.94)	9.15(3.38)	17.61(3.76)	20.56(3.46)	16.83(3.69)	122.97(19.70)
Postgraduate	39.20(7.29)	26.20(3.56)	9.60(3.20)	19.20(3.03)	20.00(5.78)	16.60(1.67)	130.80(19.43)
F	0.653	2.664	1.275	2.676	0.898	0.483	1.542
P	0.582	0.049*	0.294	0.048*	0.443	0.695	0.205
Experience in the OR							
0-5	36.59(5.62)	22.88(4.45)	8.80(2.41)	16.75(3.16)	20.11(3.37)	16.77(3.14)	121.92(15.19)
6-10	36.26(7.17)	23.46(5.26)	9.76(3.66)	18.14(3.35)	20.46(3.55)	16.96(3.92)	125.07(22.46)
11-15	38.03(6.57)	24.50(5.18)	9.96(2.77)	18.76(2.65)	20.88(3.62)	17.11(3.35)	129.26(18.67)
16-20	37.71(5.99)	24.38(5.28)	11.28(4.20)	19.47(2.94)	20.61(3.08)	17.85(3.05)	131.33(17.25)
20 and Over	37.10(5.19)	25.73(4.22)	9.42(3.25)	19.89(2.60)	20.05(3.67)	17.36(3.97)	129.57(17.34)
F	0.507	1.747	2.990	6.823	0.331	0.468	1.859
P	0.731	0.141	0.020*	0.000*	0.857	0.759	*0.119
Professional satisfaction							
Very Satisfied	38.51(6.22)	24.33(4.76)	9.48(3.15)	18.41(3.42)	21.01(3.25)	17.53(3.45)	129.30(17.52)
Satisfied	35.17(5.68)	23.01(4.98)	9.59(3.25)	17.62(2.89)	19.79(3.41)	16.58(3.39)	121.79(18.47)
Not Satisfied	32.00(.00)	21.00(2.64)	8.66(2.08)	12.00(2.00)	15.00(3.46)	13.66(.57)	102.33(3.78)
F	9.016	2.331	0.144	6.901	7.354	3.453	6.981
P	0.000*	0.100	0.866	0.001*	0.001*	0.034*	*0.001

Place of Work							
University	35.27(6.23)	22.29(4.80)	9.20(3.37)	17.38(3.58)	19.95(3.77)	16.19(3.33)	120.30(19.48)
Ministry of Health	37.46(6.17)	24.97(4.69)	10.12(3.47)	18.97(2.57)	20.90(3.21)	17.65(3.46)	130.09(17.89)
Private	37.59(5.95)	23.50(4.85)	9.18(2.58)	17.39(3.39)	20.14(3.31)	17.12(3.42)	124.94(16.91)
F	2.948	5.325	2.025	5.788	1.507	3.123	4.953
P	0.055	0.006*	0.135	0.004*	0.224	0.046*	*0.008

* $P < 0.05$ Table 4. *Quality of Life subscale mean scores of nurses*

Quality of Life Subscale	Quality of Life Mean Scores (n:206)				
	(Min-Max)	Min	Max	Mean	SD
Functional Status	(0-100)	9.38	100	78.63	20.47
Well Being	(0-100)	15.0	96.6	61.99	15.87
General Health Understanding	(0-100)	0	95.0	57.68	16.02
Global Quality of Life	(0-100)	18.2	96.4	66.10	14.56

Table 5. *The relationship between the demographic data of nurses and their Quality of Life scores*

Socio-demographic Data	Quality of Life Subscale Scores Mean (SD)			
	Functional Status	Well Being	General Health Understanding	Global Quality of Life
Gender				
Female	78.49 (20.43)	61.31 (15.68)	57.18 (16.02)	65.66 (14.54)
Male	80.22 (21.40)	69.54 (16.42)	63.23 (15.40)	71.00 (14.27)
t	-0.333	-0.333	-2.06	-1.45
P	0.740	0.740	0.04*	0.148
Professional satisfaction				
Very Satisfied	78.14 (21.76)	63.86 (15.31)	60.66 (15.50)	67.55 (14.87)
Satisfied	79.52 (18.25)	60.16 (16.47)	55.05 (15.46)	64.91 (13.68)
Not Satisfied	67.29 (43.14)	55.22 (8.03)	37.50 (28.17)	53.33 (26.42)
F	0.581	1.664	5.776	2.023
P	0.560	0.192	0.004*	0.135
Place of Work				
University	76.15(21.09)	57.01(14.21)	52.37(15.55)	61.84(14.51)
Ministry of Health	79.41(21.30)	63.78(17.06)	58.32(15.44)	67.17(15.16)
Private	80.00(19.09)	64.49(15.17)	61.65(15.94)	68.71(13.29)
F	0.665	4.550	5.907	4.108
P	0.515	0.012*	0.003*	0.018*

* $P < 0.05$

The fact that approximately one fourth (23.3%) of surgical nurses stated that they did not feel that they were adequate in complex areas of their profession, such as an operating room, poses a risk, both for the employees and the patients. Nurses who feel inadequate working in complex areas, such as the OR, are a risk both for the employees and for patient's safety.

Half of the nurses analyzed in this study (49.5%) expressed that they did not attend the continuous

education programs regularly, which is of concern for the profession. It is clear that educated surgical nurses have considerable knowledge about risk management of the specific hazards within the operating department (34). Professional education also decreases work stress of the nurses (8,19).

It was determined in this study that the professional organizations and monitoring of scientific developments required for a profession to have a strong focus were inadequate. An overwhelming

majority of the nurses (81.6%) stated that they did not read a professional journal regularly, more than half (51.9%) were not members of a professional organization and less than half (44.2%) read a daily newspaper. Nurses may have difficulty getting access to scientific journals in Turkey. There are no specific journals in Turkish related to surgical or operating room nursing. Although the internet is available in all hospitals, the English knowledge level of a majority of nurses is inadequate for reading and understanding an international journal. Göçmen found that 62.8% of surgical nurses did not have orientation education, 82% did not read a scientific journal and 42.6% did not attend continuous education programs (35). It was detected in a study by Gözümlü et al. that the majority of the nurses did not have knowledge about professional organizations and journals, none of them were members of an organization and only 2.9% had a subscription to a journal (38). Our findings were consistent with the results of Göçmen and Gözümlü (35,38).

Working and resting times of nurses should be appropriate and regular so that they can allocate time to their families after working hours or can engage in free time activities (18). Irregular working hours and night duties make it difficult to maintain regular eating and exercising habits (1). In our study, 71.3% of the nurses stated that they participated in free time activities such as going to the movies (147 people) and going to the theater (25.7% -53 people). Having time to participate in these types of social activities may improve the morale of nurses and have a positive effect on their professional lives.

Healthy Lifestyle Behaviors

The nurses examined in this study were found to have healthy lifestyle behaviors at an average level (125.37). According to results of various studies conducted in Turkey, the total healthy lifestyle score was found to be 115.19 among industrial employees, 117 among preventive health services personnel, 120.88 in women, 121.5 in nurses and midwives working in the preventive health services and 139.5 in lecturers (24-26,29). In light of these results, it can be concluded that healthy lifestyle behaviors of surgical nurses are slightly higher than other groups, except for academicians. It has also been determined that the ge-

neral health status of Canadian nurses is low (20). However, Friis et al.'s study showed that Danish nurses have a healthier lifestyle when compared to other Danish women (39).

Although our findings are similar to those obtained in the literature, it was expected that nurses, as members of the health care team who have received education on this subject, would get higher scores on the HLB inventory.

In the analysis of the HLB inventory subscales, the highest mean was obtained for self-realization and health responsibility, followed by interpersonal support, nutrition and stress management. The lowest mean was found for exercise. Our findings are in parallel with the findings of the studies conducted by Güner and Demir, Pasinlioğlu and Gözümlü and Esin, but they are different from the study by Persson and Martensson (1,24,27,29). They found that the majority of nurses working during night shift exercised regularly and had healthy eating habits. An AORN project showed that exercise programs offered to employees help relieve stress (on the SF-36 tool) experienced in the operating room and increase job satisfaction. It has been stated that exercise should be a part of the weekly work of perioperative nurses and hospitals should create a positive and healthy environment and help employees to become healthier (34). Obtaining a low mean score from the exercise subscale is consistent with the results of a study conducted by Duffy et al. (40). This situation may constitute a risk factor and nurses may be put at risk for developing many chronic illnesses in the future.

The fact that the surgical nurses have a high level of professional satisfaction and they would choose to be a surgical nurse again if given the chance is supported by their high scores on the self-realization subscale.

Quality of Life

In our study, global quality of life of the surgical nurses was found to be at an average level (66.10). Their highest quality of life mean score was in the functional status subscale while their lowest quality of life mean score was in the general health understanding area. In a study conducted by Kaya with employees of the emergency response team, 49.4% of the physicians, 61.5% of the nurses and midwives and 54.3% of the health officers descri-

bed their quality of life as moderate (6). In a study by Cimete et al., 65.7% of the nurses; in Avcı and Pala's study, 60.1% of the physicians; in Fadiloğlu et al.'s study, 73.3% of the dialysis nurses; and in Ergün-Şenuzun et al.'s study, 61.8% of the oncology nurses stated that they had moderate quality of life levels (3,21-23). In Chiu et al.'s study, the surgical nurses exhibited better subjective quality of life assessments than the nurses working in ward and emergency room or intensive care units (41). Although our findings are consistent with the literature, the qualities of life of employees need to be raised to improve the quality of patient care.

In the examination of the relationship between the demographic characteristics of the surgical nurses and their quality of life subscales, no significant correlation was found between quality of life and educational level, marital status, years of employment and work schedule. These results are not consistent with the literature (3,23). This finding may have resulted from the difficult working conditions of the operating rooms, in particular the inability to take breaks and the high risk of exposure to bloodborne pathogens and other environmental hazards. In the literature, difficult working conditions have been determined to have a negative effect on the general quality of life (3,23).

Conclusion

Nurses, who have important duties and responsibilities in the protection and improvement of health, need to act as role models for the public by displaying exemplary health behaviors and protecting their own health. Especially surgical nurses working in such a critical area need to protect their own physical and mental health, and to this end, they need to adopt healthy lifestyles. In this manner, they protect both themselves and their patients from occupational hazards. However, the nurses included in the sampling of this study were found to have average levels of healthy lifestyle behaviors and their quality of life scores were found to be low. This finding needs to be taken into consideration by administrators in their efforts to eliminate negative factors from the profession in order to increase quality of life levels and healthy lifestyle behaviors of nurses. Administrators may launch programs actively promoting wellness in

the workplace, such as targeted health promotion activities, fitness programs, health fairs, safety training and medical screening to avoid lifestyle-related illness arising from unhealthy eating habits and lack of physical activity. In addition, nurses need to be informed about nursing organizations to help them acquire a professional awareness and they need to be provided with the necessary resources, so that they can read professional journals. Healthy lifestyle behaviors should also be integrated into the nursing curriculum.

Abbreviations

AORN, Association of periOperative Registered Nurses

HLB, healthy lifestyle behaviors

HLBI, healthy lifestyle behaviors inventory

OR, operating room

QOL, quality of life

SF-36, MOS 36-item short form health survey

WHO, World Health Organization

Authors' contributions

FDK has made a substantial contribution to the study conception and design. FDK, EO, RC and AED implemented this study and participated in the acquisition, analysis and interpretation of data. FDK, EO, RC and AED have been intimately involved in drafting and editing the manuscript. All authors read and approved the final manuscript.

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Proposing a reform in health system of countries under the system of General Deputy

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Abstract

Health as an essential issue has its own delicacy. Since insufficient attention to this issue can bring about losses to the health of society as well as wasting the resources spent in this section. The dimensions of an organizational structure in health systems such as structural and content ones in these countries face traditionalism resulting in large drops in innovation and creativity. Despite the great efforts of some countries in decentralization, the centralization approach is still dominant in health structure. So, in response to problems and challenges arising from the need for justice, quality, and efficiency, some reforms along with fundamental, targeted and sustainable properties within the health system in these countries is essential seem essential.

Key words: reform, health system, General Deputy

Introduction

World Health Organization has defined health as people's complete physical, mental and social comfort. According to the broad aspects of this definition, the importance of divine grace is more evident. Health has two important features, first it is considered as essential need and fundamental right of people and on the other, it is an area for rapid change. Subsequent changes in diseases, evolution in health concepts, technology development in diagnosis, treatment and services all show the speed of changes in health. Health sector in society covers a vast area in which providing its suitable condition requires national determination. Its provision is one of the main tasks of governments and laws in each country with the rule that indicate the health status of the country.

Decision making in health system has its own difficulties. Many years and a lot of patience are required for important decisions and major programs so that the expected impacts of the policy. For example, picking the expected fruits of the family doctor program requires years of effort and organized reforms in the health system. It means that careful and long term planning is necessary and policy makers should pay special attention to the time and constantly notice it. It also requires substantial financial and human resources; executives need to seriously change their procedures and should interact with the performance of many stakeholders within the health system as well as other government departments and private sectors. If the policy maker is trying to remove a program in the country or to stop the transmission of the disease within the country, it cannot be applied in a short time. Changing people's behavior and bringing up some changes in difference areas of development in the country, changing the behavior in the health service of health system, changing the type of interaction with neighbors, enabling people in deprived areas are the necessities for having this policy. In other words, policy maker's decision is a long-term commitment to change so that the consequences of this sweet decision can be felt later. In turn, there are decisions in the health system whose results can be obtained in a short time. Macro-structural changes are the ones in which the period of a decision and the result is short. Structural changes are presented and a policy maker put them into practice in a short time and finally "outcome" is achieved. For example, we can simply speak of the dissolution of an organization and, if feasible, a relatively short period of time it is applicable. Problems in such decisions are that the mediating result and outcome

or desired outcome and main goal are mistaken. ListenRead phonetically

Policy maker does not interfere in order only to bring up structural changes in the macro structure. In this respect, another goal is desired. For example, reduction or increase in costs in the health system and improvement of public health or a better coverage of the poor level. These are the main targets and the result of favorable policies. But structural changes are the short-term results that are observed. They are remarkably fast and can be shortly obtained by the practitioners. Hence, the macro-structural change is the best option for decision makers.

Global evidence and several countries' experience indicate likely and small benefits of macro-structural changes (especially when they are not intertwined with any special programs) as well as the high costs in macro-structural changes. In recent years, the issue of collapsing the structure of health systems in many countries following the policy of the Public Department has been repeatedly discussed. Creating a reform in health system seems necessary in the current situation as some changes occur in the face, type and structure of diseases and infectious diseases have been replaced with non-communicable diseases and heavy costs have been imposed on families and society which is inevitable in most of these countries. On the other hand, multiple responsibilities in some of these countries, decisions and parallel services with other parts of the government in terms of the operations are considerable. Its cost is certain and it will show itself in a long-term disruption when delivering service to citizens and critical functions provided for the society by these organizations. Despite the fact that the executive power in many of these organizations in parallel with Health Organization is more limited and little expertise in them has been created. In this context, the model which is considered comes from the experiences of countries under the national medical system which appears to have had a significant success in the following strategies. Moreover, the service recipients' satisfaction levels are above average in the countries under the system of public deputy. However, our proposal for the reform was based on the type of political, social and cultural level and economic income in these countries with each position and the facilities. So this paper, regar-

dless of the types of changes, proposes a strategy for useful changes, using opportunities, adapting with changes. These strategies can help the health system to face with the environmental changes in a best manner and bring about changes to better achieve goals of the health system and respond to customer needs.

First strategy:

National Policy for Health System

In the present condition multiplicity of decision makers and health finance providers has made health systems in these countries not have the right position and the political will necessary for reform and change in management as well as delivering health services to the public. Many countries consider all the existing social and national institutions for monitoring the service quality and people's satisfaction with practices and the outcomes of health services as a strong point. Thus, in some countries such as Australia, France and Sweden and the board of several central and state organizations supervise health services on behalf of the people and government. It also monitors feedback in national, local and regional policies in these countries. When policy making and setting goals in national development of health and its macro strategies are discussed, strong national organizations are needed for scientific and society-oriented policies with the necessary authority so that they can be able to plan and manage at national level. Downsizing the structure, assigning of all administrative affairs and health services to lower levels, removing the mission of the medical education management from the health system, executing management and supervising all resources allocated from the central government such as taxes and dedicating them to the National Health Council including: public health records of all government ministries and government agencies that have separately access to some part of public resources called health care.

Strategy Two:

Organizational Structure of Health Sector

Organizational aspects of health system structure and content of such criticism is to be developed in the structural aspects of high idealism and therefore recognize innovation and creativity

has been decline. Despite great efforts for decentralization approach is still focused on the health structure is dominant. peripheral units of the next organizational structure, task-oriented approach, has expanded over the complexity and lack of communication between units and organic sectors suffering. Substantive dimension “to encourage employees” to the poor health goals and corporate culture to move in bringing human motivation and providing vital health services to the community the best is not enough. Place and manner of the private sector participation and quality monitoring organization communicate with the public sector has an aura of uncertainty that underlies the abuse of absolute freedom, or sometimes undermine this section provides. Therefore simplify the design structure matrix approach and manpower requirements with the knowledge and skills required of national planning and management is inevitable.

Strategy Three:

Leveling Health Care Services

Access to health care services is the inalienable right of every citizen. Establishing appropriate structures to provide health facilities in different parts of a country is one of the most important tasks of governments. This plan emphasizes the referral system in different villages, towns and cities. But perhaps what is important in the implementation phase of this project and has influence on its success is increasing people's awareness and understanding regarding the referral system. In fact, different people whether those who are rendering health care services or those who are recipients of these services must have required knowledge in this regard. Leveling health services is recommended with criteria such as population, geographical access, cultural level, social context, level of enjoyment of health care facilities and grading care services based on regional population index, covered population and the amount burden disease in the region, type and outbreak of the disease in the region, variety of equipment and hospital beds. For example, “in some areas some diseases are communicable and non-communicable or outbreak of a disease is more than that of another disease in other areas. These facts have effects on leveling and prioritizing of health services.”

In the plan of leveling health services, hospitals and medical centers are divided into several categories

such as regional, polar and national ones. One of the important advantages of this leveling is that the patient's commuting is prevented. Institutionalization of this system in the society needs culturalization among the people as consumers and physicians and the government as service providers.

Strategy Four:

Financing health sector

One of the main features of the most successful countries in providing health for the community is the logical way of providing funds and maximizing the share in public sector (central and local taxes, insurance contributions) than the share of people paying out of their pockets in order to finance health services. It is done so that people feel secure and have peace of mind at disease time and do not ignore health care in case of disability and poverty. There are different methods to finance and pay costs in the health system including direct payment of all costs of treatment by clients and those required health care as well as those who enjoy free services. However, international agencies recommend that financing health systems should be done in such a way that service providers and recipients have least financial relationship. “It is clear that in a health care system that people are forced to search for needed services or receive care and treatment should significantly pay health service fee directly from their pocket to pay for those services. Access to services is possible for those who could have paid it and there is also the possibility that the poorest members of society remain deprived of it. Fairness of protection against financial risk requires highest degree of separation between financial participation and consumption (enjoyment of the service). This comes true especially for those interventions that are costly for households' payments. What determines the balance between a patient and a physician is the patient's need and the physician's expertise, not the financial capacity or limitations. Obviously, financial constraints cause many needs to remain unanswered. It seems if the costs of national planning and policy making in health sector are reduced, public funds are divided in terms of population and as per capita premiums are allocated to the social insurance organizations so that they can buy services at hospitals and centers based on

service packages and buy insurance to purchase the service consider the principles of quality standards and service centers. In this case, people can have access to more desirable in terms of quality and quantity of services (increasing the service pack slightly) and to receive insurance reimbursement, hospitals and centers are obliged to act on favorable performance indicators and competitive environment to attract patients and consent are provided. Moreover, self handling of hospitals can be practical through maximum revenues from insurance and minimum cash.

Of course to fulfill these wishes, the share of health should come from tax, national income, local tolls and incomes from local agencies responsible such as municipalities, factories and industries polluting the environment in a desired manner. Further, insurance organizations should have the capacity to plan (defining standard service package, setting realistic tariffs, the appropriate way of paying and a comprehensive information system) and to have appropriate control mechanisms and to move within the country's health policies.

Strategy Five:

Human Resource Management

Manpower especially trained and skilled manpower is an important investment for any organization. Fortunately, most human resources in health sector in these countries have a high level of knowledge and skills that in turn requires reasonable management. Giving least legal rights to a majority of employees (experts, the majority of doctors and paramedics and nurses), feeling unfair with minimal staff (a group of managers and clinicians), weak non-financial incentives such factors as job and workplace and mechanisms to encourage and encourage health, workers have faced the challenge of incentive. Since their satisfaction level and service quality directly is related to public health, one of the first modern management strategies in this section should be built on the correct use of tools by management staff. Perhaps with a little spending, proper planning of jobs, promotion of staff, convenient way of paying and elimination of discrimination could be a possible way of directing human resources in this section. Due to this, despite of the fact that there are unemployed trained forces, there will be no suffering from the poor

index of one doctor or one nurse in a thousand people. Matrix structure and enhancing team performance in policy making and designing processes and jobs at operational level of service, mapping the career path clearly, managing employees' performance based on contracts as well as payments corresponding job performance, adopting the proper method of payment for each level, designing the logical model of health managers on the basis of knowledge, experience and performance records among the graduates of majors such as clinical with more technical skills (required for operating system level) and management graduates with management skills (required for planning and policy levels) seem to be desirable combination of both knowledge and skills in the form of individuals or management teams that can improve ways of managing this section.

Strategy Six:

Management Technology in Health Sector

Today, management knowledge and interventions in the health organization, medical and office equipment, medical procedures and drugs are considered as health technology. These technologies after health manpower are investments of a country. As in a business sector proper investing relies on accurate and comprehensive information and experiences that take into accounts all the benefits and risks, selecting and using health technologies (due to the expensive cost and extent of use for the entire population of a country) requires efficient policy making, selection and use. For example, bringing some expensive drugs into the country and adopting a broad management policy without the necessary studies lead to exorbitant costs and getting the least benefit for the patient and society. Health organizations particularly health service providers are mostly after acquisitions of new technology because the interests of patients and society are obtained through technology. If prior to admitting an expensive technology or technology that, if approved, will widely be used and the system may suffer heavily due to maintenance costs and its use, necessary studies should be done. In that case, efficiency and productivity of resources will be more and the potential losses to patients will be less. Applying health technology assessment tools and comprehensive review

of emerging technologies or the ones being used in order to minimize errors in selection and use of technology, establishing a board for monitoring new technologies such as the New Medical Technology Association, or center of technology and study projects technology assessment by academic teams and scientific consulting groups and on the other after selecting the appropriate technology, good management of the next technology is required after planning, resource allocation and maintenance and training of user so necessary intervention is required in technology management at national and regional levels.

Strategy Seven:

Managing Financial Resources in Health Sector

Of all health sector challenges and what comes to mind and occupies the politicians' and administrators' mind and always heavily affects their thoughts and actions are costs, reduced budgets and resource limitation. On the other hand, according to the process of crediting and the variety of activities in the health sector, the low share of public budgets from local governments and the low share in health sector from the total gross domestic costs, high cost share of the household's total health expenditure are considered as the limiting factors in providing the cost of the health sector. Although the health sector budget in these countries rather than the traditional incremental budget based on classified inputs improved as the operational budget, there is still a large gap up to performance-based budgeting. The cause of this failure is the system's weakness in costing or calculating all costs at the level of rendering and managing services. Adopting appropriate ways in key payment for changing behavior of providers especially hospitals and doctors with new methods of paying "per capita and the" DRG can lead to better service, more staff and more important priorities. The basis of budgeting reform is promoting the accounting system from cash to commitment and calculating the cost of service and cost analysis. On the other hand, standardization of operations and ways of measuring performance are the prerequisite for performance-based budgeting. Although the extent and variety of services in hospitals, centers, and headquarters is not easy but the only way to treaty making the bed for performance-based human

resources management, performance-based budgeting and costing services. To change the payment system, there is also a need to define and standardize service packages, technology packages and standardization of medical procedures through the Clinical Practice Guidelines or the Clinical Guide to Performance so that basis of payment should be on accepted scientific procedures for treating every patient or every category of classified diseases. In this case, according to the possible and certain diagnosis of disease, paying standard-based operation is done individually or globally and the costs are directly connected to the documented output. Then there will be no other over-diagnosis operation or leading the patient to inappropriate procedures or costly treatment, unless staff or physician accepts additional fees and penalties. Hereby, the patients will be in a secure environment and costs and will never be exploited financially or medically. So applying the appropriate way of paying is both an incentive mechanism to changing behavior and improving the system, and is a means of controlling unnecessary expenses and operating safety and patient satisfaction in terms of physical and economic dimensions.

Strategy Eight:

Organization Information Management

One of the deeply rooted problems of the health system is the little benefit which can be obtained from integrated information systems in health service management at policy and operational levels. Integrated information management system is an area of the information in the fields of performance in an organization which is considered as integrated and full. Therefore, there is a possibility of planning and forecasting future in an organization. For example, personnel information separately, basic budgeting principles and information systems a separate budget documents and accounting field operations in a separate islands of information and data management, information equipment, software and different software framework organizing said. Even if all the events following the efforts of different sectors for organizing information of management (not just administrative action) occurred, due to rupture of the main loop of management information in the organization, there is a problem in management reporting and planning multiple interventions between the central parts. For example,

designing the actual system of performance-based budgeting requires the existence of a management spirit on all aspects of information management in the organization. Today, many organizations have come to believe in the role of the system in guiding and coordinating activities for the organizational objectives. If we want consider the satisfaction of all interested groups we should look at our activities from different aspects and this requires the establishment of different management systems in the organization. But the establishment of different management systems with the specific needs of each of them not only cause confusion and complexity but it will bring about problems such as resource losses, huge amount of documentation, repetitions, reducing the performance efficiency of the organization, the conflict between the policies and goals defined for each system. The solution to preventing these problems is the integration of different management systems in a unit management system. Different management systems have needs for all or some of them are common. In integrated management system the common requirements are identified and are merged between systems. On the other hand, the specific requirements of each of the systems are put together and will ensure that do not conflict with each other.

Strategy Nine:

Listening to Customers (Voice of Customer)

If a patient is displeased with the process of doing a service, long waiting times, confusion in the corridors of hospitals and insurance or encountering people at the time of admission and paying additional fees or illegal one, how and what legal procedures can he take so that changes can be made in the origin of these services, so that this problem will not be repeated for other patients. The same way if the physician suffers from lack of medical resources and materials, diagnostic or therapeutic tools necessary for the patient or the organization's not compensating his services and not providing the path for his promotion, are there any ways and effective institutional channel to improve conditions of his employment or service.

In other systems these roles are given to non-governmental organizations which are inquisitive and there are necessary strategies for effectiveness of these criticisms or demands, in a way that the

customer's statement was not only legal and systematic, but also the consistently active mechanisms of polls, analysis of comments and responses to them through the national supervisory bodies and relevant organizations will be put into practice.

For example, National Board of Health and Welfare and the National Board of Social Insurance in Sweden, Regional Council in Romania, state and local councils in most European countries and municipalities in which the mayor or municipal council are directly selected by the people as good observers of services to patients. So predicting and designing stable legal mechanisms with much shorter process and effective power over policies and health programs of each country and the real not false presence of patients' representatives in formal gathering for national and regional health services and designing the active mechanism for listening to patients (for example, surveys of patients at discharge time and 10 days later), and the staff and their feedback to the planning and administrative procedures of the organizations are recommended.

Strategy Ten:

Scientific Instruments and the Role of Knowledge Management and Health Economics

Today's world is aware of the importance of science and art of management as the only solution to the progress of organizations and countries that have been able to get help from findings, tools and knowledge management for discovering and solving their problems have been successful in the field of industry, trade and services. It goes without saying that health system management and organizations of health service providers face with complexities and the serious organizational issues today and the relative differences of service market with other sectors. According to the same needs, people in and out of a country have earned academic knowledge but unfortunately the health system's enjoyment from knowledge and skills management science and health economics is actually seriously neglected, despite so much effort. Although physicians and clinical experts are treasures of technical knowledge in this area, the management of these complex systems needs a combination of managerial and clinical knowledge and this has been experienced in the world. Some people criti-

cize managerial capabilities of some graduates in this field regarding individual personality and level of effort by departments which violates international law of using academic graduates in this field of study in sensitive careers. However, smart doctors with case study or participating in meetings may be able to get familiar with some of modern management concepts and tools trying to the useful source of reform in the organization. However, academic study about a subject creates all-round vision rooted in diligent and interested people at different levels of knowledge which are also tangible in other disciplines. In this regard, serious attention to health economics and management education in universities in the country and job training to managers and designing formal mechanisms for management experts and health economics along with clinical specialists in community decision-making and overall management are inevitable.

Conclusion

Every organization needs a planned change which is a regular action to restructure the way in which organizations can adapt with changing conditions in their external environment in order to achieve new goals. Thus, this work is difficult and sometimes costly. But such a change in that regard is important because it can help your organization to adapt with changes that occur in the organization and environment that may threaten its survival. The dynamicity and continuity of such movements in organizations depends on the changes and flexibility in each of the operations based on organizational goals.

Another important point is that change and its way are very crucial. It means that if a method is successful in a specified time and place, it cannot be successful in another nation and country. Therefore, all patterns of change are used with deep study on the community and organization so that all powers of the country and society can be efficiently used especially the efficient and optimal use of experts and the efforts and this cooperation is effective even if we face with failure.

Also, mentioning this point is necessary if change is accompanied with proper management, it can be utilized for the organization in a positive way. But if the manager does not have the

ability to deal with change, the change becomes a crisis that can sometimes even lead to failure of the organization. When managers also encounter the complex conditions and changes, they must alter the views as Edison changes his mind pattern when inventing electricity. So he never spent his time on improving the performance of the candle, because he knew that the new scheme should start.

Organizational change is a continuous process of testing and accordance which compromises the capabilities of the organization with needs of a dynamic and uncertain environment. Policy making, financing, organizational structure, human resource management, information technology management, finance management, listening to customers, scientific instruments and the role of knowledge management and health economics are the main elements of this process.

Although in the past these concepts were about commercial and manufacturing organizations but they were used in this sector and continue there. So this paper, regardless of the kinds of changes, introduces helping tools for beneficial changes, using opportunities, coping with changes and The tools that can help the health system to get along with the best environmental changes and create changes for improving the situation, better access to the goals of health system and respond to customer needs.

Creating a flexible organization and updated can help the manager to take the correct, rapid and effective approach with changes, to best use the emerged potential opportunity due to changes, and to improve and develop the organization and to obtain goals and meet the needs of the organizations and also to provide high quality products and services in a relatively short period of time.

Because of the several reasons stated in relation to health system's problems, like getting into a competitive environment and using market mechanisms the need to change for survival is felt more than before. Therefore programs for change and reform for achieving health system goals and responding to community needs and expectations must be developed. For success and better adaptation with the environment, access to high quality services, satisfaction of employees and customers, competitiveness, reduction of costs, reduction of service delivery time, using the above-mentioned strategies is suggested.

It seems desirable that any organization should have such a flexible and dynamic structure so that by receiving change messages from the environment will itself change and this way it will provide this continuous coordination with their changing environment.

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Investigation of the effect of education on risk factors in patients with history of myocardial infarction

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Abstract

This study was performed in order to determine the effects of education and the type of education with regard to behaviors, on risk factors and in decreasing risk factors in patients who have experienced myocardial infarction for the first time, respectively.

The study enrolled 100 patients with acute myocardial infarction admitted to the coronary care unit, department of cardiology of a university hospital, between 30th of March 2003 and 15th of February 2004.

A two-part survey was used to collect the data. The questionnaires comprised of a socio-demographic questionnaire and an evaluation form of the result of care.

Differences between average scores after care in the experimental group were found to be statistically significant between 1st, 2nd and the 3rd controls, whereas the difference between 1st, 2nd and the 3rd controls in control group was found to be insignificant. This study showed that a planned, supported and repetitive educational program initiated at an early stage is more effective for patients.

Key words: Myocardial infarction, patient education, risk factors

Introduction

Coronary heart disease (CHD) is the most common cause of morbidity and mortality in developed western countries as well as in our country. (1,2) The number of elderly patients who happen to be susceptible to repetitive cardiovascular incidents is increasing due to the increasing average life span and advances in treatment options. (2)

According to workshop of TEKHARF carried out by Turkish Cardiology Institution, it has been

found that nearly 2 million people in our country suffer from coronary heart disease (CHD). The annual mortality rate of CHD in our country is 5.1% in men and 3.3% in women. 45% of all deaths in this country are caused by cardiovascular diseases, with 36% of deaths occurring due to heart diseases, and 32% coronary artery diseases. (3) Cardiac rehabilitation reduces mortality and enhances quality of life. (4) Control and conservative studies are thought to be effective in developed countries as deaths caused by CHD are on the decline. (5)

Cardiac rehabilitation is recommended following a cardiac event such as a myocardial infarction or open-heart surgery since patients are taught health-promotion lifestyle behavior changes. (4)

As a result, literature proposes that post-MI patients and wherever possible their spouse/partners, are given information regarding the condition, risk factors, medications, diet, psychological concerns, activities, stress management and symptoms, so that they can manage the post-discharge period safely and make informed decisions about potential changes in life-style. (6)

Review of the literature

It is a widely accepted belief among healthcare professionals that patient education for survivors of MI is valuable. Patients benefit by learning about their disease, and how to reduce risk factors and modify their lifestyles. When caring for survivors of MI, healthcare professionals believe that patient education is a crucial part of treatment. The interdisciplinary team assumes that by learning about their illness and its treatment, patients can better manage their disease, prolong their lives and improve their quality of life. (7) Survivors of acute myocardial infarction are at a considerably increased risk of suffering further cardiac events. The

development of secondary prevention programs is therefore an important task. (8) Improved compliance with the prescribed treatment regimen and subsequent reduction in hospital readmission may be achieved through comprehensive educational programs. Compliance may be enhanced if patients believe that ordered safe and effective treatments are needed, and if they perceive that adequate support is received from their health care provider, with a relationship that is based on trust and respect. (9,10) Cardiac education and cardiac rehabilitation aim to improve patients' long-term survival and recovery after myocardial infarction through education on risk factor management. Risk factors place the patient at a higher risk than normal, of developing ischemic heart disease. These include smoking, hypertension, elevated serum cholesterol, obesity, diabetes and lack of exercise. Patients are commonly taught about management of these topics through written and verbal information regarding anatomy and physiology, lifestyle, medications, exercise, and dietary advice. (11)

There are also many dimensions to the concept of patient education. Education in general is recognized as an important part of nursing interventions. (12) These interventions are designed to support patients in their decision making, and most decision aids for patients are informative in nature. (13) Some successful nursing interventions have been found to improve quality of life. (14)

The outcomes of patient education have received considerable research attention in the past few years. There are no defined standards in patient education and studies related to differences in applied education over patients are very limited in our country. But, standardization of the applied education methods is very important in the efficacy of the given education on patients. With standardization in education, the probability of misunderstanding of a given education would decrease.

This study is carried out in order to determine which of the different educations applied is more effective on behaviors so as to decrease the risk factors in patients who have experienced MI for the first time. Healthcare professionals can utilize these findings to develop teaching programs that truly meet the need of patients.

Methodology

Sample

The study enrolled 100 patients with acute myocardial infarction admitted to the coronary care unit, department of cardiology of a university hospital, between 30th of March 2003 and 15th of February 2004. The hospital where this research was conducted, is the largest hospital in eastern Turkey, and almost all patients with myocardial infarction in this region, particularly living in the vicinity of Erzurum, are treated there.

Instruments

A two-part survey was used to collect the data. The questionnaires included; a) a socio-demographic questionnaire, b) a form evaluating the result of care.

- a) Socio-Demographic Questionnaire: This questionnaire was used to assess patients' basic information, such as gender, age, marital status, employment, education, body-mass index, cholesterol level, blood pressure, smoking and alcohol habits, history of other diseases and awareness about own illness. This form was filled out by both groups on the second day of hospitalization
- b) Form of evaluation of the result of care: This form was prepared by researchers and applied to experimental (n=50) and control groups (n=50) discharged from the hospital when they turned up for their first (30-35 days later from discharge), second (60-70 days later) and third (90-100 days later) control visits. With this form, the status of smoking, weight gain, blood pressure, cholesterol level, adaptation to their diet and drug use were determined for the period after their discharge from the hospital. Evaluation of the result of care was determined over three points. If the target were reached in the evaluation, 3 points were given. If partial success were reached, 2 points were given and patients with unchanged status took 1 point.

Procedures

Data were obtained by individual conversation with patients and information taken from patient files (cholesterol and blood pressure level taken at the time of discharge from the hospital). Weight

information was obtained and recorded by a previously proven accurate recording scale according to body mass index.

Data acquisition was begun with the control group. The demographic forms were filled by patients in the control group on the second day of their hospitalization. Group education was given to patients in the control group by researchers for 20 minutes, once every 15 days until the end of their 3rd controls. Groups were made up of 5-7 individuals. Patients were informed about the time of group education by prior phone calls by researchers. In the education, information about heart anatomy, systemic and pulmonary circulation, information about obtaining and normal levels of vital signs, definition and signs of myocardial infarction, nutrition after MI, example lists of diet, physical activity and sexual intercourse after MI, returning back to work and subjects regarding drug taking were given verbally by the researcher. Questions regarding life after MI were answered by the researcher. Evaluation forms of care result were applied to patients in the 1st, 2nd and 3rd controls when they came to the outpatient cardiology clinic. Following acquisition of data from the control group, data acquisition from the experimental group was commenced. Control and intervention group patients were matched in order to lessen the effects of some independent variables on the patients' education. The matching variables were age, sex, educational level, marital status, and working status.

The socio-demographic forms were applied to patients belonging to the experimental group on the second day of their cardiology intensive care hospitalization. Education commenced on the same day by first handing out education booklets. Education was given by researchers to patients on a one-by-one basis. Pictures and posters were used along to make topics easier to understand. A family member was allowed to stay with the patient during the education to help care of the patient after discharge from the hospital. Group education was given to the experimental group as in the control group. The evaluation form of the result of care was applied to the experimental group on their 1st, 2nd and 3rd control visits.

To be eligible, patients had to be 30 years of age or older, to have no known psychiatric or neurological disorders that would interfere with comple-

tion of measures, to have been faced with MI for the first time in their lives, and to be able to read Turkish. The nature and purpose of the study were explained. An information form explaining the aim and content of the study received written consent from the chief of cardiology department of the research hospital. Researcher explained that patients were free to join to the study, that obtained personal information would remain confidential and that they could stop their participation at anytime they wanted and only volunteers participated in the study. Considering the possibility that patients could influence others, experimental and control group subjects were not taken in the study at the same time. Therefore the number required for the control group of patients were obtained first and studies on the experimental group were begun later.

The patient education brochure

To support verbal information through utilization literature and expert opinion, the patient education brochure was developed by the researcher in the light of literature.(15,16,17) In the patient education brochure named "life after MI", information regarding heart anatomy, systemic and pulmonary circulation, information about obtaining and normal levels of vital signs, definition and signs of myocardial infarction, nutrition after MI, example lists of diet, physical activity and sexual intercourse after MI, returning back to work and subjects regarding taking drugs were given.

Data Analysis

In the analysis of the data, descriptive statistics were computed for patients' characteristic. The chi-square and independent t-test were used to determine the similarities between the control and the intervention groups in terms of control variables. In order to determine whether there was a difference between the average end of care score obtained at different times in the experimental and control groups, repetitive surveys of single factor variance analysis for the analysis, and t test to determine differences between the groups were used. T test was used for sex, Mann Whitney U test for education, occupation, weight, cholesterol level, blood pressure, daily cigarette smoking status, and Kruskal wallis variance analysis for smoking years and end of care scores.

Findings

A total of 100 patients with myocardial infarction took part in this study. The mean ages of the control and experimental group were similar (59.78 ± 10.07). Most of the patients in both groups were male 82 %, had graduated from primary school 84%, and 98% of the control group and 100% of experimental group of patients were married. 62% of both groups of patients were overweight at the time of discharge from the hospital. 42% of patients had Cholesterol levels over 240 mg/dl in the experimental group, whereas this figure was 34% in the control group and this difference was not found to be statistically significant. ($p > 0.05$) According to average blood pressures of participating patients recorded during the hospitalization period, 80% of the control group had pressures below 140/90mmHg, whereas 82% of patients in control group had levels below 140/90 mmHg. The difference between the groups was considered statistically insignificant. ($p > 0.05$) It was also found that 52% of patients in the experimental group were smoking and 52 % of patients took alcohol but had quit, whereas 68% of patients in the control group were smoking and 22% of patients took alcohol but had quit and the difference between the groups was found to be statistically insignificant. ($p > 0.05$) It was observed that 100% of the experimental group and 98% of the control group had received no education about their illnesses before.

Comparing the end of care scores of experimental and control groups, patients belonging to the experimental group received 16.68 ± 2.30 points on the 1st control (30-35 days after discharge from hospital) 18.66 ± 2.64 points on the 2nd control (60-70 days after discharge), and 20.56 ± 2.40 points on the 3rd control (90-100 days after discharge). Average end of care scores increased pro-

gressively in patients in the experimental group on every control and differences between each control was found to be statistically significant. ($p < 0.05$) Patients in the control group received 14.64 ± 2.39 points on the 1st control, 15.14 ± 2.44 points on the 2nd control, and 15.46 ± 2.69 points on the 3rd control. Average scores of the control group also increased progressively on each control but differences between controls were found to be statistically insignificant. Differences between the groups were found to be statistically significant however ($p < 0.05$) (Table 1).

Comparing the average adaptation scores of smoking cessation, blood pressure and drug taking between the experimental and the control groups, differences between 1st, 2nd and 3rd controls were statistically significant as were the differences between the groups ($p < 0.05$) (Table 2). Comparing the average cholesterol level and average scores of diet adaptation in participating patients, differences between 1st, 2nd and 3rd controls in the experimental group was statistically significant. ($p < 0.05$) Differences between 1st, 2nd and 3rd controls in patients belonging to control group were found to be insignificant statistically ($p > 0.05$). Difference between groups was statistically significant ($p < 0.05$) (Table 2).

A statistically significant difference was found when comparing adaptation scores of outpatient clinic and group education on the 1st, 2nd and 3rd follow-up controls in the experimental group ($p < 0.05$). Differences between 1st, 2nd and 3rd controls were found to be statistically insignificant in the control group ($p > 0.05$). Difference between groups was found to be statistically significant ($p < 0.05$).

Differences between sex, level of education, profession and average score determined at the end of care were statistically insignificant ($p > 0.05$).

Table 1. Comparison of average scores of end of care in patients belonging to experiment and control group

Group	Status of measurement			
	1 st Control X±SD	2 nd Control X±SD	3 rd Control X±SD	
Experiment group	16.68±2.30	18.66±2.64	20.56±2.40	t:-3.702 ; p<0.05
		Mauchly's W=.736, Sd=2, p<0.05		
Control group	14.64±2.39	15.14±2.44	15.46±2.6	
		Mauchly's W=.926, Sd=2, p<0.05		

Table 2. Comparison of averaging adaptation scores in 1st, 2nd and 3rd controls of the patients in experiment and control group

Smoking	1st Control X±SD	2nd Control X±SD	3rd Control X±SD	
Experiment group	2.00±0.00	2.07±0.26	2.42±0.50	
		Mauchly's W=0.578, p<0.05		
Control group	1.80±0.47	1.88±0.40	1.97±0.29	t:-2.46, p<0.05
		Mauchly's W=0.818, p<0.05		
Cholesterol				
Experiment group	1.94±0.31	2.06±0.37	2.38±0.49	
		Mauchly's W=0.962, p<0.05		t:1.097, p< 0.05
Control group	1.18±0.40	1.20±0.40	1.26±0.44	
		Mauchly's W=0.592, p<0.05		
Weight				
Experiment group	2.06±0.23	2.36±0.48	2.60±0.49	
		Mauchly's W=0.968, p<0.05		t:1.865, p<0.05
Control group	2.06±.23	2.06±0.23	2.14±0.40	
		Mauchly's W=0.572, p<0.05		
Blood pressure				
Experiment group	2.10±.36	2.70±0.50	2.84±0.37	
		Mauchly's W=0.799, p<0.05		t:-2.486,p<0.05
Control group	2.32±.62	2.68±.61	2.68±0.58	
		Mauchly's W=0.882, p<0.05		
Diet				
Experiment group	2.08±.44	2.36±.48	2.82±.38	
		Mauchly's W=0.955, p<0.05		t:-2.778, p<0.05
Control group	1.76±.51	1.82±.48	1.82±.48	
		Mauchly's W=0.833, p>0.05		
Drug Usage				
Experiment group	2.66±.47	2.78±.41	2.98±.14	
		Mauchly's W=0.936, p<0.05		t:-3.57, p<0.05
Control group	2.20±.45	2.34±.51	2.32±.55	
		Mauchly's W=0.952, p<0.05		

Discussion

In general, cardiac rehabilitation programs offer education about the heart and risk factors for coronary artery disease. The reported effects of such programs differ considerably. Some studies have reported positive results of formal patient education on behavioral factors, for example exercise, smoking cessation, coping, and resumption of sexual activity. The studies were small and differed in design as well as time of follow-up. One study reported a better state of returning to work, and a better smoking status with counseling sessions given by a nurse rehabilitator. In contrast to that study, another study was found to have no beneficial effects on the

psychosocial outcome from a nurse rehabilitator intervention and suggested that special counseling programs may not be beneficial. (8)

In the end of our study, the average end of care score was found to be higher in the experimental group than in the control group. In previous studies too, educated MI patients were shown to have better adaptation. Results of this study are parallel to those in literature, which reminds us that education program applied to the experimental group is more effective. (18)

Also, as it is previously stated in some other studies, importance of the time of start of education and repetitions during the follow-up period on

increasing the efficacy of education programs given to the patients is emphasized once again. (6,19)

Average scores about smoking cessation were found to be higher in the experiment group than in the control group. In some previous studies it has been emphasized that educated patients have higher adaptation in ceasing smoking. (8,20,23) These results also emphasize the importance of early starting of education during hospitalization and repetitive follow-ups. Initiating the smoking cessation program during the hospitalization period followed by repetitive counseling during the follow-up may have improved the result.

Average scores of adaptation of patients regarding cholesterol levels were found to be higher in the experimental group. Results in our study were parallel to that of Tokem, Bahar & Özcan. (18)

This difference may also be due to a better state of adaptation of drug use and diet in the experimental group than in the control group. It has been reported that the most favorable impact on cholesterol levels is from multifactorial rehabilitation programs that include exercise training, dietary education, counseling, psychological support and pharmacological treatment. (23,24) It has been observed that, adaptation to reach targeted body-mass index of patients in the control group was better than that of the control group after discharge from the hospital. In many conducted studies, results of educated patients were found to be better than that of uneducated patients. (20,25) Blood pressure adaptation average scores in the group are increased in time in both groups but the difference between the two groups was found to be statistically significant. This difference may be due to better adaptation of drug use and diet in the experimental group compared to the control group. Also this shows that efficacy of education given to the experiment group was better.

Average scores of diet adaptation was higher in the experiment group showing that, as in all results, education program given to the experimental group was more effective than that of the control group. Some earlier studies have also detected positive effects of dietary education. (8,23,26)

Adaptation to drugs was found to be higher in patients in the experimental group. Wang et al. (27) (2011) showed that adaptation of drug use in patients participating in the cardiac rehabilitation

program was positively affected. In this study, it was also observed that patients in the experimental group continued their adaptive responses to drug use and better preserved their adaptation in comparison with control group of patients.

There are two limitations for this study. First, it was conducted at a single centre, and therefore may have lacked generalization. A second limitation was that we did not have any cost comparison data of our intervention and usual care, which made it impossible to draw any conclusions about the cost-effectivity of the program.

Researcher should compare the effectiveness of different teaching methods. To apply these types of studies in Turkish hospitals, it is required to develop a philosophy by nurses and other health care professionals, to get the hospital administration's support on patient education activities. Also, with this way, more emphasis could be given on other studies exploring efficacy of different education programs and we believe that this could be a guide for a wiser approach and in turn increase the efficacy of care given to patients by healthcare workers. Planned health education must be prepared to facilitate adaptation of patients against their illnesses and education must commence right after they pass the acute period of infarct. Long term follow-up of the patients is necessary for the given education to prove effective

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The efficiency evaluation of Out-of-Pocket healthcare expenditure in China: Data envelopment analysis-tobit analysis based on panel data

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Abstract

Background: Several times healthcare reform have been implemented by China central government since the 1980s. And the government also greatly increases the state healthcare expenditure especially from the new century. But the problem of inadequate and overly expensive medical services still does not alleviate for normal people.

Objective: To examine that the out-of-pocket(OOP) healthcare expenditure efficiency decreasing induces the stagnation of total healthcare expenditure efficiency, though the state healthcare expenditure efficiency is increasing. And analyze the influence factors of the OOP healthcare expenditure efficiency.

Data and methods: The provincial panel data from 2002 to 2009 by the Statistics Bureau of China were utilized. Data Envelopment Analysis(DEA) method is applied to study the efficiency of provincial total healthcare and OOP expenditure. Panel Tobit model is used to analyze the influence factors of OOP healthcare expenditure efficiency.

Results: Our results indicate that the state healthcare expenditure efficiency is increasing but personal OOP healthcare expenditure efficiency is descending. So the total healthcare expenditure efficiency is not rising and the problem of inadequate and overly expensive medical services is not solved. There are different OOP expenditure efficiency among 3 different regions in China. The efficiency of east regions are higher than that of the west and central regions. The efficiency influence factors include population structure, per local fiscal expenditure, urbanization ratio, per GDP and population scale.

Conclusions: It is the descending of OOP healthcare expenditure efficiency that impedes the government solving the problem of inadequate and overly expensive medical services. The government should pay more attention to govern the influence factors of OOP healthcare expenditure efficiency. Especially for the central and west regions government, pure economic increasing model should be turned into overall social development.

Key words: Out-of-Pocket healthcare expenditure efficiency, healthcare reform, DEA-Tobit Model, economic development.

Introduction

China's healthcare system has been through great changes since the application of Reform and Opening-up policy. The central government has implemented several reforms in the healthcare industry. Different from those in other industries, however, reforms in healthcare didn't achieve the desired results. In contrast, problems such as inadequate and overly expensive medical services, acute physician-patient relationship and rapidly increasing medical costs, are getting worse and worse. In this situation, whether government or public, are aware of the importance of increasing investment in health care. During the 3-year period from 2009 to 2011, Chinese government has made a total fiscal expenditure of 850 billion and related works have been carried out in 5 aspects including the basic medical insurance system, the national essential drug system, the primary healthcare service system, the basic public health services and the public hospital reform. Positive results are achieved. The fully coverage of basic

medical insurance system is largely accomplished. Breakthroughs are made in national essential drug system. Primary healthcare service system is further improved. And the equalization of basic public health services is accelerating as well as the public hospital reforming process.

However, how to analyze the effects of healthcare reform quantitatively? How is the total health expenditure efficiency while China's total expenditure on health in the current is composed by state healthcare expenditure, social healthcare expenditure and personal out-of-pocket(OOP) healthcare expenditure? With so many research results supporting the conclusion that the healthcare expenditure efficiency of China's provincial government is rising, (1,4) why can't consumers obviously realize the benefit brought by healthcare reform and why is the problem of inadequate and overly expensive medical services still exist? Taking each province as a whole in this paper, first we use the DEA method to analyze the efficiency of total healthcare expenditure, state healthcare expenditure and OOP healthcare expenditure. Then we analyze the influence factors of each province's OOP healthcare expenditure efficiency by panel Tobit model. This paper is organized as follows: Section 2 makes literature review and summary of the existing researches. Section 3 briefly describes the research method and data and the 4th section evaluates various types of healthcare expenditure efficiency from the year 2002 to 2009. An analysis of the influence factors of OOP healthcare expenditure efficiency is presented in section 5. And in the last, comes up with the proposals to increase the OOP healthcare expenditure efficiency, thus to increase the total healthcare expenditure efficiency ultimately.

Literature Review

A variety of efficiency evaluate methods have long been used in health economics. Some studies point out that, it is relatively easy to make a theoretical definition of output and allocative efficiency of health resources, while making an empirical technical analysis turns out to be rather difficult (5). As health economists stress the frontier study, data envelopment analysis (DEA) and stochastic frontier analysis (SFA) are applicable in health economics. Some studies summarized the methods of effici-

ency evaluation applied for hospital and healthcare system (6), and others studies made a detailed comparison of the strengths and weaknesses of DEA and SFA while evaluating the efficiency of health organizations (7). With micro survey data, some Chinese scholars made a general analysis and evaluation of the operational efficiency of China's 249 city hospitals while others analyzed the efficiency of health clinics in townships (8, 10). With macro statistical data, Some researchers evaluated China's regional health production efficiency (1). Some researchers selected life expectancy, infant mortality and childhood immunization rates as the output of state healthcare expenditure. Rather than the above indexes (11), some studies analyzed the healthcare expenditure efficiency of China's local government of 1997 and 2003, using the more explicit data including health output and amount of the state health organizations, health technicians and bed facilities in health organizations (3). Some researchers analyzed the technical efficiency of OECD countries by DEA and pointed out that there was a waste of resources in America's health investment (12). A recent study compared the proportion of per capita income and health spending in GDP and the proportion of OOP expenditure in total expenditure of OECD countries, and came up with the conclusion that OOP healthcare expenditure efficiency is relatively low in the United States (13).

Meanwhile, a large number of scholars are also concerned about the factors that affect the output efficiency. Such as some researchers pointed out that income was the major factor of healthcare spending rapidly increasing (14). Some scholars indicated that industrialization and urbanization on the one hand enhanced the capacity of government fiscal expenditure, and promoted people's demand for public expenditure on the other hand (15). Some studies analyzed the influence factors that OOP and informal healthcare expenditure affected the efficiency of Georgia's health services, which included institutional factors such as culture and trust of demand side, government support and transparency management of supply side, etc (16). Other studies analyzed the changes and influence factors of OOP healthcare expenditure in Vietnam from 1992 to 2002, whose economic reform and health system changes is similar with China (16). They got the conclusion that the proportion

in total expenditure and the efficiency of OOP healthcare expenditure were affected by differences of ability to pay and coverage of health insurance. A recent Chinese studies analyzed the influence factors of state healthcare expenditure based on Wang Jun's (2008) research, especially analyzed fiscal decentralization and healthcare reform's effects on the efficiency of healthcare output (4). Another recent Chinese studies examined the factors affecting the healthcare spending of China's urban and rural residents with panel data of 26 provinces, and pointed out that changes in income and medical cost had a great influence on people's healthcare spending (18). Using China Health and Nutrition Survey (CHNS) data, some researchers showed the factors affecting the OOP healthcare expenditure of Chinese residents, which included residents' self-rated health, ages, abilities to pay, medical insurance, etc (19). And other researchers studied the influence factors of government's public health expending behaviors (20).

The existing related researches have following defects: First, evaluating the operating efficiency of healthcare expenditure currently is mainly based on the efficiency evaluation of state healthcare expenditure. But in fact, it can be seen from Table 1 that China's state healthcare expenditure accounts for only 15%-27% in total healthcare expenditure, while OOP expenditure is up to 37%-58% since 2002. Compared with other countries, this is a very high proportion, and may have some negative effects (21). Therefore, Only by evaluation of state healthcare expenditure, we can not get the accurate Chinese healthcare expenditure efficiency. And this is why people still feel medical services overly expensive while the government has carried the rapid growth of state healthcare expenditure. Second, the output indicators of state expenditure focus more on hardware or infrastructure indexes such as amount

of the health organizations, health technicians, bed facilities in health organizations, etc. But in terms of OOP expenditure, more attention is paid on the number of clinic visits, hospital admissions and other quantitative indexes, as these indexes better indicate whether the problem of inadequate medical services is solved or not. Therefore, the simple evaluation of the output indicators of state healthcare expenditure also can not fully reflect the changes in efficiency.

Data and Methods

As a non-parametric frontier estimation method, DEA has advantages that other subjective evaluation methods don't have. The evaluation results of DEA will not be affected by measurement units of the indicators, and weight coefficients of evaluation model are obtained through optimization, avoiding artificial factors (22). Also, compared to other evaluation methods, DEA is capable of dealing with multi-input and multi-output variables. As this paper focuses on the output efficiency of healthcare, we use the Variable Returns to Scale(VRS) and Output-Orientated DEA method to evaluate the efficiency. Some researchers gives a clear and complete interpretation for DEA's basic mathematics principals (23).

After obtaining the DEA efficiency scores of healthcare expenditure of different provinces in the first stage, next we take these scores as dependent variables and try to find out the factors that affect them. As the efficiency evaluation value is between 0 and 1, Tobit model is used to analyze the various factors that may have impacts on healthcare expenditure and to explain the influence factors of the expenditure efficiency, and finally we get some policy suggestions for improving OOP expenditure efficiency.

Table 1. Health Expenditure of China (2002-2009)

Year	2002	2003	2004	2005	2006	2007	2008	2009
Total expenditure (billion Yuan)	579.0	658.4	759.0	866.0	984.3	1157.4	1453.5	1754.2
Percentage of state health expenditure (%)	15.7	17.0	17.0	17.9	18.1	22.3	24.7	27.2
Percentage of OOP health expenditure (%)	57.7	55.9	53.6	52.2	49.3	44.1	40.4	37.5

Data source: China Statistical Yearbook (2011)

Take the study of Zhang Ning et al. (2006) as a reference, the input variable we choose is the out-of-pocket healthcare expenditure of each province. China's total expenditure on health is composed by 3 parts: the state healthcare expenditure, the social healthcare expenditure and the OOP expenditure. OOP expenditure refers to the personal cash expense when receiving various healthcare services.

Instead of the long health evaluation indicators as life expectancy and infant mortality, we use more specific healthcare output indicators including the number of health agencies, health technicians and bed facilities as measurements of health evaluation (3,4). As for OOP expenditure, the output indicators are the number of clinic visits and hospital admissions, whose provincial statistics can be found since 2002. Social healthcare expenditure is the public spending on healthcare excluding expenditure of the government. Social medical insurance spending, commercial health insurance spending, social donations, administrative incomes are parts of social expenditure. Since the complexity of the composition of social healthcare expenditure and lack of statistic data of each province in China, social healthcare expenditure efficiency is not calculated in this paper.

When analyzing the influence factors of OOP healthcare expenditure efficiency in different provinces, population structure and financial capacity of the government are used as co-variables (16,17). In September, 2006, the Chinese State Council set up a coordination group of healthcare reform, which was a sign that a new round of healthcare reform was launched. So we use dummy variables of healthcare reform to study the impacts that healthcare reform had on OOP healthcare expenditure from 2006. And In order to observe different effects the reform policies had on east, center

and west of China, interaction terms of healthcare reform variables and dummy variables of these 3 districts are taken into accounts. Meanwhile, individual's ability to pay measured by per GDP is also an important variable to study the influence that economic development has on healthcare expenditure efficiency of different regions (17,19). As the pure technical efficiency and the scale efficiency of OOP healthcare expenditure are closely connected with level of urbanization and scale of population, we also analyze the impacts of urbanization ratio and population scale (17,19).

All data used in this article came from the Finance Yearbook of China, China Health Statistics Yearbook, China Statistical Yearbook and the 60 years' statistics collection of new China.

4. Results

4.1 Efficiency Changes of the three kinds of Expenditures

With the DEA software and indicators listed in Table 2, we calculated the average efficiency values of the OOP expenditure, state expenditure and total expenditure on healthcare from 2002 to 2009, which are shown in Figure 1.

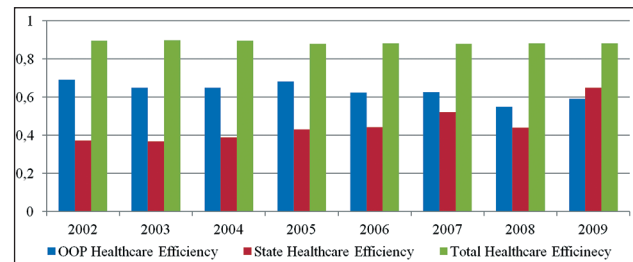


Figure 1. Changing of Composite Technical Efficiency of Healthcare Expenditure (2002-2009)

Table 2. Variables

	1 st stage input indicators	1 st stage output indicators	2 nd stage influencing factors
Personal health expenditure	OOP healthcare expenditure	Clinic visits, hospital admissions	Total dependency ratio, per local fiscal expenditure, per GDP, healthcare reform, urbanization ratio, population scale, et al.
State health expenditure	Final accounts of healthcare	Number of healthcare organizations, healthcare technicians, bed facilities	
Total health expenditure	Total expenses of healthcare	Number of healthcare organizations, healthcare technicians, bed facilities, clinic visits, hospital admissions	

As can be seen from Figure 1, from 2002 to 2009, China's state healthcare expenditure efficiency was in a trend of increasing as a whole, but the total expenditure efficiency value varied between 0.87 and 0.89, almost without any efficiency improvement. The main reason for this is the efficiency of OOP expenditure showed a downward trend from 0.69 in 2002 to 0.59 in 2009, and reached its lowest value of 0.54 in 2008. In other words, under the circumstances of increasing state expenditure efficiency, it is the decreasing efficiency of OOP expenditure that leads to stagnation in efficiency of total healthcare expenditure, as it takes the largest proportion of total expenditure. In the meantime, it partially lead to the problems of medical services remain unsolved.

4.2 Comparison of Provincial OOP Healthcare Expenditure Efficiency

We use the average values from 2002 to 2009 and get the total technical efficiency, the pure technical efficiency and the scale efficiency in all 31 provinces of China.

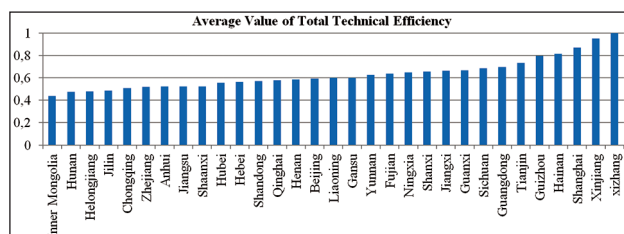


Figure 2. Total technical efficiency of personal healthcare expenditure

We can see from Figure 2 that the total technical efficiency differs among provinces, from 0.43 of Inner Mongolia to 1 of Tibet. And the values of eastern, central and western regions differ, too. Of the 10 provinces which have the highest efficiency scores, there are 5 western provinces, 4 eastern provinces and only 1 center provinces¹, while in the bottom 10, the numbers are 3, 2 and 5. Thus,

¹ The east regions include 11 provinces and municipalities. They are Beijing, Tianjin, Hebei, Liaoning, Shanghai, Jiangsu, Zhejiang, Fujian, Shandong, Guangdong and Hainan. The central regions include 8 provinces. They are Shanxi, Jilin, Helongjiang, Anhui, Jiangxi, Henan, Hubei and Hunan. The west regions include 12 provinces, autonomous regions and municipalities. They are Sichuan, Chongqing, Guizhou, Yunnan, Tibet, Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Guangxi, Inner Mongolia.

we can get the conclusion that the expenditure in central regions is less efficient than that of eastern and western regions.

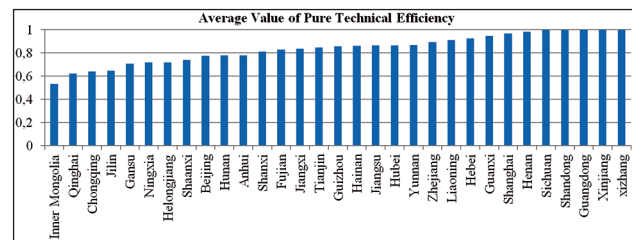


Figure 3. Pure technical efficiency of personal healthcare expenditure

Pure technical efficiency reflects the management and planning of OOP healthcare expenditure on a fixed scale. From Figure 3 we can see that China's provincial pure technical efficiency was not largely improved. And the provincial data clearly showed that technical efficiency of eastern regions was the highest while that of western regions was quite low.

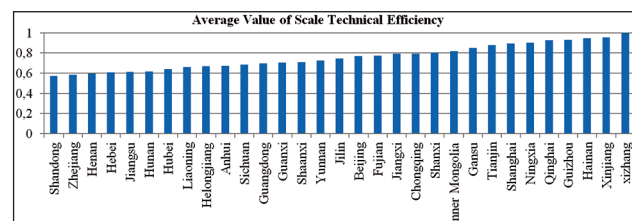


Figure 4. Scale Technical Efficiency of Personal Healthcare Expenditure

When the input is fixed, the scale efficiency is the ratio of the output of production frontier to the output in optimal scale of technical efficiency. Higher scale efficiency means the scale of production is closer to the optimal one. Of all the scale efficiency values in Figure 4, there are 7 western, 3 eastern and 1 center provinces ranking in the top 10, and 0 western, 4 eastern, 6 central in the bottom 10, which makes it clear that western regions have the highest scale efficiency and center regions are relatively less efficient.

From the Variable Returns to Scale(VRS) and Output-Orientated DEA model we learned that 215 provinces had the decreasing returns to scale and 11 provinces had increasing ones among the 248 samples in 8 years. The 11 provinces which had increasing returns to scale all had smaller scale of OOP expenditure, including Tianjin (2006,

2007, 2008, 2009), Guizhou (2006, 2007), Ningxia (2004, 2006), Hainan (2003, 2006), Qinghai (2006). Once there were decreasing returns to scale in DEA model, the scale of production should be reduced to improve production efficiency. This is evidence that overly high proportion of OOP healthcare expenditure in total expenditure is unreasonable.

4.3 Influencing Factors Analysis: Do economic growth and healthcare reform improve the efficiency of OOP healthcare expenditure?

Since the data type is balanced panel data, and the dependent variable is the total technical efficiency score ranging from 0 to 1, to take full advantage of the cross-sectional and time series information contained in panel data, and also to avoid bias caused by OLS estimation, we establish the following panel Tobit model to do regression analysis:

$$y_{it}^* = x_{it}'\beta + \gamma_i + v_{it}, y_{it} = \begin{cases} y_{it}^*, y_{it}^* > 0 \\ 0, y_{it}^* \leq 0 \end{cases}$$

In the expression, y_{it}^* is the provincial total technical efficiency from 2002 to 2009. x is a set of social, economic and policy variables affecting OOP healthcare expenditure, including the total dependency ratio, per local fiscal expenditure (Yuan/person), per GDP (Yuan/person), dummy variables of healthcare reform, urbanization ratio, population scale, regional dummy variables, as well as the interaction terms of healthcare reform variables, per GDP and regional dummy variables. γ is the regional effect unobservable and v is the random disturbance. i and t represent province amount and times. As Hausman test proved that random effect is supported in the model, we use random effects panel Tobit model to evaluate, and the results are shown in Table 3.

As can be seen from the above analysis, the Rho values of model 1 to model 4 are all above 0.6, which means changes in individual effects mainly explain changes in expenditure efficiency. From the Log Likelihood Ratio Test values we know that goodness of fit of model 4 is better than those of model 1 to 3.

Model 2 and model 3 shows that per GDP have positive and significant effects on efficiency, indicating the economic development and personal income increase greatly promote expenditure efficiency. If economic growth could lead to development of society, it leads to scientific decision-making of OOP healthcare expenditure (17,18). But in model 4 we can see that impacts per GDP have on different regions are not the same. It is positive effect in the east but negative effect in the center and west, which is similar with Chaudhuri's findings in Vietnam (2008) that differences of economic growth and development patterns between urban and rural districts lead to different effects on efficiency. Viewing from the development patterns, the so-called economic catch-up of the central and west to the east is developing into a pure GDP chasing, ignoring the overall development of society. Therefore, if economic growth could not transit into social development, it will restrain the improvement of efficiency. If more concrete statistics data such as the healthcare input and output data of rural and urban area were available in this research, the differences in impacts would be more obviously showed.

The negative relationship between healthcare reform variables and expenditure efficiency proves that healthcare reform fails to improve OOP healthcare expenditure efficiency, but improves efficiency of state expenditure according to the research of Han Huawei and his colleague in 2010. It confirms the result of DEA analysis above in this paper, that the descending of OOP healthcare expenditure efficiency is a main reason of the stagnation of total healthcare expenditure efficiency. Therefore, measures should be taken to improve efficiency of OOP expenditure as well as state expenditure, which is the only way to improve efficiency of total healthcare expenditure and to achieve good results in healthcare reform.

In model 2 to 4, urbanization ratio plays a positive role in promoting efficiency of OOP healthcare expenditure, for urbanization means more convenient health services and better medical resources. But the population scale is impeding the efficiency. This shows that China's OOP healthcare management level is very low. Currently the personal healthcare management knowledge mainly comes from public promotion carried out by local

Table 3. Analysis of influencing factors of provincial personal healthcare expenditure efficiency in China

	Model 1	Model 2	Model 3	Model 4
Total dependency ratio	0.309 (1.535)	0.416* (1.755)	0.459* (1.940)	0.369 (1.577)
Per local fiscal expenditure	-2.4e-8** (-1.968)	-3.9e-8** (-1.968)	-3.8e-8* (-1.882)	-2.7e-8 (-1.358)
Urbanization		0.001 (1.468)	0.001 (1.583)	0.001** (2.049)
Population scale		-6.6e-10* (-1.730)	-5.8e-10 (-1.538)	-2.4e-10 (-0.635)
Per GDP		3.2e-06** (2.376)	2.7e-6* (1.935)	
Dummy variable (Eastern)	-0.005 (-0.084)	-0.061 (-1.099)		
Dummy variable (central)	-0.106* (-1.855)	-0.103* (-1.865)		
Dummy variable (healthcare reform)	-0.064*** (-4.763)	-0.101*** (-5.398)		-0.076*** (-3.921)
Healthcare reform *east			-0.084*** (-2.992)	
Healthcare reform *center			-0.124*** (-4.792)	
Healthcare reform *west			-0.089*** (-4.105)	
Per GDP *east				2.03e-6* (1.718)
Per GDP *center				-5.2e-6* (-1.727)
Per GDP *west				-2.7e-06 (-1.071)
Constant term	0.612*** (5.840)	0.497*** (4.417)	0.439*** (4.166)	0.512*** (4.859)
Standard deviation of individual effect	0.119*** (7.183)	0.115*** (7.022)	0.119*** (6.948)	0.121*** (6.929)
Standard deviation of disturbance term	0.092*** (20.774)	0.089*** (20.705)	0.088*** (20.656)	0.086*** (20.629)
Likelihood ratio test (Chi-square)	41.642	63.255	61.278	72.963
Rho	.627	.627	.643	.663
Log likelihood	199.0	207.9	207.2	211.6

Note: *, **, *** mean 10%, 5%, 1% significant level.

health departments. Ordinary people are lack of individualized healthcare management experiences and have little knowledge in these aspects. The reasons are including shortage of human resources

in administration of public health services, lower management level and others.

In model 1 to 4, the total dependency ratio has a positive effect on OOP expenditure efficiency

because children and old people receive medical services more frequently and they or their guardians learn more about the policies of health services compared with the grown-up people. Per fiscal expenditure has negative effect on efficiency, which is in accordance with Bian Ying et al. (2001) and Sun Ju (2010)'s research results (23,24). An important reason is the fee-for-service policy in China, which means the stronger fiscal expenditure capability, the more subsidy for OOP healthcare cost, and the more likely situation of supplier-induced demand to happen (25), which in turn leads to the descending of OOP expenditure efficiency, similar to Belli's study about the supply side in 2004.

Discussions

Based on the data from 2002 to 2009 and with the method of DEA, we can see that the state healthcare expenditure efficiency is increasing while OOP expenditure efficiency is descending since healthcare reform. Finally the total healthcare expenditure efficiency is not rising. So, to improve the efficiency of total healthcare expenditure, measures should be taken not only in improving the state expenditure efficiency, but also in improving OOP healthcare expenditure efficiency. On the other side, expenditure efficiency of different regions varies widely. The central region is least efficient. The eastern region has highest pure technical efficiency and the west has the lowest. In terms of scale efficiency, decreasing return to scale appears in most of the provinces.

Then we analyze the influence factors of OOP healthcare expenditure efficiency by panel Tobit model. The results include that per GDP's impacts on expenditure efficiency varies in different regions, dummy variable of healthcare reform has negative effects on efficiency, the increasing of urbanization ratio promotes the efficiency, and there is also a negative relationship between population scale and OOP expenditure efficiency.

Thus, the policy suggestions are as follows:

Government in central and western regions should put more efforts in the overall social development rather than only chasing pure economic growth. Simple pursuit of GDP can not lead to increase of efficiency and government should also develop healthcare resources to improve the qua-

lity of social development. And, as the supplier-induced demand character of healthcare services, government needs to strengthen the support to the supply side when aiding the demand side. Only aiding the demand side and OOP expenditure can not lead to increase of efficiency.

Investing more on trainings of local personalized services to primary healthcare managers. Considering the lower management level of healthcare services in China. The local state should strengthen the capability of healthcare managers and optimize the services and management level of OOP healthcare expenditure efficiency. At the same time, the local state should take actions to spread public healthcare knowledge and enhance the regulation of hospitals. Also, the state should take action to improve the transparency of patients' information.

Increasing urbanization ratio and optimizing health resources allocation. Urbanization has advantage of gathered living residents, which shortens patients' treatment waiting time. Urbanization also gathers medical resources and this is favorable to the competition among different hospitals. However, in rural and remote areas, government should also strengthen the management and configuration of healthcare resources in order to avoid the local monopoly by barefoot physicians.

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Effects of a hydroalcoholic extract of walnut male flowers on streptozocin diabetic rats

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Abstract

Introduction: Diabetes is a metabolic disorder resulting from defects in insulin secretion and function. Walnut is used in traditional medicine to treat diabetes. In the current study we evaluated the anti-diabetic effects of the hydroalcoholic extract of walnut male flowers in streptozocin diabetic rats and its probable side effects on the liver.

Methods: Eighty adult male Wistar rats were randomly selected and divided into four different subgroups including a control group (n=8) with no intervention, a group of 8 receiving normal saline as the witness group and another 3 groups of 8 rats each receiving either 2, 4, or 6 g/kg of the extract per day for 15 days. Three diabetic groups of 8 rats each treated with the above doses of the extract for the aforementioned period of time, and a group of 8 diabetic rats without any further treatment. Diabetes was induced in rats by intraperitoneal injection of 60 mg/kg of streptozotocin. At the end of the experimental period, blood was taken from the experimental and control groups and the serum levels of insulin, glucose and liver enzymes (ALAT, ASAT, and ALP) were measured.

Results: Our results showed that the hydroalcoholic extract of walnut male flowers increased the levels of insulin, decreased blood glucose, liver ASAT and ALP enzymes in the treated diabetic groups compared to the non- treated group ($P < 0.05$). The anti diabetic effects of the extract were not dose dependent.

Conclusion: Our results show the effectiveness of the hydro-alcoholic extract of walnut male flowers in diabetic rats through prevention of liver damage and reduction of blood glucose.

Key words: Diabetes, walnut male flowers, rats, streptozotocin.

Introduction

Diabetes mellitus is a chronic metabolic disorder caused by inherited or acquired deficiency in production of insulin by the pancreas or by the ineffectiveness of the insulin produced and is a common metabolic disorder with hyperglycemic symptoms (1, 2). Diabetes symptoms are either due to a decreased secretion of insulin or an increased resistance of target cells to this hormone or both. There are many different complications of this autoimmune disease including changes in the intracellular metabolism of tissues such as increased ALAT and ASAT in the liver and blood (3, 4). Blood glucose concentration is the most important factor in regulating insulin secretion from β cells of pancreas. Glucose is carried by blood to pancreas by GLUT-2 to regulate insulin secretion from pancreas (5). Production of ATP from glucose will also regulate ATP sensitive potassium channels which regulate insulin secretion. This leads to membrane depolarization and opening of voltage-dependent calcium channels in the β cell membranes and the increase of calcium entry into the cells, resulting in insulin secretion (6). Liver is one of the main targets of insulin and plays an important role in maintaining stable blood glucose levels and is also the main site of detoxification of drugs and metabolites. Liver can inactivate drugs and metabolites by enzymatic reactions, especially through transaminases (7). During chronic liver disease, muscular dystrophy and chronic renal disease, serum levels of liver enzymes such as ASAT (aspartate aminotransferase) and ALAT (alanine aminotransferase) will increase in the liver and plasma (8, 9).

It has been shown that the number of patients with diabetes will increase in future from 150 million in the year 2000 to 300 million in the year 2030 (10, 11). Therefore, using herbal medicines with no side effects on liver are of interest for the

treatment of diabetic patients (12). Different parts of walnut tree are currently used in traditional medicine. In the current study the effect of a hydroalcoholic extract of walnut male flowers on the level of blood glucose and insulin in streptozotocin diabetic rats is studied. Liver protecting properties of this extract were also checked by measuring the serum levels of ALAT, ASAT and ALP enzymes in diabetic rats treated with this extract.

Materials and Methods

Preparation of walnut male flower extract

Walnut male flowers were collected from walnut trees, dried and pulverized. Twenty grams of the dried powder were mixed with 300 ml of 50% hydroalcoholic solution in a percolating container and incubated for 72 hours at room temperature. Then the extract was separated and heated for 12 hours at 50° C and finally dried in a dessicator for 24 hours.

Animal experiments

Eighty adult male Wistar rats with an average weight of 200-225 grams were used in this study using optimal living conditions. The study was approved by the ethics committee of Shiraz University of Medical Sciences. Rats were subdivided into 10 groups of 8 rats for our experiments. One group was used as a control, 4 groups were made diabetic with streptozotocin (see below), 4 groups were kept as non-diabetic for studying the effects of the various doses of the extract on normal rats and a group was used for the determination of the LD50 of the extract. Diabetes was induced in animals by an intraperitoneal injection of 60mg/kg of streptozotocin to each rat (Kalamazoo, MI, USA) (13). After 3 and 7 days, blood samples were taken from the animals and glucose was measured. Rats with blood glucose concentrations of more than 300mg/dl were considered as diabetic. Each experimental group was divided into 4 subgroups: the control group received normal saline and the other three groups received 2, 4 or 6 g/kg of the extract in normal saline. To determine the lethal dose of the extract, 8 rats were administered with up to 40 g/kg dose of the extract. After the Final day of the experiments (day 16), the rats were anesthetized and blood sampling was performed.

All separated sera were stored at -20° C until use. Glucose, ALAT, ASAT, ALP (Pars Azemoon, Tehran, Iran) and insulin (DRG International Inc., USA) levels were measured according to the manufacturer's instructions.

Statistical analysis

The data were analyzed by One Way ANOVA, Tukey HSD Test and Mann-Whitney U using SPSS statistical package (SPSS Inc, Chicago, IL, USA). P-values of less than 0.05 were considered significant.

Results

Our results showed that the administration of hydro alcoholic extract of walnut male flowers to mature male diabetic rats results in a significant increase in blood insulin (Table1) and a reduction in blood glucose level (Table2) compared to the sham control groups. No changes were observed in the levels of insulin and blood glucose in non diabetic rats (Tables 1, 2).

Our results showed that the induction of diabetes in rats resulted in significant increases in serum levels of ASAT and ALP enzymes compared with the control groups. Oral administration of the hydroalcoholic extract of walnut male flowers for 15 days reduced the levels of these enzymes in diabetic rats compared to the control group ($P < 0.05$), but this extract had no effects on the level of serum ALAT. Similarly, no significant differences were observed in the serum levels of ASAT and ALP enzymes in non-diabetic group treated with different doses of the extract (Table3).

Type 2 diabetes or non-insulin dependent diabetes is characterized by chronic hyperglycemia, resulting in increased production of reaction oxygen species (ROS). In addition, increasing the glycosylation of antioxidant enzymes such as superoxide dismutase, glutathione peroxidase and catalase will reduce their activity required for the destruction of ROS and will result in secondary disorders of diabetes and eventually will cause tissue damage (14). The liver is one of the main targets of insulin, and liver damage is one of the consequences of diabetes resulting in increased levels of ALAT, ALST and ALP enzymes in blood (15). This is probably due to increased permeability of

Table 1. Comparison of the serum insulin levels in diabetic and non-diabetic groups treated with the hydro alcoholic extract of walnut male flowers.

Groups	serum levels of the hormone insulin (Mean \pm SD) (μ g/l)				
	Control	Sham	Experimental groups (treated with the flower walnut flower extract)		
			2 g/kg	4 g/kg	6 g/kg
Diabetic	0.62 \pm 0.15	0.03 \pm 0.02	1.31 \pm 0.63*	1.15 \pm 0.71**	1.68 \pm 1.01***
Non-diabetic	0.62 \pm 0.15	1.16 \pm 0.41	1.40 \pm 0.74	1.46 \pm 0.81	1.81 \pm 0.98

* $P \leq 0.05$;

** $P \leq 0.01$;

*** $P \leq 0.0001$;

Table 2. Comparison of serum glucose levels in diabetic and non-diabetic groups treated with a hydro alcoholic extract of walnut male flowers.

Groups		average of blood glucose (Mean \pm SD) (mg/dl)			
		Diabetic		Non-diabetic	
		First day	Fifteenth day	First day	Fifteenth day
Control		142.5 \pm 16.7	147.5 \pm 17.5	142.5 \pm 16.7	147.5 \pm 17.5
Sham		528.1 \pm 101.0	673.1 \pm 92.2	151.3 \pm 15.1	158.8 \pm 15.8
Experimental groups	2 g/kg	744.4 \pm 100.5	362.5 \pm 204.8*	156.9 \pm 8.4	154.4 \pm 14.5
	4 g/kg	685.0 \pm 139.2	430.0 \pm 199.7*	156.8 \pm 8.3	160.6 \pm 9.8
	6 g/kg	595.0 \pm 103.9	356.0 \pm 151.4*	155.6 \pm 7.8	158.9 \pm 9.2

* $P \leq 0.0001$

Table 3. Comparison of serum levels of ALP, ASAT, and ALAT enzymes in diabetic and non-diabetic groups treated with the hydroalcoholic extract of walnut male flowers.

Groups		serum levels of liver enzymes (Mean ± SD) (IU/L)					
		Diabetic			Non-diabetic		
		ALP	ASAT	ALAT	ALP	ASAT	ALAT
Control		13.6±3.2	136.3±24.6	63.5±2.7	13.6±3.2	136.3±24.6	63.5±2.7
Sham		14.1±2.9	177.5±14.1**	75.6±12.9	10.6±1.7	135.6±18.6	59.4±6.8
Experimental groups	2 g/kg	9.0±2.7**	135.6±29.2**	64.4±21.9	9.0±1.4	126.9±26.0	59.4±18.0
	4 g/kg	9.0±2.7**	137.5±30.5*	72.5±17.7	9.3±1.8	118.1±26.2	59.4±18.1
	6 g/kg	10.5±2.5*	126.3±10.9**	73.1±20.7	8.6±1.2	121.3±24.6	62.8±16.9

* $P \leq 0.05$

** $P \leq 0.005$

cell membrane in the early stages of liver damage as well as increased protein catabolism associated with gluconeogenesis and urea formation (16). Currently, insulin injection is the main treatment for blood glucose reduction in diabetic patients. Certain other commercial products are also used for the treatment of diabetes (17). These compounds have undesirable side effects such as increasing the fat stores, loss of adipose tissue at the injection site and

production of hypoglycemic shock (17). Due to the high costs of medication and their side effects, the need for new and effective treatments with fewer side effects are quite evident (18,19). Herbal medicines are a proper replacement, as they have less cost and lower side effects. Walnuts (*Juglans regia*) other than being used as a nutritious nut in our everyday food, several parts of this tree have been used as drugs in traditional medicine. The leaves of

this plant are used for the treatment of rheumatic pains, fever, anemia and diabetes (20). Other studies have shown that the roots of the walnut tree are effective for the treatment of diabetes, malaria, rheumatic pains and removal of kidney stones (21,22). Based on the important role of ROS in the streptozocin-induced diabetes mellitus (23), fortification of the antioxidant systems of cells in diabetics could have an important and effective role in preventing or reducing the side effects of diabetes and its complications (24). Many studies have shown that walnut leaves have phenolic compounds and antioxidants such as flavonoids and chlorogenic acid (25). Studies also have shown that flavonoids can reduce blood sugar by inhibiting the intestinal absorption of glucose and by the inhibition of glucose-6 chlorogenic acid alkaline phosphatase, as key factors in regulating blood sugar (26,27). It is suggested that the flavonoids and their antioxidant properties in the hydroalcoholic extract of walnut leaves can be effective in the treatment and prevention of diabetes (31). In agreement with our findings, Fathiazad and Garjani have shown that hydroalcoholic extract of walnut leaves can reduce blood sugar in streptozocin-induced diabetic rats, without any effect on the control animals (28). Also it has been demonstrated that the hydroalcoholic extract of walnut leaves can prevent liver damage following diabetes and it has a significant effect on the reduction of serum ASAT and ALAT enzymes (29). On the other hand, the ethanolic extract of walnut leaves decreases blood glucose, cholesterol, triglycerides, urea nitrogen, creatinine, ASAT, ALAT and ALP enzymes in alloxan diabetic rats (30). Extracts of walnut leaves are effective in the reduction of blood sugar and fat, and have healing effects on metabolic disorders caused by diabetes in rats (32,33).

In conclusion, our results showed that the hydroalcoholic extract of walnut male flowers can increase serum levels of insulin, and decrease blood glucose levels in diabetic rats. More investigations are needed to explore the anti diabetic effects of walnut male flowers in human.

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Prevention of nipple problems in primipara breastfeeding mothers: A pilot study

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Abstract

Methods: This research was planned as an experimental design for the purpose of comparing the effectiveness of mother's milk (n=35), tea compress (n=35) and warm moist compress (n=35) on the prevention of nipple problems in primipara breastfeeding women. The research was conducted between October 1, 2006, and October 30, 2007, at two hospitals in Izmir, Turkey.

Results: The majority (67.6%) of the mothers was in the 20-25 year old age group, 47.6% had a primary school education, and 89.4% were housewives. Immediately after delivery 9.5% of the mothers were given their infants to hold. Almost all of the mothers (97.1%) gave their infants their first feeding with mother's milk and 11.5% breastfeed their infants within the first half hour. It was determined that there were fewer nipple problems in the warm moist compress group on the 6th and 7th day compared to the mother's milk and tea compress groups. There was less nipple pain in the warm moist application to the nipple than in the mother's milk and warm moist tea compress groups. During the first 14 days after delivery 54.3% of the mothers in the tea compress group, 42.9% of the mothers in the warm moist compress group, and 51.4% of the mothers in the mother's milk group experienced nipple cracking.

Conclusion: Because warm moist compress were effective, are easy to apply and economical it is recommended that they be used for the prevention of nipple pain.

Key words: Nipple problem, nipple pain, warm moist compress, tea compress, Turkey.

Introduction

Breastfeeding is important for the health and development of both mother and child and provides optimal infant nutrition. Nipple pain and trauma as complications associated with breastfeeding are considered among the most significant factors impacting on breastfeeding in the first weeks of motherhood (1,2,3,4). In a study conducted by Coker et al. (2003) (n=284) two thirds of mothers had nipple pain and cracking within the first two weeks postpartum, 55% had milk accumulation in the breasts, 19% had bleeding from the nipple, and 4.6% had mastitis (5). Other studies have reported an incidence of nipple pain between 34% and 96% and approximately one third of mothers experiencing this problem stop breastfeeding within the first six weeks postpartum (1,2,6,7). In studies conducted in our country Vural and Akan (1995) reported that 54.2% of mothers had nipple cracking (8), Gozum and Kilic (2003) that 71.4% of mothers had fullness, tenderness and pain in the breasts (9), Kavlak et al. (2005) that 55.6% of mothers had redness at the end of their breasts, 62.1% had nipple pain, and 60.1% had nipple cracking (10). These results are statistically significant for showing that the incidence of nipple problems is high in our country.

In our country the number of researches carried out related to applications used by mothers experiencing nipple problem is inadequate. In studies performed it was established that mothers have resorted to certain traditional applications when they have experienced nipple problems; for example, applying mother's milk, tea, butter, olive oil, quince seed-honey mixture, carbonated water, tooth paste, boiled meat, onion, almond oil, lemon, baking soda and saying prayers (11,12,13). Postpartum breast care is important in the prevention of problems that can develop in breasts. In recent years use of creams, pomades, oils, lotions or moisturizers for nipple problems is being abandoned. The Montgomery tubercles located in areola have oily and antibacterial release and provide nipple and areola with natural moisture. Despite these pharmacologic me-

asures (their benefits are being discussed) studies carried out in recent years have put emphasis on the applications which will allow maintenance of this function and these pharmacologic measures are being replaced by natural methods (14,15).

In the care of breasts of mothers who are breastfeeding the World Health Organization [WHO]/The United Nations Children's Fund [UNICEF] (1993) recommend that the breast be kept clean and dry and that mother's milk be applied when they are having pain at the ends of their breasts (16,17). Breast care and education given to mothers in the postpartum period in our country is based on these recommendations. However there has been limited research conducted on the effect of this practice recommended by WHO/UNICEF on decreasing nipple pain.

Hot and cold applications to the nipple and keeping the area dry decrease nipple pain (15). The application of heat decreases pain by stimulating the pain inhibitory reflex by means of the heat receptors and its vasodilating effect. In addition there have been opinions reported that local application of heat prevents the development of cracked nipples or speeds their recovery after they develop (14). Local application of heat is applied moist or dry according to purpose. Most patients tolerate and like warm moist applications better (15). Buchko et al. (1994) found a four times a day warm moist compress application to be more effective in preventing cracking than mother's milk (14).

Another recommendation for breast care is the application of hot or cold moist tea compresses. In previous studies tea has been shown to have various pharmacologic effects, such as antioxidative, antiinflammatory, antimutagenic, anticarcinogenic, antiangiogenic, apoptotic, antiobesity, hypocholesterolemic, antiatherosclerotic, antidiabetic, antibacterial, antiviral, and delayed aging. The therapeutic effect of local tea compress application comes from the tannic acid in tea mixtures. Tannic acid is absorbed by the mucous membranes and prevents the development of necrosis in eroded skin (14,18). Lavergne (1997) had one group of mothers within the first five days postpartum apply warm tea compresses for breast care and another group of mothers apply warm moist compresses four times a day. Another group of mothers only kept their breasts dry and clean. The tea and water compresses were

found to be more effective than keeping the breast dry (19). In Turkey, people consume tea almost in every house and every day (18). Drawing on the idea that tea has a healing effect and that the tea compress practice could be beneficial for mothers in addition to being very simple to prepare at home and economical, tea compress was applied to a group. Therefore, in our study, the same technique was compared with other two applications.

One of the important jobs of nurses is to support mothers in their breastfeeding to ensure that newborn infants are fed with mother's milk. This research, which was planned based on the importance of preventing nipple problems in the postpartum period which can have a negative effect on breastfeeding, is important for improving mother and child health because newborn infants benefit from mother's milk with the support and education given to mothers in continuing to breastfeed.

Methods

Design and participants

This research was conducted as an experimental study for the purpose of determining the effect of tea compresses, warm compresses, and mother's milk methods in breast care of primipara breastfeeding mothers on the prevention of nipple problems. The research was conducted on obstetric wards at two teaching hospitals in Izmir (Dr. Ekrem Hayri Ustundag Gynecology and Obstetrics Hospital and Health Ministry Ege Obstetrics and Gynecology Teaching and Research Hospital). The data were collected between October 1, 2006, and October 30, 2007. The research population was comprised of mothers who gave birth at these two hospitals.

The research inclusion criteria were to be 18 years or older, primipara, have a telephone at home, speak Turkish, should read and write, not have had a high risk pregnancy or childbirth, delivered after the 37th gestational week, delivered a single infant, delivered spontaneously by the vaginal route, have normal nipples (not have flat nipples, inverted nipples, excessively small or large nipples), not having nipples with redness or cracking, having infants that had not had neonatal complications, mothers who could be seen within the first 24 hours after delivery and who lived within the borders of Izmir municipality (14,15,19).

Initially, 150 mother were invited to take part in the study; 50 in the mothers' milk, 50 in the tea compress and 50 in the warm compress groups, and 123 accepted the invitation; an involvement rate of 82.0 %. Throughout the research, five mothers from the human milk group, six out of tea compress group and seven out of hot compress group were excluded since they could not continue the fourteen-day follow-up process due to lack of time required for the suggested practice because of reasons such as baby care, following the medication recommended by the doctor, making another treatment for nipples, giving up the method after the trial of a few days, their baby's being at hospital because of hepatitis and the partners' unwillingness about the implementation of the method. As a result, the study included 35 participants in the mothers' milk group, 35 participants in the tea compress group and 35 participants in the warm compress group.

Data collection

Interview, registration and survey forms were used as the method of data collection in the research. Research data were collected on a "Puerperium Description Form" prepared to determine mothers' sociodemographic characteristics, "Breastfeeding Observation Form" used to evaluate breastfeeding, and "Breastfeeding Monitoring Form" completed by mothers at home for 14 days. The Puerperium Description Form, prepared by the researchers after reviewing relevant literature, has three sections with questions about mothers' sociodemographic characteristics (17 questions), current pregnancy (14 questions), and breastfeeding practices in the hospital (23 questions). Breastfeeding was evaluated with the Breastfeeding Observation Form, recommended by WHO and UNICEF. This form focuses on the mother and infant. The criteria used in the measurement are mother's body position, infant's behavior, emotional attachment, anatomy, suckling and time spent suckling (20,21). It has eight questions: method mother used to prevent breast problems in the last 24 hours, infant's feeding method, number of breastfeedings, and experience of problems with nipple. Mothers who had a vaginal delivery on the obstetric ward of one of the two participating hospitals and who met the inclusion criteria and agreed to participate voluntarily be-

gan to be interviewed within 24 hours of delivery. After the mothers were informed about the purpose of the research and gave their verbal consent they were asked to sign the consent form approved by the ethics committee. The Puerperium Description Form was completed in face to face interviews with the mothers. Then the mothers were observed while breastfeeding their infants and the Breastfeeding Observation Form was completed. After that the mothers who were included in the research were given education on the benefits of mother's milk and successful breastfeeding to encourage them to breastfeed and they were also given an educational brochure prepared to support this education. Then the mothers who had been given the education were observed while breastfeeding again and the Breastfeeding Observation Form was completed for the second time. Education was also given to mothers while they were in the hospital about how they were to fill in the Breastfeeding Monitoring Form at home. This education included how to complete the form, the technical aspect of filling in every item on the form, and the importance of filling in the form at the same evening hour every day.

The mothers in the mother's milk group were given information about spreading their own milk on both nipples and the surrounding skin after each breastfeeding and leaving it to dry; the mothers in the tea compress group were given information about applying a warm moist tea compress to their nipples and surrounding skin for 20 minutes after breastfeeding four times a day; the warm compress group mothers were given information applying a warm moist compress to their nipples and surrounding skin for 20 minutes after breastfeeding four times a day. All mothers were shown how to do their procedure while in the hospital and given an educational brochure with the steps of the procedure. To prevent the tea compress group mothers from using different types of tea they were all given the same brand of tea. A mobile telephone number was given to the mothers that they could call for questions about filling out the form or breastfeeding. Mothers were visited in their homes on the fifth day and the education about the benefits of mother's milk and successful breastfeeding was repeated and their questions were answered. The mothers were visited again on the 14th day and their forms were collected.

Data analysis

The Statistical Packet for Social Science (SPSS) 11.0 packet computer program was used in the analysis of research data. Number and percentage distribution, Chi square test, Multivariate Chi square test, Kruskal Wallis Test, and Wilcoxon t test were used in the analysis of data obtained in the research. In the statistical analyses a p value less than 0.05 was accepted for significance.

Ethics

Written permission to conduct the research was obtained from Ege University Nursing Faculty Scientific Ethics Committee and Izmir Province Health Ministry. Information about the procedure was explained to patients in the research and written informed consent was obtained.

Results

Characteristics of participants

The mean age of the mothers was 22.4 ± 3.29 . The majority (67.6%) of the mothers was in the 20-25 year old age group, 47.6% had a primary school education, and 89.4% were housewives. The majority (92.4%) of the mothers had health insurance, 66.7% had balanced income and expenses, and 57.1% were in nuclear type families. Approximately half (56.2%) of the mothers had been married for one to three years. The majority (86.7%) of the mothers had willingly become pregnant, 87.6% had completed their first pregnancy, and 12.4% had had a miscarriage. Almost all (99.0%) of the mothers had had regular prenatal monitoring visits and 70.2% had gone for 11 or more prenatal visits. Chi square test was done to determine the groups' homogeneity. No statistically significant differences were found among the three groups for age group, educational status, number of pregnancies, number of prenatal visits (Table 1).

Sources of information about breastfeeding and nipple practices during pregnancy

Only 29.5% of the mothers had received information about breastfeeding during pregnancy and 61.3% had received this information from a written publication. Only 10.5% of the mothers had had a breast examination during pregnancy. It was determined that 31.4% of the tea compress group

mothers, 34.3% of the warm moist compress group mothers and 28.6% of the mother's milk group mothers had done a procedure to their nipples during pregnancy. Chi square test was done to determine the groups' homogeneity. No statistically significant differences were found among the three groups for status of receiving information about breastfeeding ($X^2=1.190$, $df=2$, $p=0.552>0.05$), status of having had a breast examination ($X^2=3.859$, $df=2$, $p=0.145>0.05$), status of doing a procedure to the nipple ($X^2=0.265$, $df=2$, $p=0.876>0.05$).

Mothers' breastfeeding practices at the hospital

Immediately after delivery 9.5% of the mothers were given their infants to hold. Almost all of the mothers (97.1%) gave their infants their first feeding with mother's milk and 11.5% breastfeed their infants within the first half hour. In this research at the first breastfeeding 52.4% of the infants breastfeed the first time willingly and strongly. The majority (91.4%) of the infants were fed only mother's milk by their mothers while in the hospital. The mothers of the infants who had been given supplemental feedings were asked the reasons why infant formula was given to their infants and the mothers responded because the nurse gave the formula because their infant did not breastfeed and because they did not have milk the doctor gave formula. During the first interview 37.1% of the mothers in the tea compress group, 34.3% of the mothers in the warm moist compress group, and 25.7% of the mothers in the mother's milk group reported that they had nipple pain. No statistically significant differences were found among the three groups for status of having nipple pain while breastfeeding at the hospital ($X^2=1.131$, $df=2$, $p=0.568>0.05$). Almost half (47.1%) of the mothers stated that they experienced pain when breastfeeding began. In the research the mothers in the warm moist compress group had less severe pain than the mothers in the other two groups. No statistically significant difference was found in the mean scores from the nipple pain scale according to the mother's breast care procedure group (Kruskal-Wallis Testi, $p=0.596>0.05$). The majority (99.0%) of the mothers continued to breastfeed when they had nipple pain; 97.1% of the mothers did not think about stopping breastfeeding because of nipple pain.

Table 1. Characteristics of participants

Profiles	Tea Compress (n=35)	Warm Moist Compress (n=35)	Mother's Milk (n=35)	Total (N=105)
<i>Age (years)</i>	n(%)	n(%)	n(%)	n(%)
≤19	6(17.1)	5(14.3)	5(14.3)	16(15.2)
20-25	22(62.9)	26(74.3)	23(65.7)	71(67.6)
26-30 *	7(20.0)	4(11.4)	7(20.0)	18(17.2)
$X^2 = 1.491 \quad df=4 \quad p=0.828^{**}$				
<i>Education of women</i>				
Primary school	16(45.8)	17(48.6)	17(48.6)	50(47.6)
Secondary school	10(28.5)	7(20.0)	5(14.3)	22(21.0)
High school graduate	9(25.7)	11(31.4)	13(37.1)	33(31.4)
$X^2 = 2.495 \quad df=4 \quad p=0.646^{**}$				
<i>Occupation</i>				
Housewife	30(85.7)	33(94.2)	31(88.5)	94(89.4)
Employed	5(14.3)	2(5.8)	4(11.5)	11(10.6)
<i>Social insurance for health care</i>				
Yes	32(91.4)	32(91.4)	33(94.3)	97(92.4)
No	3(8.6)	3(8.6)	2(5.7)	8(7.6)
<i>Income status</i>				
Income less than daily living expenses	7(20.0)	4(11.4)	5(14.3)	16(15.2)
Income equal to daily living expenses	19(54.3)	23(65.7)	28(80.0)	70(66.7)
Income greater than daily living expenses	9(25.7)	8(22.9)	2(5.7)	19(18.1)
<i>Family type</i>				
Nuclear family	18(51.4)	22(62.9)	20(57.1)	60(57.1)
Extended family	17(48.6)	13(37.1)	15(42.9)	45(42.9)
<i>Number of pregnancies</i>				
1	33(94.2)	30(85.7)	29(82.9)	92(87.6)
2 and 3 (miscarriage)	2(5.8)	5(14.3)	6(17.1)	13(12.4)
$X^2 = 2.283 \quad df=2 \quad p=0.319^{**}$				
<i>Current pregnancy status</i>				
Planned	32(91.4)	29(82.9)	30(85.7)	91(86.7)
Unplanned	3(8.69)	6(17.1)	5(14.3)	14(13.3)
<i>Prenatal visit number</i>				
1-5	0(0)	1(2.9)	2(5.9)	3(2.9)
6-10	7(20.0)	10(28.6)	11(32.3)	28(26.9)
≥11	28(80.0)	24(68.5)	21(61.8)	73(70.2)
$X^2 = 5.942 \quad df=6 \quad p=0.430^{**}$				

*2 individuals 30 years over; ** $p > 0.05$

Mothers' breastfeeding observation score before and after education

In the research the scores from the breastfeeding observation form for mothers from all three groups improved after they received education about successful breastfeeding. There was a statistically significant difference in mothers' pre-education and post-education observation score means (Wilcoxon T Test, $p=0.000 < 0.05$).

Status of having nipple problems

It was determined that in the first 14 days postpartum 74.3% of the mothers in the tea compress group, 74.3% of the mothers in the warm moist compress group, and 80.0% of the mothers in the mother's milk group had nipple problems. There was no statistically significant difference among groups for having nipple problems ($X^2=0.420$, $p=0.811 > 0.05$).

According to the research results there were statistically significant differences among groups on the 6th and 7th days for having a nipple problem after delivery (6th day $X^2=7.587$, $p=0.023<0.05$; 7th day $X^2=7.587$, $p=0.023<0.05$). It was determined that there were fewer nipple problems in the warm moist compress group on the 6th and 7th day compared to the mother's milk and tea compress groups. In this research the highest rate for nipple problems was on the third day when 56.2% of the mothers experienced nipple problems (Figure 1).

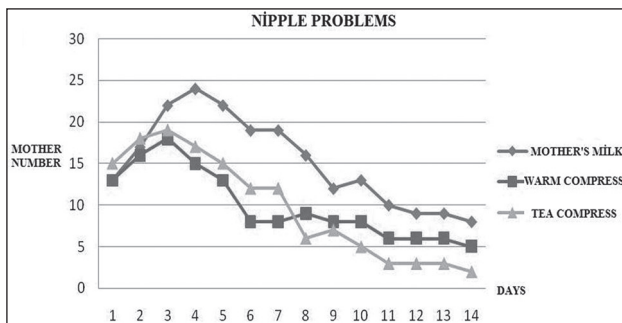


Figure 1. Distribution of nipple problems in mothers according to day

Nipple pain

During the first 14 days after delivery 71.5% of the mothers in the tea compress group, 57.1% of the mothers in the warm moist compress group, and 68.6% of the mothers in the mother's milk

group experienced nipple pain. No significant difference was found among groups for nipple pain ($X^2=1.775$, $p=0.412>0.05$) (Table 2).

The nipple pain lasted for one to five days in 60.0% of the tea compress group mothers, in 65% of the warm moist compress group mothers, and in 45.8% of the mother's milk group mothers. There was no statistically significant difference among the groups for duration of nipple pain ($X^2=1.824$, $p=0.402>0.05$) (Table 2).

There was no significant difference among groups for severity of pain on any day (Kruskal-Wallis Test, $p>0.05$), however the warm moist tea and warm moist compress groups mothers experienced less pain than the mother's milk group mothers. In addition on the third postpartum day the highest percentage of mothers (44.8%) experienced nipple pain.

Nipple cracking

During the first 14 days after delivery 54.3% of the mothers in the tea compress group, 42.9% of the mothers in the warm moist compress group, and 51.4% of the mothers in the mother's milk group experienced nipple cracking. There was no statistically significant difference among groups for nipple cracking ($X^2=0.991$, $p=0.609>0.05$) (Table 2).

Table 2. Status of having nipple pain and nipple cracking during first two weeks postpartum

	Tea Compress (n=35)	Warm Moist Compress (n=35)	Mother's Milk (n=35)	Total (N=105)
Nipple Pain Status	n(%)	n(%)	n(%)	n(%)
Yes	25(71.5)	20(57.1)	24(68.6)	69(65.7)
No	10(28.5)	15(42.9)	11(31.4)	36(34.3)
$X^2 = 1.775 \quad df=2 \quad p=0.412^*$				
Nipple Pain Duration				
1-5 days	15(60)	13(65)	11(45.8)	39(56.5)
≥ 6 days	10(40)	7(35)	13(54.2)	30(43.5)
$X^2 = 1.824 \quad df=2 \quad p=0.402^*$				
Nipple Cracking Status				
Yes	19(54.3)	15(42.9)	18(51.4)	52(49.5)
No	16(45.7)	20(57.1)	17(48.6)	53(50.5)
$X^2 = 0.991 \quad df=2 \quad p=0.609^*$				
Nipple Cracking Duration				
1-5 days	15(78.9)	9(60.0)	14(77.8)	38(73.1)
≥ 6 days	4(21.1)	6(40.0)	4(22.2)	14(26.9)
$X^2 = 1.839 \quad df=2 \quad p=0.399^*$				

* $p>0.05$

Nipple cracking lasted one to five days for 78.9% of the tea compress group mothers, 60.0% of the warm moist compress group mothers, and 77.8% of the mother's milk group mothers. There was no statistically significant difference among groups for duration of nipple cracking ($X^2=1.839$, $p=0.399>0.05$) (Table 2).

The number of mothers experiencing nipple cracking was the highest on the third day (34.3%) for mothers in the tea compress, warm moist compress and mother's milk groups.

Discussion

The health of mothers and children can be improved by preventing nipple problems which have a negative effect on breastfeeding because the newborn benefits from mother's milk. Supporting mothers in their breastfeeding is one of the important duties of nurses and midwives.

In the analysis of the first 14 days from the aspect of the prevention of nipple problems in our research the tea and warm moist compress treatments were found to be more effective than treatment with mother's milk. It was determined that there were fewer nipple problems in the warm moist compress group on the 6th and 7th day compared to the mother's milk and tea compress groups. The purpose of the Best Practice Information Sheet is to determine the effectiveness of interventions used by and for breastfeeding women to prevent and/or reduce nipple pain and trauma. Warm water compress is recommended over breast milk for the management of nipple pain and trauma related to breastfeeding (Grade B: Moderate support that warrants consideration of application) (3). Our research findings are consistent with those reported in the Best Practice Information Sheet.

Two thirds of the mothers in our research were found to have nipple pain during first two weeks postpartum. Although no difference was found among the groups the mothers in the warm moist compress group experienced less nipple pain than the other two groups in our research. In our research the mothers in the warm moist tea and warm moist compress treatment groups felt less pain than the mothers in the mother's milk control group. Although no significant difference was found among these groups. In addition on the third postpartum day the

highest percentage of mothers experienced nipple pain. A randomized controlled trials (RCT) compared four interventions on 73 primiparous breastfeeding women: instruction only, warm moist teabag compress, warm water compress, and milk massaged into the nipple and air-dried. All groups were given written and verbal instructions on breastfeeding. The breast milk group had the highest mean scores for both pain affect and pain intensity. A statistically significant improvement in pain scores and pain effect was found in the warm water compress group as compared to the teabag group and the breast milk group (14,22,23). Another RCT including 65 primiparous women showed that warm water or tea bags compresses were more effective in alleviating the pain of breastfeeding compared to breast milk compresses (19,22,23). Ninety primiparous women were randomised into three experimental groups. Group 1 applied warm wet compresses on and around the nipples after breastfeeding four times daily. Group 2 applied expressed breast milk on and around the nipples and let it dry for a few minutes after each breastfeed. Group 3 did nothing but keep their nipples clean and dry (15,22,23). No statistical difference in pain scores was shown between the three groups. However, women who applied warm compresses showed the lowest pain intensity and pain affect. Additionally, all three groups' pain scores peaked on day one and started to decrease from day three on (22,23). An RCT involving 177 primiparous women compared four different interventions; warm water compress, milk massaged into the nipple and air-dried, instruction only and modified lanolin. The warm water compress group reported the lowest pain intensity and affect on days seven and 14. The number of women still breastfeeding at six weeks were comparable (22,23). All groups experienced the highest pain intensity and affect on day four. The findings from our research are consistent with those reported in the literature.

Although there was no significant difference found among the groups the incidence of nipple cracking and percentage of mothers whose nipple cracking lasted one to five days were less in the warm moist compress group than the other two groups. In the analysis of the 1st-14th days from the aspect of preventing nipple cracking there was no one superior treatment group. In our study the highest percentage of nipple cracking was found

on the third postpartum day when approximately one third of the mothers had this problem. Buchko et al. (1994) determined that warm moist compresses applied four times a day were more effective than mother's milk application on the development of cracking. In studies by Akkuzu and Taskin (2001) and Buchko et al. (1997) the most nipple cracking was also found to occur on the third day (14,15). These research findings are similar to those reported in the Akkuzu and Taskin (2001) and Buchko et al. (1997) studies (14,15).

Conclusion

Based on the experiences and findings obtained throughout this research we recommend that midwives and nurses teach mothers in the hospital about warm moist compresses for the prevention of breast problems and that mothers be visited at home after discharge to ensure they continue the practice. In addition if women can begin to be taught during pregnancy about the prevention of breast problems that can occur during lactation the WHO and UNICEF recommendations can be fulfilled that breastfeeding women continue to only give their infants breast milk during the first six months and that after that they add supplemental feedings but continue to breastfeed until the child is at least two years old.

Although this research presents significant data related with the prevention of nipple problems, the expansion of findings is limited due to a few factors. First, the study includes a limited number of participants in the experimental and control groups and it is difficult to state that it represents the society in general. Second, the breastfeeding follow-up form was filled by mothers at home at the same hour for fourteen days. Mothers recorded the nipple problems they experienced during the day as much as they remembered. Another important limitation is that the practice has been realized by mothers at home four times a day for fourteen days. In order to make the mothers practice continually, the aim of the research was explained to them at the hospital and home visits were made on the 5th and 14th days. Working with larger experimental and control groups in prospective studies will contribute significantly to the evaluation of the effectiveness of practices to be conducted in order to avoid nipple problems.

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Key factors in developing medical and wellness tourism - Asian consumers as an example

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Abstract

Modern people expect to reduce pressure of life through engaging in wellness activities on their travels. Consumers are also eager to increase their confidence by means of changing their appearance. In addition, Asian countries have actively thrown themselves into the development of the medical and wellness tourist market, thus driving a new trend in tourism. This study aimed to investigate consumers' cognition of and demand for medical and wellness tourist services and provided relevant suggestions for government organizations, medical institutions, and the tourist industry.

Key words: Medical tourism, wellness tourism.

Introduction

Countries that are now actively developing medical and wellness tourism include Singapore, South Korea, and Thailand, etc. Thailand has the advantage of holiday resorts, and early on launched a travel package that combines vacation and a simple beauty spa. Because Singapore has few tourist attractions, its medical and wellness tourist services have attached great importance to surgery. With regards to South Korea, owing to the influence of popular culture, its idol stars now attract more and more females from Japan, China and other Asian countries. These females go to South Korea for facelift services, which promote the development of its tourism.

Medical tourism has always been a tourism aspect to which great attention has been paid by a number of Asian countries. Taiwan has advanced medical equipment. Its medical technologies are in a leading position in Asia. Meanwhile, its cost of medical services is quite low. Furthermore, because Taiwan has implemented a health insurance global budget payment system, medical institutions have invested in medical travel servi-

ces, not only for attracting consumers who come to Taiwan for medical travel services, but also to serve Taiwan's own consumers.

According to an investigation of Taiwanese consumers' travelling status in 2010 (1), Taiwanese consumers took 1,239,370,000 trips inside Taiwan that year, which indicates a 26.5% growth from 2009. In addition, Taiwanese consumers spent 7.537 billion U.S. dollars in 2010, an increase of 35.3% over the year 2009. With regard to the purpose of travel inside Taiwan by Taiwanese consumers in 2010, sightseeing tourism accounted for the first (64.5%), and fitness vacations were ranked as second (4.7%). From this, it can be seen that wellness tourism still has tremendous room for development.

According to Avenel and Barlet (2000)(2), vertical integration can be defined as when one manufacturer participates in more than one continuous production stage or the distribution stage of products and services. This can be termed vertical integration or partial vertical integration. The vertical integration of medical and wellness tourism is the integration of supply and demand between the medical and tourist industries. It attempts to integrate different service stages into one travel package. Taiwanese consumers have begun to pay attention to health maintenance and their appearance following the enhancement of their economic well-being. The development of medical tourism in Taiwan is still in its initial stages. This raises the question: Can a burgeoning consumer market in medical and wellness tourism be generated? Hence, this study aimed to investigate consumers' cognition of and demand for medical and wellness tourist services. The purpose was to understand consumers' opinions on medical and wellness tourist services and providing relevant suggestions for government organizations, medical institutions, and the tourist industry.

Literature Review

Medical and wellness tourism can be classified into wellness tourism and medical tourism. As argued by Mueller and Kaufmann (2001)(3), wellness tourism refers to the summation of all the relations and phenomena of travel and migration of residence with regard to people's expectations to protect and promote their health. Tourists stay in professional hotels that provide proper technical expertise and individual care. They require an all-encompassing service package, which may contain exercise, beauty treatments, health nutrition, diet, relaxation, meditation and other mental activities. Lee and Spisto (2007)(4) indicated that medical tourism refers to the tourist activities that involve medical procedures or activities, the aim of which is to promote tourists' health status. The constituent elements of medical and wellness tourism are as follows: disease treatment (medical tourism), enhancement (plastic surgery), health (spa/replacement therapy), and reproduction (fertility treatment, e.g. IVF).

Currently, medical and wellness tourism products mainly fall into three categories. The first category is directed at the wellness tourist group that is concerned with recreation and health maintenance. The products required by this group are mainly healthy food, hot springs, spa therapies and other healthcare services. These types of products can be integrated with cultural, environmental ecology, and scenic tourist spots. The second category of wellness tourism products is directed at the tourist group that wishes to receive health examination services, the main services in this category are healthcare treatment or medical consultations, supplemented by local scenic spots or hot spring trips. The third category is directed at the tourist group that wishes to receive diagnosis and treatment at large hospitals or clinics providing specialist and professional medical treatment. This group of tourists mainly takes part in miniature beauty medical operations, weight-loss treatment, dentistry and other medical services. In this regard, scenic spots will collocate with these medical services (5).

Methods

Samples

First of all, this study established pilot test samples using convenience sampling in order to

conduct an item analysis for the preliminary scale. 50 patients participated and completed the preliminary test. Following this, the study checked the structure of the scale and the quality of the items. After the preliminary questionnaires were collected, the researcher examined the circumstances under which those participants gave their answers and gathered their opinions of the questions. Moreover, the researcher processed the questionnaire items. During the second stage, formal samples of the questionnaire interviews were collected from the outpatients of the hospitals that provide medical tourist services in Taiwan. These patients were recruited following permission from the hospitals. The participants were interviewed randomly using convenience sampling. Following the approval of the patients, interviewers used face to face interviews to conduct the questionnaire investigations. A total of 351 valid questionnaires were collected.

Measuring Instruments

The present study employed questionnaires to evaluate consumers' knowledge about medical and wellness tourism and examine their understanding and requirements of medical and wellness tourism. With regard to the composition of questions, references have been made to "The investigation of our people's travelling status" by the Tourism Bureau of the Ministry of Transportation, the ecological tourism scale by Wu et al. (2005)(6), and empirical studies. The study worked out a structured questionnaire consisting of 31 questions. The main contents of these questions were: consumers' cognition of medical and wellness tourism (in broad and narrow senses), their attitudes towards medical and wellness tourism (government policies, providers' services, economic development), and their demand for medical and wellness tourism activities (monetary demands, trip planning demands). The study used a 5-point Likert scale, ranging from extremely disagree (1 point), disagree (2 point), no comment (3 point), agree (4 point), and highly agree (5 point). Since the constructs measured in this study tended to be formative models, it is reasonable that the internal consistency of the measurement scales is lower (7,8). Therefore, the Cronbach's α value of each measurement scale will not be reported.

This study divided consumers' cognition of medical and wellness tourism into cognition in a

broad sense and cognition in a narrow sense. In broad terms, it referred to the fact that individuals leave their daily lives to take part in tourism activities with the purpose of reducing pressure of life and promoting health. In this respect, regulations from the medical industry, the tourism industry, and the government are necessary. In narrow terms, consumers consider that, within medical and wellness tourism, they are inclined to engage in wellness activities on their travels, such as spa treatments or yoga courses.

There are three types of attitudes towards medical and wellness tourism. The first type is government policies, which mean that the government must play a supervisory role and set norms and standards according to different journeys. The second type is providers' services, which refer to the services, specialties, and convenience that providers offer. The third type of attitude refers to whether medical and wellness tourism can boost the local economy. Consumer demands for medical and wellness tourism activities can be divided into monetary demands and trip planning demands. Monetary demand means the cost of receiving medical and wellness tourism services. Trip planning demand means how many kinds of medical or wellness services a travel package covers.

Analysis of Samples

As for the structure of this study's valid samples, female subjects accounted for the majority (65.8%). The ages of the sample subjects mainly ranged from 21 to 50 (63.7%), with about equal numbers of single and married. Most of them had received a higher education (55.6%) and worked in the service industry (54.7%). Their salaries mainly varied from NTD30,000 to NTD45,000 (30.5%).

The study conducted a sample analysis with the characteristics of tourism. The travel habits of these sample subjects were based on planning (77.5%). Family members and relatives were their main travel companions (59.3%). Most of them travelled during the weekend (62.1%). They believed that the main factor that influenced tourist activities was the limitation of time (49%). 45.6% of the subjects had searched data through computer networks. Most often, they had planned their travel and journeys by themselves (73.8%). The most acceptable range of travel expenses was

within 1,000 U.S. dollars (90.8%). Usually, the purpose of travel was purely sightseeing (52.4%). Among these sample subjects, 64.1% of them had heard of medical tourism. The medical tourism they wanted to participate in most was the travel that is aimed at recreation and health maintenance (healthy food, hot springs and spa treatments, plus tourist attractions) (64.4%).

Results

First, the current study verified the relevance of consumers' cognition of medical and wellness tourism (in broad and narrow senses) and their attitudes towards these forms of tourism (government policies, providers' services, economic development). Table 1 demonstrates the results of the regression analysis with respect to the verification. It can be seen from Models 1, 2 and 3 in Table 1 that when consumers have a high degree of cognition of medical and wellness tourism in a broad sense, they show a distinctive positive relevance to government policies, providers' services, and economic development. On the other hand, when consumers have a high degree of cognition of medical and wellness tourism in a narrow sense, they present a clear negative relevance to providers' services and economic development. Subsequently, the study verified the relevance of consumers' cognition of medical and wellness tourism (in broad and narrow senses) to their demand for medical and wellness tourism activities (monetary demands, trip planning demands). It can be known from Models 4 and 5 in Table 2 that when consumers have a high degree of cognition of medical and wellness tourism in a broad sense, they manifest a significant positive relevance to monetary demands and trip planning demands. However, consumers' cognition of medical and wellness tourism in a narrow sense will not exert any notable influences.

Discussion and conclusion

The aim of the study was to investigate the key factors in developing medical and wellness tourism. In order to reach this aim, the study worked out a scale and divided consumers' cognition of medical and wellness tourism into cognition in a

Table 1. Regression analysis of the relevance of consumers' cognition of medical and wellness tourism to attitudes

Independent variables	Dependent variables		
	Consumers' attitudes towards wellness tourism		
	Government policies	Providers' services	Economic development
	Model 1	Model 2	Model 3
Control variables			
age	0.02	-0.01	-0.05
income	0.06	0.13*	0.13*
marriage	-0.09	-0.02	0.00
Independent variables			
consumers' cognition of wellness tourism			
cognition in a broad sense	0.46***	0.40***	0.50***
cognition in a narrow sense	-0.02	-0.11*	-0.10*
Adj R ²	0.21	0.16	0.24
F	18.95***	13.96***	23.09***

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ All the values of VIF are less than 1.627

Note: Regression coefficients are the ones that have been standardized.

Table 2. Regression analysis of the relevance of consumers' cognition of medical and wellness tourism to demand

Independent variables	Dependent variables	
	Consumers' demand of wellness tourism	
	Government policies	Providers' services
	Model 4	Model 5
Control variables		
age	-0.10	-0.09
income	0.06	0.13*
marriage	-0.09	-0.06
Independent variables		
consumers' cognition of wellness tourism		
cognition in a broad sense	0.39***	0.41***
cognition in a narrow sense	-0.02	-0.02
Adj R ²	0.15	0.17
F	13.49***	14.88***

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$ All the values of VIF are less than 1.627

Note: Regression coefficients are the ones that have been standardized.

broad sense and cognition in a narrow sense. Second, with regard to consumers' attitudes towards developing medical and wellness tourism, the study discussed several aspects concerning government roles, services that providers need to offer, and whether this burgeoning tourist industry can promote local economic development. Third, consumer demand for medical and wellness tourism was divided into monetary demand and trip

planning demand. The results indicated that when consumers have a high degree of cognition of medical and wellness tourism in the broad sense, they show a distinct, positive relevance to government policies, providers' services, and economic development. This means that when consumers think that tourism involves medical treatment and health care, tourists, tourism practitioners, and medical institutions are all the principal participants

in the tourism. In this regard, regulations from government policies help to guarantee consumers' security. Meanwhile, tourist service providers and medical institutions must offer specific introductions to the products. This new pattern of tourism, which is the alliance of different trades, can attract more consumers from home and abroad and boost local economic development. On the other hand, when consumers have a high degree of cognition in the narrow sense, statistically, their cognition demonstrates a negative relevance to providers' services and economic development. This result means that consumers with a narrow sense of cognition consider that medical and wellness tourism tends to be wellness tourism, adding hot springs, Chinese medicine, health food or spa treatments to their travels. These activities themselves have been operated for a long time. In addition, service providers advertise widely using a variety of media and messages. Hence, consumers do not believe that wellness tourism can bring economic development and give the impression that providers' services need to be enhanced. Furthermore, when consumers have a high degree of cognition of medical and wellness tourism in the broad sense, they show a positive relevance to monetary demands and trip planning demands. This is due to the fact that consumers with a broad sense of cognition deem that medical and wellness tourism tends to be the combination of medical treatment and tourism. Medical expenses depend on different medical services and travel packages. If the travel involves surgery, monetary demand differs from the cost for pure spa activities. Moreover, because travel activities involve curative effects and medical risks, the consumers' sense of insecurity will be reinforced, which makes them pay particular attention to trip planning demands. If the planning of a travel package includes the service in which medical professionals work as narrators, it will increase the degree of customers' satisfaction.

The burgeoning medical and wellness tourism industry brings opportunities to form an alliance between the medical industry and the tourist industry. It also brings golden opportunities for a nation to promote its own medical technologies and scenic spots. Medical and wellness tourism differs from traditional travel patterns. It should incorporate the concept of patient security and sustained subsequent

medical care into its core issues. It is only in this way that a nation can shape its unique features in the upsurge of worldwide medical and wellness tourism.

Acknowledgements

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Cardiovascular syncope in the University of Sarajevo students

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Abstract

Introduction: Syncope is defined as a transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneous recovery. The term syncope excludes seizures, coma, shock, or other states of altered consciousness. Syncope is a prevalent disorder, accounting for 1-3% of emergency department (ED) visits and as many as 6% of hospital admissions each year in the United States. As much as 50% of the population may experience a syncopal event during their lifetime. Although many etiologies for syncope are recognized, categorization into reflex (neurally mediated), orthostatic, and cardiac (cardiovascular) may be helpful during the initial evaluation. Cardiac syncope is associated with increased mortality, whereas non-cardiac syncope is not. Syncope may result in significant morbidity due to falls or accidents that occur as a result. In the United States alone, an estimated \$2 billion annually is spent on patients hospitalized with syncope. Although most causes of syncope are benign, this symptom presages a life-threatening event in a small subset of patients. It is unclear whether hospital inpatient admission of asymptomatic patients after syncope affects outcomes. No current criterion standard exists for diagnosing undifferentiated syncope. Many physicians continue to admit patients because of perceived risk. Recent reviews of the 2001 American College of Emergency Physician (ACEP) clinical policy suggest that evidence-based criteria may decrease admission rates by nearly half by identifying cardiac causes of syncope. Inpatient admission should be reserved for patients in whom identification of specific immediate risk, such as those with structural heart disease or history of ventricular arrhythmia, is needed. Outpatient management can be used for patients who are low risk for a car-

diac etiology in order to define a precise cause in order to effect mechanism-specific treatment.

Objective: To determine the type and frequency of syncope of the student population at the University of Sarajevo; To assess the importance of ECG and 24h-Holter monitoring in the diagnosis of syncope in students of the University of Sarajevo.

Materials and methods: The study was prospective, retrospective, clinical, and descriptive analytical. The sample consisted of the University of Sarajevo students. The sample included students in regular and systematic examinations of the Institute of Public Health of Students at the University of Sarajevo in the period 2008 - 2010. Methods of investigation included personal history, auscultatory findings of the heart, an electrocardiogram and 24 Holter-monitoring of the heart and echocardiogram.

Results: Syncope in the male population of patients were present in 3 boys or (8%), recurrent syncope: 4 boys or (10%) headache: 5 boys, or (13%) and 24 boys (61%) did not have these problems. Syncope in female patients were seen in: 3 girls, or (4%), occasional syncope with transient loss of consciousness: 2 girls or (3%), recurrent syncope: 2 girls, or (3%), headache: 22 girls, or (34%) and 40 girls (57%) did not have these problems. Unconsciousness in all examined patients was seen in: 6 patients or (6%), occasional fainting with short seizures: 5 patients or (5%), recurrent blackouts: 6 patients or (6%), headache: 28 patients, or (25%) and 64 patients (58%) did not have these problems.

Key words: The University of Sarajevo students, syncope, heart rhythm disorders.

Introduction

Syncope is defined as a transient, self-limited loss of consciousness with an inability to maintain postural tone that is followed by spontaneo-

us recovery. The term syncope excludes seizures, coma, shock, or other states of altered consciousness. Syncope is a prevalent disorder, accounting for 1-3% of emergency department (ED) visits and as many as 6% of hospital admissions each year in the United States. As much as 50% of the population may experience a syncopal event during their lifetime. Although many etiologies for syncope are recognized, categorization into reflex (neurally mediated), orthostatic, and cardiac (cardiovascular) may be helpful during the initial evaluation. Cardiac syncope is associated with increased mortality, whereas non-cardiac syncope is not. Syncope may result in significant morbidity due to falls or accidents that occur as a result. In the United States alone, an estimated \$2 billion annually is spent on patients hospitalized with syncope. Although most causes of syncope are benign, this symptom presages a life-threatening event in a small subset of patients. It is unclear whether hospital inpatient admission of asymptomatic patients after syncope affects outcomes. No current criterion standard exists for diagnosing undifferentiated syncope. Many physicians continue to admit patients because of perceived risk. Recent reviews of the 2001 American College of Emergency Physician (ACEP) clinical policy suggest that evidence-based criteria may decrease admission rates by nearly half by identifying cardiac causes of syncope. Inpatient admission should be reserved for patients in whom identification of specific immediate risk, such as those with structural heart disease or history of ventricular arrhythmia, is needed. Outpatient management can be used for patients

who are low risk for a cardiac etiology in order to define a precise cause in order to effect mechanism-specific treatment.

Syncope occurs due to global cerebral hypo perfusion. Brain parenchyma depends on adequate blood flow to provide a constant supply of glucose, the primary metabolic substrate. Brain tissue cannot store energy in the form of high-energy phosphates found elsewhere in the body; therefore, a cessation of cerebral perfusion lasting only 3-5 seconds can result in syncope. Cerebral perfusion is maintained relatively constant by an intricate and complex feedback system involving cardiac output, systemic vascular resistance, arterial pressure, intravascular volume status, cerebrovascular resistance with intrinsic auto regulation, and metabolic regulation. A clinically significant defect in any one of these or subclinical defects in several of these systems may cause syncope. Cardiac output (CO) can be diminished secondary to mechanical outflow obstruction, pump failure, hemodynamically significant arrhythmias, or conduction defects. Systemic vascular resistance (SVR) can drop secondary to vasomotor instability, autonomic failure, or vasodepressor/vasovagal response. Mean arterial pressure (MAP) decreases with all causes of hypovolemia. Medications can affect CO, SVR, or MAP. Other conditions can mimic syncope. A CNS event, such as a hemorrhage or an un-witnessed seizure, can present as syncope. Syncope can occur without reduction in cerebral blood flow in patients who have severe metabolic derangements (e.g., hypoglycemia, hyponatremia, hypoxemia, hypercarbia). Fra-

Classification and pathophysiology

Reflex (neurologically caused) syncope

Vasovagal

Situational

Carotid sinus syncope

Atypical forms (with the obvious triggers and / or atypical presentation)

Syncope caused by orthostatic hypotension

The primary weakness of the autonomic nervous system

A secondary weakness of the autonomic nervous system

Drug induced orthostatic hypotension

Loss of volume

Cardiac syncope (cardiovascular)

Arrhythmias as primary cause

Structural diseases

mingham data demonstrate a first occurrence rate of 6.2 cases per 1000 patient-years. Syncope reoccurs in 3% of affected individuals, and approximately 10% of affected individuals have a cardiac etiology. Data from Europe and Japan suggest a similar occurrence rate to the United States, accounting for 1-3.5% of ED visits.

Cardiovascular Syncope

About 90 percent of people who faint have cardiovascular syncope, the most serious type of fainting disorder. The risk of cardiovascular syncope increases with age, and those at greatest risk are people who have: Coronary artery disease, or CAD (clogged blood vessels to the heart), angina (chest pain caused by reduced blood flow to the heart) or a prior heart attack (myocardial infarction). Ventricular dysfunction, a weakness in the ventricles, the heart's major pumping chambers. Structural heart disease, such as problems with the heart valves or muscles (cardiomyopathy). An abnormal electrocardiogram (ECG). An ECG is a common test that prints out a graph that shows how the heart is beating and records its electrical activity. Recurrent episodes of fainting that come on suddenly and without warning.

Signs of Cardiovascular syncope

Cardiovascular syncope usually is sudden. There may be no warning signs that an individual is about to faint. People sometimes feel tightness in the chest, shortness of breath, apprehension or an unusual awareness of the heartbeat (palpitations). Palpitations may feel as if the heart is fluttering, racing, skipping beats or pounding with unusual force in the chest. If syncope occurs after palpitations that end abruptly, a heart rhythm disorder often is the cause. Fainting during physical exercise or a history of unexplained fainting in childhood may be signs that syncope is related to a heart problem. Orthostatic (Postural) Hypotension is a condition in which the blood pressure drops suddenly when a person stands up. Sometimes the underlying cause is a cardiovascular condition called "pump failure." This means that the heart pump sometimes "fails" to maintain normal blood pressure. This may be due to muscle damage from

a prior heart attack, inflammation of the heart, structural defects in the heart's valves or muscle (cardiomyopathy) or medications. Disorders of the electrical system that regulates the rate and strength of the heartbeat can cause pump failure. Heart rhythm disorders (arrhythmias) include bradycardia (a too-slow heartbeat), tachycardia (a rapid heartbeat) and fibrillation (a rapid heartbeat that also is chaotic or irregular).

Cardiovascular Syncope and Long QT Syndrome

Fainting is the primary symptom - and may be the only warning sign - of Long QT Syndrome (LQTS), an inherited electrical disorder of the heart. LQTS is believed to be a common cause of sudden and unexplained death in children and young adults. It may occur in as many as 1 in 5,000 individuals and causes up to 4,000 deaths in children and young adults each year in the United States.

Mortality/Morbidity

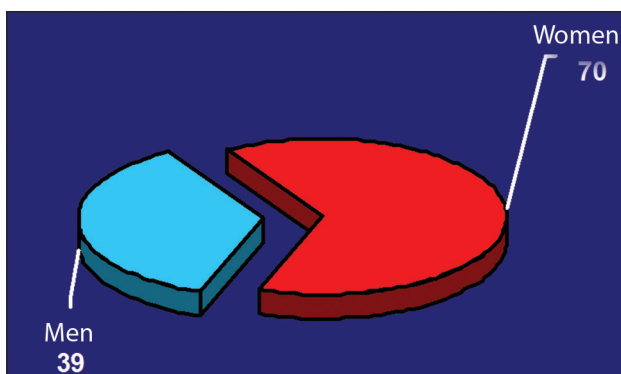
Data suggest that patients with cardiac syncope are more likely to experience a poor outcome. Patients who have a significant cardiac history and those who seem to have a cardiac syncope (because of associated chest pain, dyspnea, cardiac murmur, signs of congestive heart failure [CHF], or ECG abnormalities) should be considered to be at increased risk. Most published methods of risk stratification take into account cardiac symptoms and risk factors. Morbidity from syncope includes recurrent syncope, which occurs in 20% of patients within one year of the initial episode. Lacerations, extremity fractures, head injuries, and motor vehicle accidents can occur secondary to syncope. No significant differences regarding race are observed with respect to syncope risk. Larger prospective studies fail to show clinically significant differences between men and women. National Hospital Ambulatory Medical Care Survey (NHAMCS) data show that syncope occurs in all age groups but is most common in adult populations. Non-cardiac causes tend to be more common in young adults, whereas cardiac syncope becomes increasingly more frequent with advancing age. Syncope is relatively uncommon in pedia-

tric populations. One small retrospective study by Pratt and Fleisher reported a prevalence of less than 0.1% in children. Pediatric syncope warrants prompt detailed evaluation. Advancing age is an independent risk factor for both syncope and death. Advancing age correlates with increasing frequency of coronary artery and myocardial disease, arrhythmia, vasomotor instability, autonomic failure, polyneuropathy, and use of polypharmacy.

Materials and methods

The sample consisted of the University of Sarajevo students. The sample included students in regular and systematic examinations of the Institute of Public Health of Students at the University of Sarajevo in the period 2008 - 2010. Investigated sample consisted of students' age 18 to 26 who experienced syncope. We use personal history chart and secondary medical charts (discharge list from hospitals or clinics, medical findings from internal medicine specialist or cardiologist). The investigation included syncope recorded during previous pediatric or cardiological examinations, or those diagnosed for the first time during regular and systemic examinations at the Institute of Public Health of Students at the University of Sarajevo.

This study included total of 109 the University of Sarajevo students, out of which 70 female respondents or 64% and 39 or 36% male respondents with significant difference on level $p < 0,005$ ($t=2,97$) in favor of female population in the study.



Graph 1. Relation of gender distribution of investigated patients

Methods of investigation

- Personal history data for assessment of cardiac status of the patient and family history of the student population at the University of Sarajevo;
- Auscultatory data on cardiac rhythm and its regularity, intensity and quality of heart sounds, systolic and diastolic sounds, heart noise of students at the University of Sarajevo;
- Electrocardiographic findings in the evaluation of syncope in the University of Sarajevo students;
- 24 h Holter-monitoring in the diagnosis of heart rhythm disorders during evaluation of syncope in the University of Sarajevo students;
- Echocardiography in the evaluation of syncope in the University of Sarajevo students.

Risk stratification

Short-term high-risk criteria, which require hospitalization or intensive evaluation

Severe structural or coronary artery disease (heart failure, low LVEF, or condition after myocardial infarction)

Clinical or ECG signs indicating aritmic syncope

- Syncope occurring during endurance or rest
- Palpitation at the time of syncope
- Family history of sudden cardiac death (SCD)
- Non-sustainable ventricular tachycardia
- Bifascicular block (LBBB or RBBB combined with the PLH SLH) or other interventricular conduction disturbances with QRS duration > 120 ms
- Unacceptable sinus bradycardia (<50 beats / min) or sinoatrial block in the absence of negative chronotropic drugs or physical load
- QRS complexes with pre-excitation
- Prolonged or short QT interval
- RBBB appearance with ST elevation in leads V1-V3 (Brugada properties)
- A negative T waves in right precordial leads, epsilon waves and ventricular late potentials indicating ARVC

Recommendation: diagnostic criteria for initial evaluation	Class	Level b
VVS is diagnosed if syncope is caused by emotional or orthostatic stress disorder and is associated with typical prodromal signs.	I	C
Situational syncope is diagnosed if it occurred during and immediately after specific triggers such as coughing, sneezing, gastrointestinal stimulation, urination, after endurance, after a meal.	I	C
Orthostatic syncope is diagnosed when it occurs after standing up and can be documented as OH.	I	C
Arrhythmia related syncope is diagnosed with ECG when: <ul style="list-style-type: none"> • persisting sinus bradycardia <40/bpm in average or repeating sinoatrial block or sinus pauses ≥ 3 seconds • A-V block Mobitz II second or third degree • variable BBB of left or right bundle branch • VT or fast SVT • episodes of non-sustained or polymorphic VT with long or short QT interval • disorders of the PM heart function or ICD with cardiac pauses 	I	C
Cardiac ischemia related syncope is diagnosed when they are registered on the ECG with acute ischemia with or without myocardial infarction.	I	C
Cardiovascular syncope is diagnosed when it occurs in patients with atrial myxoma prolapse, emphasized aortic stenosis, pulmonary hypertension, pulmonary embolism or acute aortic dissection	I	C

Recommendation: electrocardiographic monitoring	Class a	Level b
Indications		
ECG monitoring is indicated in patients who have clinical or ECG features suggesting arrhythmic syncope. Duration (and technology) of monitoring should be selected in accordance with the risks and signs of recurrent syncope:	I	B
• direct hospital monitoring (in bed or telemetry) are indicated in high-risk patients as defined in the Table “Risk Stratification”	I	C
• Holter-monitoring is indicated in patients who have very frequent syncope or pre-syncope ($\geq 1x$ weekly)	I	B
• ILR is indicated in:	I	B
- Early stage of the evaluation of patients with recurrent syncope of unknown origin, the absence of high-risk criteria according to Table “Risk-stratification and the high probability of recurrence within the device battery longevity”;	I	B
- High risk patients in whom evaluation undertaken shows no cause of syncope or requiring specific treatment;		
• ILR should be considered to determine the contribution of bradycardia before introduction of cardiac pacing in patients with suspected or safe reflex syncope accompanied with frequent or traumatic syncopal episodes	IIa	B
• External Recorder should be considered in patients who have the time interval between symptoms ≤ 4 weeks	IIa	B
Diagnostic criteria		
• ECG monitoring is diagnostic when there is a correlation between syncope and detected arrhythmias (brady or tachyarrhythmia)	I	B
• In the absence of such correlations, ECG monitoring is diagnostic when detected Mobitz II or III degree of the AV block or ventricular pause ≥ 3 seconds (they can be possible in extremely trained young people during sleep, patients’ medication, or the controlled response in FA), or rapid extension of SVT or VT paroxysms. The absence of arrhythmia during syncope excludes arrhythmic syncope.	I	C
• ECG recorded during pre- syncope without a relevant arrhythmia is not a precise cause of syncope;	III	C
• Asymptomatic arrhythmias (other than those listed above) are not precise cause of syncope;	III	C
• Sinus bradycardia (in the absence of syncope) is not confident cause of syncope.	III	C

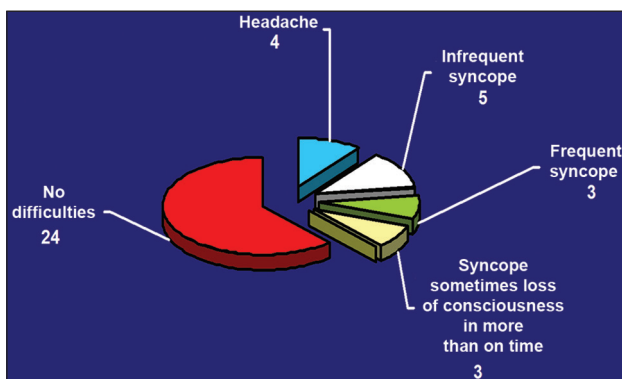
Clinical features that may indicate the diagnosis and initial evaluation

- Neurologically induced syncope
 - The absence of cardiac disease
 - History of recurrent syncope
 - After the sudden unexpected loss of vision, hearing, smell, or pain
 - Prolonged standing or pushing, heated places
 - Nausea, vomiting associated with syncope
 - During the meal or postprandial
 - With the turning of the head or pressure on the carotid sinus (as in tumors, shaving, tight collars)
 - After the endurance
-
- After standing
 - Temporary connection with beginning or changes in dosage of vasodepressive drug leads to hypotension
 - Prolonged standing especially in crowded, hot places
 - The presence of autonomic neuropathy or Parkinsonism
 - Standby after endurance
-
- Cardiovascular syncope
- Objective evidence of structural heart disease
 - Family history of sudden death or channelopathies
 - During endurance or getting up
 - Abnormal ECG
 - Suddenly occurring palpitations that are directly associated with syncope
 - ECG indicating aritmic syncope:
 - Bifascicular block (defined as LBBB and RBBB) combined with front left hemi block (PLH) or left rear hemi block (SLH)
 - Other intraventricular anomalies in conducting ($QRS \geq 0.12$ -)
 - Second-degree A-V block Mobiz
 - Asymptomatic inappropriate sinus bradycardia ($<50\text{bpm}$)
 - sinoatrial block or sinus pauses ≥ 3 - in the absence of negative chronotropic medication
 - Unsupported, non-sustained VT
 - Pre-excitation QRS-complexes
 - Longer or shorter QT intervals
 - Early repolarization
 - Right bundle branch block (RBBB) with ST segment elevation in V1-V3 leads (Brugada Syndrome).
 - Negative T in the right precordial leads, epsilon waves and ventricular late potentials indicating ARVC
 - Q-waves suggesting myocardial infarction

Results of investigation with discussion

Table 1. Display of presence of syncope in male patients

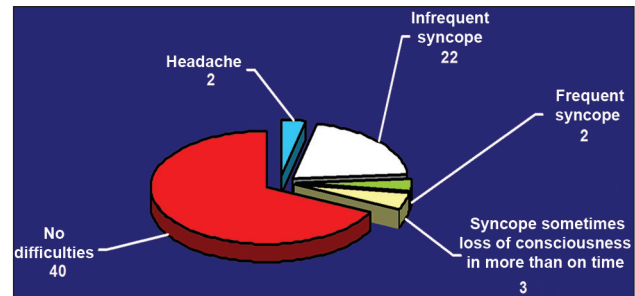
Table review of syncope in male patients		
Type	Number of respondents	%
Syncope sometimes, loss of consciousness in more than on time	3	8 %
Frequent syncope	3	8 %
Headache	4	10 %
Infrequent syncope	5	13 %
No difficulties	24	61 %
Total	39	100%



Graph 2. Relation of syncope in male patients

Table 2. Display of presence of syncope in female patients

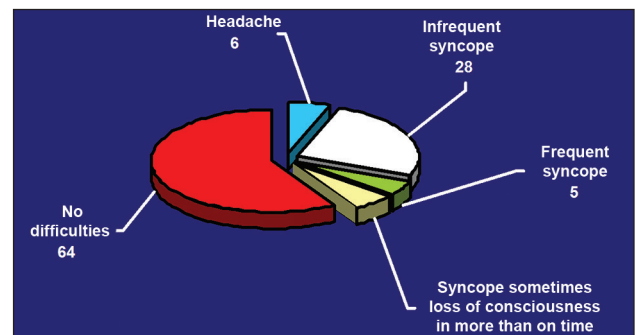
Table review of syncope in female patients		
Type	Number of respondents	%
Syncope sometimes, loss of consciousness in more than on time	3	4 %
Frequent syncope	2	3 %
Headache	2	3 %
Infrequent syncope	22	34 %
No difficulties	40	57 %
Total	70	100%



Graph 3. Relation of syncope in female patients

Table 3. Display of syncope in all patients

Table review of syncope in all patients		
Type	Number of respondents	%
Syncope sometimes, loss of consciousness in more than on time	6	6 %
Frequent syncope	5	5 %
Headache	6	6 %
Infrequent syncope	28	25 %
No difficulties	64	58 %
Total	109	100%



Graph 4. Relation of syncope in all patients

Long-QT Syndrome

LQTS is characterized by prolongation of the QT interval with a QTc 450 ms. were recorded 6,42% of the students. A genetic defect in either cardiac-potassium (LQT1 and LQT2) or sodium (LQT3) channels results in delayed repolarization and QT prolongation. LQTS generally is inherited with an autosomal dominant pattern variable penetrance. The risk of cardiac events depends on the specific genetic defect, gender, and age. The most important non-demographic risk factor is the degree of QT prolongation. The lifetime risks of syncope or aborted or actual sudden death in

Table 4. Display of presence of shortened PQ interval, prolonged QT interval and Torsade de pointes in all patients

Heart rhythm disorders	Male		Female		Total	
	Number	%	Number	%	Number	%
PQ INTERVAL (shortened)	3	7,69	12	17,14	15	13,76
QT INTERVAL (prolonged)	7	17,95	0	0,00	7	6,42
TORSADE DE POINTES	3	7,69	2	2,86	5	4,59

Table 5. Display of presence of cardiomyopathia in all patients

Cardiomyopathia	Male		Female		Total	
	Number	%	Number	%	Number	%
Dilatative cardiomyopathies	11	28,21	9	12,86	20	18,35
Hypertofic cardiomyopathies	3	7,69	1	1,43	4	3,75

No ischemic Dilated Cardiomyopathy

LQTS patients with a QTc 440 ms, 460 to 500 ms, and 500 ms are approximately 5%, 20%, and 50%, respectively. Syncope is an ominous finding and is presumably secondary to an episode of torsade des pointes polymorphic ventricular tachycardia that terminates spontaneously. Treatment options include blockers and implantable defibrillators. Other important interventions include restriction of strenuous or competitive exercise, avoidance of medicines that prolong the QT interval (a comprehensive listing is available at www.QTdrugs.org), and family screening.

Syncope is associated with increased mortality among patients with no ischemic dilated cardiomyopathy (NIDCM) were recorded in 18,35% of the students. The likely reason for the increased mortality is that episodes of syncope in these patients often are caused by self-terminating episodes of ventricular tachycardia that, if recurring, can lead to cardiac arrest of patients had dizziness, but only 0.3% of patients had syncope over a 6-month period. The differential diagnosis of syncope in patients with NIDCM includes bradycardia, tachycardia, orthostatic hypotension, and pulmonary embolism. Although other causes of syncope may still occur in these patients, the presence of myocardial dysfunction increases the probability of an arrhythmic origin. Vigorous ventricular contraction is thought to be a critical component of the vagal response in patients with neurocardiogenic syncope. Therefore, it is unclear whether patients with ventricular dysfunction can develop vasodepressor syncope, although

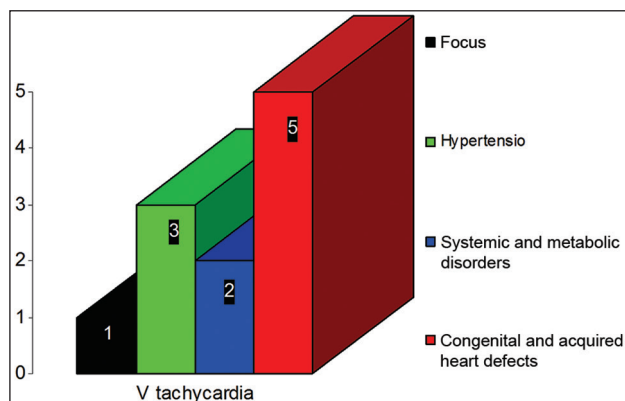
they have an abnormal vasodilatory response to a reduction in preload. Heart failure drug therapy, e.g., ACE inhibitors and blockers, can further aggravate the abnormal baroreflexes in patients with a cardiomyopathy by causing vasodilatation, volume depletion, and sinus node dysfunction. For these reasons, an abnormal head-up tilt table test alone should not lead to a diagnosis of vasodepressor syncope in a patient with NIDCM.

Hypertrophic Cardiomyopathy

Hypertrophic cardiomyopathy was recorded in 3,75% of the students, genetically determined myocardial disease with a variable prognosis. The diagnosis of Hypertrophic cardiomyopathy is confirmed with echocardiography, which demonstrates a hypertrophied, no dilated left ventricle in the absence of secondary causes of hypertrophy. Although the risk of sudden cardiac death was initially overestimated because of referral bias, hypertrophic cardiomyopathy remains an important cause of sudden death, particularly in young patients. The annual risk of sudden death in unselected patients with hypertrophic cardiomyopathy is estimated to be 0.6% to 1%. There is often a striking discordance between the risk of sudden cardiac death, echocardiography findings, and the presence of symptoms. Syncope is a major risk factor for subsequent sudden cardiac death in hypertrophic cardiomyopathy (relative risk 5), particularly if it is repetitive or occurs with exertion. However, in addition to self-terminating ven-

tricular arrhythmias, many other mechanisms can cause syncope in hypertrophic cardiomyopathy, including supraventricular arrhythmias, severe outflow-tract obstruction, bradyarrhythmias, decreased blood pressure in response to exercise, and neurocardiogenic syncope. The presence or absence of other sudden cardiac death risk factors such as family history of sudden death, frequent non-sustained ventricular tachycardia, or marked hypertrophy may help in the determination of risk. *Table 6. Display of ventricular tachycardia according to etiopatogenesis in all patients*

Table review in all patients		
Type	Number	%
Foci	1	0,92
Hypertensio art.	3	2,75
Systemic and metabolic disorders	2	1,83
Congenital and acquired heart defects	5	-



Graph 5. Relation of frequency of Ventricular Tachycardia to Etiopatogenesis in all patients

Syncope is a sudden and temporary loss of consciousness, or fainting. It is a common symptom - most people pass out at least once in their lives - and often does not indicate a serious medical problem. However, sometimes syncope indicates a dangerous or even life-threatening condition, so when syncope occurs it is important to figure out the cause. And the first order of business is to make sure the patient presenting with syncope isn't about to die. The causes of syncope can be grouped into four major categories, neurologic, metabolic, vasomotor and cardiac. Of these, only cardiac syncope commonly leads to sudden death. We will deal first with the cardiac causes of syncope, since these are the causes of syncope that can

be fatal. There are two major varieties of cardiac syncope: obstructive cardiac lesions, and cardiac arrhythmias. *Obstructive cardiac lesions:* Several heart disorders can result in an obstruction of blood flow through the heart. These include obstructed heart valves (aortic stenosis and mitral stenosis are the most common examples; obstructed blood vessels (such as a massive pulmonary embolus; and cardiac tumors (such as an atrial myxoma, a benign tumor that can obstruct the mitral valve). Most of these lesions are readily apparent to a physician taking a careful medical history and doing a careful cardiac examination. And for the most part, they are readily confirmed by performing a simple echocardiogram. Far more common as a cause of syncope - and especially as a cause of sudden death - are the cardiac arrhythmias. Again, there are two major categories of life-threatening, syncope-producing cardiac arrhythmias: the bradycardias and the tachycardia. Bradycardias, or slow heart rhythms, are treated effectively by inserting a cardiac pacemaker. There are two varieties of tachycardia - ventricular tachycardia were recorded in 4,59% of the students and supraventricular tachycardia (SVT) were recorded in 75.22% of the students;. With rare exceptions, SVT does not cause syncope nor does it cause sudden death. (The most common exception to this rule is in patients with Wolff-Parkinson-White syndrome (W-P-W), in which, rarely, SVT can degenerate into the much more dangerous ventricular variety of tachycardia.) Ventricular tachycardia, on the other hand, commonly causes sudden death. And unfortunately, ventricular tachycardia is common in people who have underlying heart disease, and is commonly overlooked by doctors. If it is missed once, neither the doctor nor the patient is likely to get a second chance to undo the error. The key to diagnosing ventricular tachycardia is to understand that this arrhythmia is extremely rare in individuals with completely normal hearts, while it is very common in patients who have heart disease. Thus, a major consideration in evaluating a patient with syncope of unknown cause is to decide whether a patient has underlying heart disease (especially ventricular muscle damage due to coronary artery disease, or to a viral infection of the heart muscle). If the ventricular muscle is normal, then the possibility of ventricular tachycardia as a

cause of syncope can be largely dismissed. (While there are exceptions to this “rule,” they are rare.) On the other hand, if the ventricles are abnormal, the doctor’s focus must shift immediately from merely preventing syncope to preventing sudden death. The patient should be immediately hospitalized and placed on a cardiac monitor, and must remain monitored until either ventricular tachycardia is ruled out, or definitive therapy to protect against ventricular tachycardia is instituted. In general, an electrophysiology study is done to assess the heart’s electrical system, and evaluate the patient’s propensity for developing ventricular tachycardia. Because of the high price that may be paid if ventricular tachycardia is missed, the doctor’s index of suspicion for this diagnosis must be high. Thus, for instance, any patient with a history of coronary artery disease, or even with significant risk factors for coronary artery disease, needs to be evaluated. Indeed, if a careful medical history and physical examination do not reveal any other likely cause of syncope, a cardiac evaluation should be undertaken.

Conclusion

Syncope in the male population of patients were present in 3 boys or (8%), recurrent syncope: 4 boys or (10%) headache: 5 boys, or (13%) and 24 boys (61%) did not have these problems. Syncope in female patients were seen in: 3 girls, or (4%), occasional syncope with transient loss of consciousness: 2 girls or (3%), recurrent syncope: 2 girls, or (3%), headache: 22 girls, or (34%) and 40 girls (57%) did not have these problems. Unconsciousness in all examined patients was seen in: 6 patients or (6%), occasional fainting with short seizures: 5 patients or (5%), recurrent blackouts: 6 patients or (6%), headache: 28 patients, or (25%) and 64 patients (58%) did not have these problems. We may see from these results that syncope are present in 25% of investigated students and syncope with short term unconsciousness are present in 6% of investigated students. The causes to this subjective difficulty may be numerous. The prognosis is dependent on etiology.

The most common etiological factors are neuro-cardiogenic 20%, cardiovascular 20%, then 10% orthostatic, neurological 10% and psychiatric 10%. Among the most important determinant

of cerebral flow falls cardiac output, perfusion flow in the level of the brain and cerebral vascular pool resistance. The appearance of syncope is the main symptom of aortic stenosis and may be the first symptom of existing aortic vitium. The appearance of syncope in patients with hypertrophic obstructive cardiomyopathy is associated especially with young people at increased risk of sudden death. Mitral stenosis can lead to cardiac syncope and this usually happens when there is tachycardia or other cardiac rhythm disorder. In mitral valve prolapse associated with ventricular and supra-ventricular arrhythmias, syncope may occur. The initial diagnostic protocol includes ECG, chest X-ray, serum electrolytes and blood glucose. There is need for mandatory cardiac evaluation of this problem: heart ultrasound, 24-h Holter monitoring and Treadmill endurance test. Treatment is adjusted to the cause of the disorder.

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Abstract

In this paper the instructions for preparing camera ready paper for the Journal are given. The recommended, but not limited text processor is Microsoft Word. Insert an abstract of 50-100 words, giving a brief account of the most relevant aspects of the paper. It is recommended to use up to 5 keywords.

Key words: Camera ready paper, Journal, ksdh.

Introduction

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Table 1. Page layout description

Paper size	A4
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Regular paper may be divided in a number of sections. Section titles (including references and acknowledge-ment) should be typed using 12 pt fonts with **bold** option. For numbering use Times New Roman number. Sections can be split in subsection, which should be typed 12 pt *Italic*

option. Figures should be one column wide. If it is impossible to place figure in one column, two column wide figures is allowed. Each figure must have a caption under the figure. For the figure captions 12 pt *Italic* font should be used. (1)

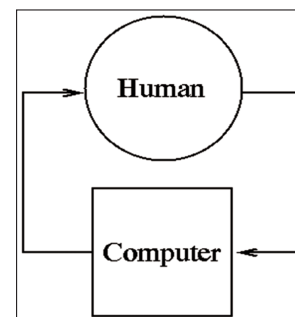


Figure 1. Text here

Conclusion

Be brief and give most important conclusion from your paper. Do not use equations and figures here.

Acknowledgements (If any)

These and the Reference headings are in bold but have no numbers.

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