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JOURNAL OF HEALTH SCIENCES OF ADIYAMAN UNIVERSITY

Research Article/Özgün Araştırma

The effect of cold application to the sacral area on labor pain and labor process: A randomized controlled trial

Sakral bölgeye uygulanan soğuk uygulamanın doğum ağrısı ve sürecine etkisinin belirlenmesi: Randomize kontrollü bir çalışma

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Abstract

Aim: This study aims to determine the effect of cold application to the sacral area in the first stage of labor on labor pain and process.

Materials and Methods: The study was done as a randomized controlled experimental study. While the women in the experimental group received cold application for 10 minutes every 20 minutes after 4 cm of cervical dilatation, the women in control group received routine care protocol of the unit.

Results: The pregnant women in experimental group showed statistically significantly low score of pain on the 40th (p=0.041), 100th (p<0.001), and 160th (p=0.014) minutes and had statistically significantly shorter delivery time (p<0.001) in comparison to the control group. It was also found that dilatation and effacement happened in statistically significantly shorter time in the experimental group (p<0.05).

Conclusion: Cold application to the sacral area of pregnant women in the first stage of labor reduces labor pain, shortens labor time, and shortens dilatation and effacement time.

Keywords: Pain management; Dilation; Labor pain; Cold application; Sacral area.

Öz

Amaç: Bu çalışmada sakral bölgeye uygulanan soğuk uygulamanın doğum ağrısı ve sürecine etkisinin belirlenmesi amaçlanmıştır.

Gereç ve Yöntem: Araştırma randomize kontrollü deneysel bir çalışma olarak gerçekleştirildi. Deney grubundaki gebelere, 4 cm servikal açıklıktan sonra 20 dakika arayla 10 dakika süre ile soğuk uygulama yapılırken, kontrol grubundaki gebelere ünitenin rutin bakım protokolü uygulandı.

Bulgular: Soğuk uygulama sonrası deney grubu gebelerin, kontrol grubuna göre, 40. dakikada (p=0,041), 100. dakikada (p<0,001) ve 160. dakikada (p=0,014) ağrı skorlarının, istatistiksel olarak anlamlı ölçüde düşük olduğu, doğum eyleminin, kontrol grubuna göre istatistiksel düzeyde anlamlı ölçüde daha kısa sürede gerçekleştiği belirlendi (p<0,001). Ayrıca, deney grubundaki gebelerde dilatasyon ve efasmanın istatistiksel düzeyde anlamlı ölçüde daha kısa sürede gerçekleştiği görüldü (p<0,05).

Sonuç: Doğum eyleminin birinci evresinde sakral bölgeye yapılan soğuk uygulama, kadınların doğum ağrısını azaltmakta, doğum süresini kısaltmakta, efasman ve dilatasyonun daha hızlı gerçekleşmesine katkı sağlamaktadır.

Anahtar Kelimeler: Ağrı yönetimi; Dilatasyon; Doğum ağrısı; Soğuk uygulama, Sakral bölge.

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Introduction

Labor is an important experience that affects the woman's life and the process of adaptation to motherhood. Studies show that a negative labor experience associated with labor pain could cause negative consequences such as deterioration in the mother's mental health[1] and development of fear of childbirth.[2,3] The positive effects of good management of labor pain may create an opportunity for next labor experiences to be positive.[3] The professional support given during labor increases the pregnant woman's feeling of control, reduces labor pain, and contributes to a positive labor experience.[4] Some of the nonpharmacological methods that could be used for the management of pain during labor could be listed as hot application,[5-7] cold application,[7,8] and acupuncture and acupressure.[9] The pain-reducing mechanism of cold application used for the management of pain during labor is explained with the gate control theory and endorphin theory.[10-13] The literature involves a limited number of studies that investigated the effect of cold application on labor pain.[7-9] These studies that investigated the effect of cold application on labor pain used cold application in different areas and in different durations and were usually conducted with primipara women. The results of the limited number of studies indicate the effect of cold application on reducing labor pain.[7-9] There are no studies that investigated the efficiency of cold application to only sacral area and that included both primipara and multipara pregnant women. The sacral area is one of the areas where labor pain is felt. Therefore, the sacral area was chosen for cold application to be effective in labor pain.

This study aims to determine the effects of the use of cold application to the sacral area in the first stage of labor on the labor pain and labor process (frequency, duration, and severity of contractions, duration of labor, cervical dilation and effacement).

Materials and Methods

Study design

The study was done as a randomized controlled experimental study

Setting and sample

The target population of the study was the women who presented to the delivery room of the training and research hospital in Niğde, Turkey between 15.06.2018 and 30.10.2018 to give birth. During this period of time, 1641 women presented to the hospital for the labor. Among them, 100 women, meeting the inclusion criteria of this study, were chosen. The sample of the study was determined by the power analysis. The women with cervical dilation of 4 cm who presented to the hospital for the labor were told about the research, and they were asked whether they wanted to participate in the study. The women who agreed to participate were included in the sample of the study. No pain relief was used in the hospital. The study conducted by Yıldırım et al.[14] was taken as the base for the values expected to be observed in the VAS (visual analogue scale) pain scores according to the dilation increase during labor. When the one-unit change of the pain score in the group that did not receive cold application was accepted as significant in the group that received cold application, the minimum sample size with a 5% margin of error and 80% power was determined as at least 22 multipara pregnant women per group. The one-unit change that can make the least change in VAS of the pain score was taken so that the sample size would be large. To have a more balanced design according to the pregnant women groups, it was decided that the experimental group should have 50 pregnant women, 25 primiparas and 25 multiparas each, and control group should also have 50 pregnant women, 25 primiparas and 25 multiparas each (Figure 1). The pregnant women to be included in the experimental and control groups were selected randomly. The groups were formed using computer-aided randomization program (https://www.randomizer.org). Stratified sampling method was utilized to make the number of primipara and multipara women to be included in the study equal. Hence, the researcher did not make any selections for the determination of the women to be included in the experimental and control groups. Having a vaginal dilatation of 4 cm was the criteria used for the selection of the participants. The

researcher was aware of cold application to the treatment group.

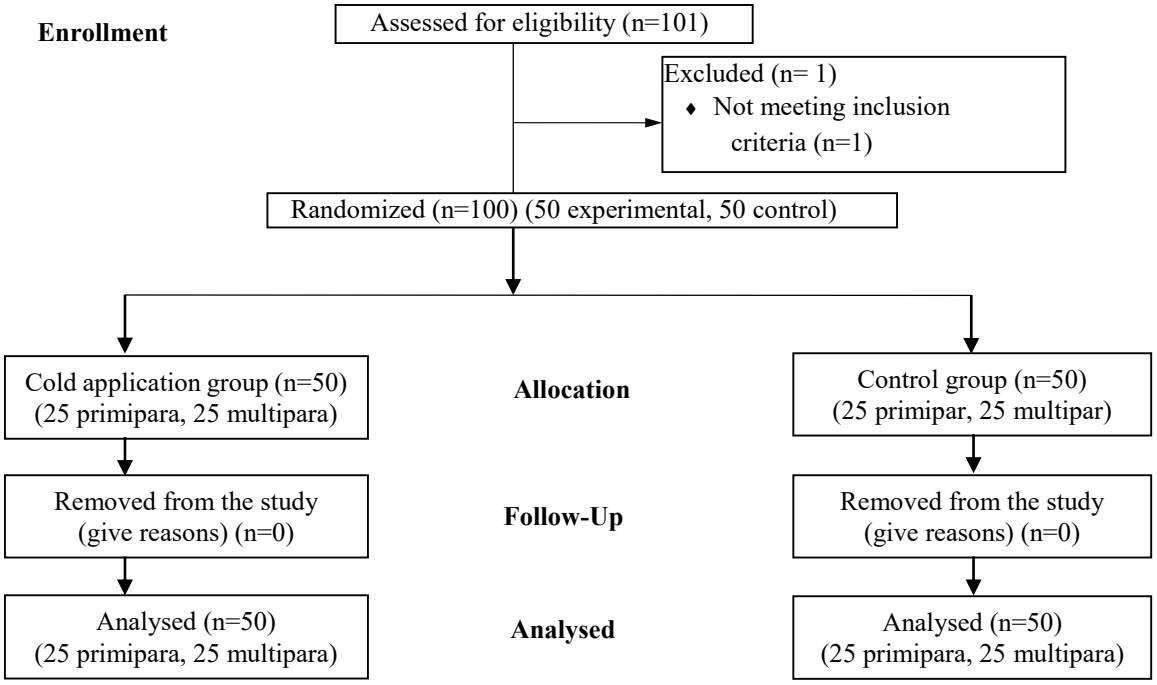

Figure 1. CONSORT flow diagram

Inclusion criteria: The inclusion criteria were having a full-term pregnancy (pregnancies between 37th and 42nd weeks), having a single fetus, having a cephalic presentation, fetal weight of 2.5- 4kg, pregnant women's having normal body mass index and receiving no antenatal trainings, and having a 4 cm cervical dilation.

Exclusion criteria: The women who had any kinds of pregnancy complications (placenta previa, preeclampsia, premature rupture of membranes, oligohydramnios and polyhydramnios, presentation disorder, intrauterine growth retardation, intrauterine dead fetus, macrosomia babies, fetal distress, etc.), who had any systemic or neurologic diseases and contraction anomalies (hypotonic or hypertonic contractions), who had induced labor, who received narcotic analgesics, who had occiput posterior, who were in the latent and transition phases of labor, and who had irregular contractions were excluded from the study since these factors were considered to affect contractions.

Data collection tools

Data were collected through the socio-demographic form, the labor monitoring form, and the visual analogue scale.

Socio-demographic form: The form prepared by the researchers in line with the literature[14,15] was composed of 20 questions that collected data about patients' socio-demographic features and pregnancy history.

Labor monitoring form: The form was prepared by the researchers in line with the literature.[14,15] It was developed to monitor the pregnant woman's labor-related features.

The visual analogue scale (VAS): The visual analogue scale was developed by Hayes and Patterson in 1921,[16] and the reliability and validity of the scale for assessing pain was performed by Price et al. in 1983.[17] Cronbach's alpha value of the scale was reported to be between 0.71 and 0.90.[17,18] VAS is a scale that is used to evaluate pain.[19-22] The patient indicates the pain s/he feels on a 10cm scale ranging from no pain on one side and severe pain on the other side. This line is used to measure the level of pain. In this study, it was used to assess pregnant women's level of pain based on their self-report.

The women who were included in the study were applied the following procedures:

Experimental group: The ice gel packs in the size of 25x15cm were taken out of the freezer of the fridge just before the application and administered by wrapping them in gauze bandages for the comfort and safety of the pregnant woman (Figure 2). All the ice gel packs had the same size. To fixate the gel packs to the area, the waistband used to determine the Toco probe in the non-stress test was utilized. The ice gel pack was placed between the waistband and waist to make it neither too tight nor too loose. The women were able to move when cold applications were applied. The cold applications were applied in left side lying position. Right before the cold application was used for the sacral area, labor pain of the women in both experimental and control groups was assessed using the VAS pain scale (VAS 1/before intervention - 4cm cervical dilation - beginning of the active phase). Starting from the active phase (when cervical dilation was 4cm), the cold application was used for the sacral area using ice gel packs 4 times for 10 minutes and in 20-minute intervals until the 100th minute. Cold application reduces pain when applied for 5 to 10 minutes.[7] The pregnant women's level of pain was assessed four times: at 4cm cervical dilation before the cold application (VAS1), in the 40th minute after cold application (VAS2), 100th minute after cold application (VAS 3), and 160th minute after cold application (VAS 4). The other measurements were also assessed at the same time at 4cm dilation before cold application, in the 40th minute after cold application, 100th minute after cold application, and 160th minute after cold application. All the measurements were done prior the labor.

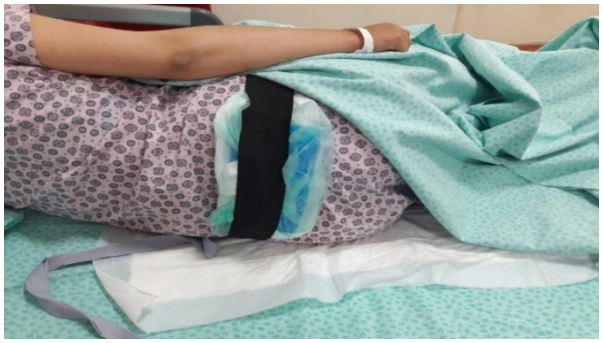

Figure 2. Sample cold application to the sacral area.

Control group: The control group did not receive any anesthesia and the pregnant women's level of pain was assessed 4 times: at the beginning of the active phase (4cm dilation, VAS 1), following 40th minute (VAS 2), 100th minute (VAS 3), and 160th minute (VAS 4).

Labor process: Labor process was assessed in both groups at the same time for 4 times by the same midwife: before the use of the application, in the 40th minute, 100th minute and 160th minute.

Data analysis

The IBM SPSS Statistics version 20.0 package program was used in the statistical analysis of the data. While the categorical measurements such as education level and labor experience were summarized as numbers and percentages, numerical measurements such as age and number of pregnancies were summarized as means and standard deviation (mean and minimum-maximum when necessary). The comparison of the categorical variables such as education level, labor experience, and labor type between the groups was performed using Chi-square test. Shapiro-Wilk test was performed in order to test if numerical measurements, such as age or number of pregnancies, met the normal distribution assumptions of this study. The comparison of the numerical measurements such as age, time of labor, and level of pain between the groups was performed using independent samples t-test; Mann-Whitney U test was used when the assumptions such as the number of pregnancies and antenatal follow-up were met. Repeated measures analysis of variance was utilized to compare the changes in numerical measurements such as the pain scores measured before and after the intervention, effacement, dilation, and duration of labor. Statistical significance was taken as <0.05 in all tests.

Ethics committee approval

Ethics Committee Approval was obtained from the Ethics Committee at Medical Faculty of Çukurova University (13th of April, 2018; meeting no:76, resolution no:29) and written approval was obtained from Niğde Ömer Halisdemir University training and research

hospital, the institution where the study was conducted. Before the intervention, the patients were informed about the purpose of the study as well as the forms (socio-demographic form, labor monitoring form, and VAS scale) and procedures (cold applications and how often they would be applied, and vaginal examinations and how often they would be done). Patients' verbal consent was received, and they signed the informed consent form. They were also informed that they could withdraw from the study at any time. Data were collected by the researcher in line with the patients' responses. In order to ensure standardization in practice, cold application was applied to pregnant women by the same person and using the same materials. The pain level of the pregnant women and the duration of labor were evaluated in both the experimental and control groups at the same time and using the same tools. In terms of the reliability of the data, the evaluation of pain was scored according to the self-reports of the pregnant women using the VAS pain scale. Thus, it was ensured that the researcher was not involved in the pain scoring process of pregnant women. Contraction duration, frequency and severity were measured with the probe of the non-stress test (NST) device in pregnant women in both the experimental and control groups. Cervical dilatation and effacement were determined by vaginal examination by the same person. In addition, the delivery rooms were single rooms, so that the patients were not affected by each other. This study was conducted under the principles of the Declaration of Helsinki.

Results

No significant differences were found when the experimental and control groups were compared in terms of age, educational level, number of pregnancies and deliveries, intervention in the birth of the mother, and gender, weight, and height of the baby (p>0.05) (Table 1).

Table 1. Comparison of features of the mother and the baby (N=100).

Features of the mother	**Group**		***p* value**
	Control(n=50)	**Experimental(n=50)**	
Age mean±SD	26.7±6.5	26.0±7.0	0.627 (t=0.488)
Education level n (%)			
Illiterate	2 (4%)	3 (6%)	
Literate	5 (10%)	5 (10%)	0.972
Primary school	23 (46%)	20 (40%)	(χ^2=0.513)
High school	13 (26%)	14 (28%)	
University and higher	7 (14%)	8 (16%)	
	Median (Min-Max)	Median (Min-Max)	
Number of pregnancies	2 (1-6)	2 (1-7)	0,858 (z=-0.179)
Number of deliveries	0.5 (0-5)	0.5 (0-5)	0,838 (z=-0.204)
Intervention in birth n (%)			
No	19 (76%)	14 (56%)	0,136
Yes	6 (24%)	11 (44%)	(χ^2=2.228)
Features of the baby			
Gender n (%)			
Female	29 (58%)	30 (60%)	0.839
Male	21 (42%)	20 (40%)	(χ^2=0.041)
Weight n (%)	3256.6±336	3284.6±387.4	0.700 (t=-0.386)
Height n (%)	50±0.6	49.9±0.5	0.468 (t=0.729)

[a]Chi-square was used. SD: Standard deviation

When the pain scores of the pregnant women were compared between the groups, no significant differences were found before the application (p=0.516); However, the pain scores of the experimental group were significantly lower than the pain scores of the control group in the 40th minute (p=0.041), 100th minute (p<0.001) and 160th minute (p=0.014) after the application.

When the duration of labor was compared between the groups, it was found to be significantly shorter in the experimental group in comparison to the control group (approximately 80 minutes) (p<0.001) (Table 2).

Table 2. Comparison of the experimental and control groups on pain scores and labor duration (N=100).

VAS	Group		*p* value
	Control (n=50)	Experimental (n=50)	
	Mean±SD	Mean±SD	
Before the intervention (VAS 1)	7.3±1.2	7.5±1.2	0.516 (t=-0.652)
40th min after the intervention (VAS 2)	7.8±1.1	7.4±1.2	**0.041** (t=2.066)
100th min after the intervention (VAS 3)	9±0.7	6.4±1.2	**<0.001** (t=13.870)
160th min after the intervention (VAS 4)	10±0.1	9.8±0.4	**0.014** (t=2.497)
P value (change over time)	**<0.001** (F=172.337)	**<0.001** (F=176.605)	
The duration between 4 cm dilation and the labor (min)	395.7±71.9	313.6±72.4	**<0.001** (t=5.691)

[a]Repeated measures analysis of variance was used. SD: Standard deviation VAS: Visual analogue scale

When the cervical dilation values of the pregnant women were compared, the dilation values between the groups indicated no differences in the 40th minute after the intervention (p=0.860); however, the comparison in the 100th minute (p<0.001), and 160th minute (p=0.001) showed that the pregnant women in the experimental group had higher dilation values (Table 3). The cervical effacement levels of the participating women were compared before the application, and it did not indicate any differences between the experimental and control groups (p=0.137), but the effacement levels in the 40th minute (p=0.034), 100th minute (p=0.001), and 160th minute (p<0.001) were significantly higher in the experimental group (Table 3).

Table 3. Pregnant women's cervical dilation and effacement findings (N=100).

Dilation (cm)	Group		*p* value
	Control (n=50)	Experimental (n=50)	
	Mean±SD	Mean±SD	
40th min after the intervention	4.8±0.5	4.8±0.7	0.860 (t=-0.177)
100th min after the intervention	5.7±0.5	7.2±0.9	**<0.001** (t=-9.864)
160th min after the intervention	7.7±0.9	8.8±1.3	**<0.001** (t=-5.424)
P value (change over time)	**<0.001** (F=745.685)	**<0.001** (F=325.045)	
Effacement (%) Before the intervention	40.2±1.4	39±5.4	0.137 (t=1.510)
40th min after the intervention	49.2±4.9	51.6±6.2	**0.034** (t=-2.155)
100th min after the intervention	59.2±5.3	74.2±8.1	**<0.001** (t=-10.964)
160th min after the intervention	76.8±7.7	88.2±12.2	**<0.001** (t=-5.580)
P value (change over time)	**<0.001** (F=748.961)	**<0.001** (F=345.320)	

Repeated measures analysis of variance was used. SD: Standard deviation

The contraction duration of the pregnant women was compared between the groups, and no significant difference was found in the 40th minute (p=0.621) after the application; however, the contraction duration of the experimental group was found to be significantly longer in the 100th minute and 160th minute after the application (p<0.001) (Table 4).

When the contraction frequency of the participants was compared according to the groups, no significant differences were detected before the intervention (p=0.110) and in the 40th minute after the application (p=0.131); the contraction frequency of the experimental group was found to be significantly higher in the 100th minute (p<0.001) and 160th minute (p<0.001) after the application (p<0.001 for both groups) (Table 4).

When the contraction severity of the participants was compared according to the groups, while no significant differences were detected between the groups in the 40th minute after the intervention (p=0.055), the contraction severity of the pregnant women in the experimental group was found to be significantly higher in the 100th minute (p<0.001) and 160th minute (p<0.001) (Table 4).

Table 4. Comparison of the contraction features of the pregnant women (N=100).

Contraction duration	**Group**		***p* value**
	Control(n=50) Mean±SD	**Experimental(n=50) Mean±SD**	
Before the intervention	41.7±3.7	37.4±8	**0.001** (t=3.399)
40th min after the intervention	51.5±5.4	52.1±6.6	0.621 (t=-0.496)
100th min after the intervention	58.2±7	74.9±8.7	**<0.001** (t=-10.572)
160th min after the intervention	71.5±7.7	84.7±7.4	**<0.001** (t=-8.755)
P value (change over time)	**<0.001** (F=675.866)	**<0.001** (F=199.193)	
Contraction frequency			
Before the intervention	5.6±1.5	6.2±1.8	0.110 (t=-1.612)
40th min after the intervention	4.4±0.7	4.7±1.2	0.131 (t=-1.528)
100th min after the intervention	3.4±0.6	2.5±0.6	**<0.001** (t=7.519)
160th min after the intervention	2.4±0.6	1.5±0.6	**<0.001** (t=7.273)
P value (change over time)	**<0.001** (F=328.054)	**<0.001** (F=134.943)	
Contraction severity			
Before the intervention	50±6.9	41.3±9.2	**<0.001** (t=5.390)
40th min after the intervention	56±8	52.6±9.3	0.055 (t=1.941)
100th min after the intervention	64.7±6	78±7.1	**<0.001** (t=-10.192)
160th min after the intervention	76±5	87.1±9	**<0.001** (t=-7.621)
P value (change over time)	**<0.001** (F=377.893)	**<0.001** (F=239.273)	

Repeated measures analysis of variance was used. SD: Standard deviation

Primipara and multipara women's pain levels were compared by experimental and control groups. The pain levels were found to be higher in the in primipara women in comparison to the multipara women; pain levels increased in both primipara and multipara women throughout the labor process, but this increase was found to be

significantly lower in the 100th minute after the cold application similarly in both primipara and multipara women in the experimental group (p=0.001) (Table 5).

The duration of labor in primipara and multipara women was compared by experimental and control groups. Although the duration of labor was longer in primipara women compared to multipara women, duration of labor significantly reduced similarly in both primipara and multipara pregnant women who were applied cold application (p=0.743) (Table 5).

Table 5. Comparison of Pregnant Women's VAS Pain Scores and Duration of Labor according to being Primipara and Multipara (N=100).

VAS	Control			Experimental			
	Primipara	Multipara	*p*	Primipara	Multipara	*p*	*p***
	Mean±SD	Mean±SD		Mean±SD	Mean±SD		
Level of pain before the application	7.9±1.1	6.8±1.1	**0.001**	8.1±1.0	6.8±1.1	**<0.001**	0.547
Level of pain in the 40th min after the application	8.4±0,9	7.2±0,9	**<0.001**	8.0±0.9	6.7±1.2	**<0.001**	
Level of pain in the 100th min after the application	9.3±0.6	8.7±0.6	**0.001**	7.0±1.1	5.8±0.9	**<0.001**	
Level of pain in the 160th min after the application	10.0±0.2	10.0±0.0	0.327	9.9±0.3	9.8±0.4	0.451	
P (change over time)	**<0.001**	**<0.001**		**<0.001**	**<0.001**		
	Control			Experimental			
	Primipara	Multipara	*p*	Primipara	Multipara	*p*	*p***
	Mean±SD	Mean±SD		Mean±SD	Mean±SD		
After how many minutes labor occurred after 4cm of dilation	462.1±34	329.3±14.9	**<0.001**	381.6±26.5	245.6±18.7	**<0.001**	0.743

Mean±SD: Mean ± Standard deviation, t test in independent groups and repeated measures analysis of variance were utilised.
*p*** *p* value indicating the effect of the pregnant woman' parity and the cold application on the change over time

Discussion

This study aimed to determine the effects of the use of cold application to the sacral area in the first stage of labor on the labor pain and labor process. The pain level of the women who received cold application was found to be significantly lower compared to the women who did not receive cold application in this study.

In their study conducted with 90 primipara pregnant women in the first stage of labor, 45 women in the experimental group and 45 women in the control group, Rahimi-Kian et al.[24] used cold application for 10 minutes and in 30-minute intervals; they found that the pain level of the pregnant women did not reduce in the first hour but it reduced significantly in the following hours.[24] In their study conducted with 64 nullipara pregnant women, 32 women in the experimental group and 32 women in the control group, Shirvani and Ganji used cold application to the stomach, lower stomach, and low back and found that the pain level in the experimental group was significantly lower.[7] In their study conducted with 80 primipara pregnant women, 40 women in the experimental group and 40 women in the control group, Al-Battawi et al.[9] used cold application to lower stomach and low back in the first stage of labor for 10 minutes in 20-minute intervals and reported that the pain level of the experimental group was significantly lower.

The results of this study are in line with the literature. It shows that the use of cold application to the sacral area is efficient in reducing pain, like cold application to the stomach and low stomach or low back and stomach in combination.[7,9,24] Comparing with other studies, the use of cold application in this manuscript only to the sacral area could be preferred both by midwives and pregnant women since its administration is easier and it does not limit the pregnant woman's

movements. The mechanism of cold application is based on the gate control and endorphin theories.[10-13]

When pregnant women were compared in terms of the labor duration, it was found that the experimental group's labor duration was shorter in comparison to the control group (Table 2). In the study that used cold application for pregnant women, Shirvani and Ganji[7] reported that the labor duration in the experimental group was shorter. In their study conducted with primipara pregnant women who received cold application to the stomach, lower stomach, and low back, Yazdkhasti et al.[25] found no significant differences between the groups in terms of the duration of the first stage of labor, but the duration of the second stage of labor was significantly shorter in the experimental group.[25] This study's findings regarding labor duration are in line with the other prior studies.[7,25]

When the pregnant women's cervical dilation and effacement values were compared according to the groups, the participants in the experimental group were found to have higher dilation and effacement values. No studies in the literature were found to have investigated the effect of cold application on cervical dilation and effacement.

Higher cervical dilation and effacement enable to shorten the duration of labor. The higher cervical dilation and effacement of the women who received cold application in this study were considered to be associated with the shorter duration of labor. This study found that the frequency, duration, and severity of contractions in women who received cold application were higher in comparison to the control group. The study conducted by Al-Battawi et al.[9] reported that the contraction duration was longer and the contractions were more frequent in the experimental group. The results of the present study were in line with the study conducted by Al-Battawi et al.[9] Dilation and effacement values were higher and the frequency, duration, and severity of contractions were higher in the experimental group, which indicated that the pregnant women felt relieved as their pain reduced and thus their labor progressed faster and the duration of labor was shorter in this group.

A study showed that cold application did not have any side effects on the mother or the baby.[26] In addition, when the short-term effects of cold application on labor pain were examined, no side effects were observed in other studies.[8,9] This study has some limitations. Firstly, the short-term effects of cold application were determined and no side effects were observed, but the long-term effects could not be examined. Secondly, the efficiency of cold application in labor pain was determined only in the active phase of labor, so it cannot be generalized to other stages of labor.

Conclusion

This study shows that cold application to the sacral area reduced labor pain, shortened the labor duration, accelerates cervical dilation and cervical effacement, and increases frequency, duration, and severity of contractions. Therefore, cold application was found be effective during the active phase of labor process and thus it can be recommended to use. The effects of cold application in the latent phase of labor process can be investigated in future studies. Future studies could also investigate the long-term effects of cold application.

Ethics Committee Approval

This study was approved by Ethics Committee at Medical Faculty of Çukurova University (13th of April, 2018; meeting no:76, resolution no:29). The study was conducted under the principles of the Declaration of Helsinki.

Informed Consent

The purpose of the study was explained to the women who volunteered to participate in the study and their consents were obtained.

Author Contributions

Study concept / design, data collecting, data analysis and interpretation, literature review, writers: EY., Sİ. The final version of this article was read and approved by all authors.

Conflict of interest

The authors have no conflicts of interest to declare.

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Peer-review

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Research Article/Özgün Araştırma

The effect of individual breastfeeding training on breastfeeding behaviors and traditional practices: A randomized controlled trial

Bireysel emzirme eğitiminin emzirme davranışlarına ve geleneksel uygulamalara etkisi: Randomize kontrollü çalışma

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Abstract

Aim: This study aims to determine the effect of individual breastfeeding training on breastfeeding behaviors and traditional practices.

Materials and Methods: The research was of randomized controlled design. The study was conducted at the family health centers in Kütahya, Turkey. A total of 304 mothers were recruited into the study, 152 in the intervention group and 152 in the control group. The Chi-Square Test, Mann-Whitney U Test and Kruskal-Wallis Test and Multinomial logistic regression were performed.

Results: After the training, the rates of the mothers whose breastfeeding duration and frequency were sufficient, who breastfed their babies in the correct position, who did not have any breastfeeding problems, and whose babies latched onto the breast correctly were significantly higher in the training group than were the rates of the mothers in the control group (p<0.05).

Conclusion: The individual breastfeeding training had an implication in improving breastfeeding behaviors and reduced harmful traditional practices.

Keywords: Breastfeeding; Training; Behavior; Practices.

Öz

Amaç: Bu çalışma, bireysel emzirme eğitiminin emzirme davranışlarına ve geleneksel uygulamalara etkisini belirlemeyi amaçlamaktadır.

Gereç ve Yöntem: Araştırma randomize kontrollü çalışma olarak tasarlandı. Araştırma Türkiye'nin Kütahya ilindeki aile sağlığı merkezlerinde gerçekleştirilmiştir. Eğitim grubunda 152 ve kontrol grubunda 152 olmak üzere toplam 304 anne çalışmaya dahil edilmiştir. Ki-Kare, Mann-Whitney U, Kruskal-Wallis ve Multinominal lojistik regresyon testleri yapılmıştır.

Bulgular: Eğitim sonrasında müdahale grubundaki annelerde emzirme süresi ve sayısı yeterli olanların, doğru pozisyonda emzirenlerin, emzirme sorunu yaşamayanların, memeyi doğru tutan bebeklerin oranı kontrol grubundakilerden önemli düzeyde yüksektir (p<0,05).

Sonuç: Bireysel emzirme eğitimi, emzirme davranışlarını iyileştirmede ve zararlı geleneksel uygulamaları azaltmada etkilidir.

Anahtar Kelimeler: Emzirme; Eğitim; Davranış; Uygulamalar.

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Introduction

The United Nations Convention on the Rights of the Child affirms that a child has the right to adequate nutrition and to the highest standards of health.[1] The United Nations International Children's Fund (UNICEF), the World Health Organization (WHO) and the American Academy of Pediatrics (AAP) recommend that infants be exclusively breastfed for the first six months of their life.[1-3] Breast milk is critical importance in improving infant wellbeing. Breast milk protects the infants against neonatal complications, respiratory tract infections, diarrhea and other illnesses.[4] Exclusively breastfeeding can save about 1.5 million infants each year.[5] However, between 2015 and 2020, the rate of infants aged 0-6 months who are exclusively breastfed is approximately 44% worldwide.[1]

In Turkey, breastfeeding initiation rates are high, but maintenance of exclusively breastfeeding durations is low.[6] The 2013 Turkey Demographic and Health Survey (TDHS) reported that the rate of exclusive breastfeeding for infants aged 0-6 months was 30.1%, while this rate was reported 41% in TDHS 2018.[7,8] These data show that despite the recommendations of the AAP and WHO, mothers in our country do not adequately feed their babies exclusively breastfeeding for the first six months.[9,10]

Even mothers who willingly initiate breastfeeding tend to start giving complementary foods to their babies a few weeks after the birth or to abandon breastfeeding altogether. Health professionals have an important role in starting and maintaining breastfeeding.[11] The support offered by healthcare professionals along with breastfeeding training has the potential of helping mothers in general to overcome the barriers that stand in the way of breastfeeding.[12] In addition, healthcare professionals need to be aware of the breastfeeding traditional practices.[13] By being so, they can support beneficial traditions and help mothers to participate in their own care. At the same time, they can prevent the use of harmful traditional practices that have adverse effects on health.[14]

This study aims to determine the effect of individual breastfeeding training on breastfeeding behaviors and traditional practices.

The hypotheses of the study:

- H0a: The breastfeeding training has not an effect the behaviors of mothers toward breastfeeding.
- H0b: The breastfeeding training has not an effect on the use of traditional breastfeeding practices.
- H1a: The breastfeeding training has an effect the behaviors of mothers toward breastfeeding.
- H1b: The breastfeeding training has an effect on the use of traditional breastfeeding practices.

Materials and Methods

Study design

The study was conducted using a randomized controlled experimental design. The research was conducted between February 2018 and October 2018 in Kütahya a family health centers (FHC's). The RCT is registered at ClinicalTrials.gov with ID NCT04705675. The design, conduct and reporting of this study adheres to the Consolidated Standards of Reporting Trials (CONSORT) guidelines.

Setting and sample

The study universe consisted of all of the mothers presenting at the FHC's in Kutahya over the period February 1, 2018-October 31, 2018. Those who met the inclusion criteria were recruited. Power was calculated using the G Power 3.1 program. In the power analysis performed at a confidence interval of 95% and a margin of error of plus/minus 5%, sample size was calculated as a total of 300 mothers with 150 in the study group and 150 in the control group. The sample size for the study comprised 320 (intervention group:160, control group:160) mothers and infants according to the assumption that there would be losses. However, some of the mothers (n=12) wished to leave before the study was completed, offering no reason for this and four mothers could not be reached for post-test one month following the training (see; Figure 1). Finally, the study was carried out with 304

infants' mothers (intervention group=152, control group=152) (see; Figure 1). The inclusion criteria of the study population encompassed mothers who consented to participating in the study and who were breastfeeding and mothers with no diagnosis of psychiatric or psychological disease, infants who borned at term with a birth weight between 2,5 to 4 kg, and being 0-6 week-old. The 304 mothers forming the sample were randomly divided into intervention and control groups.

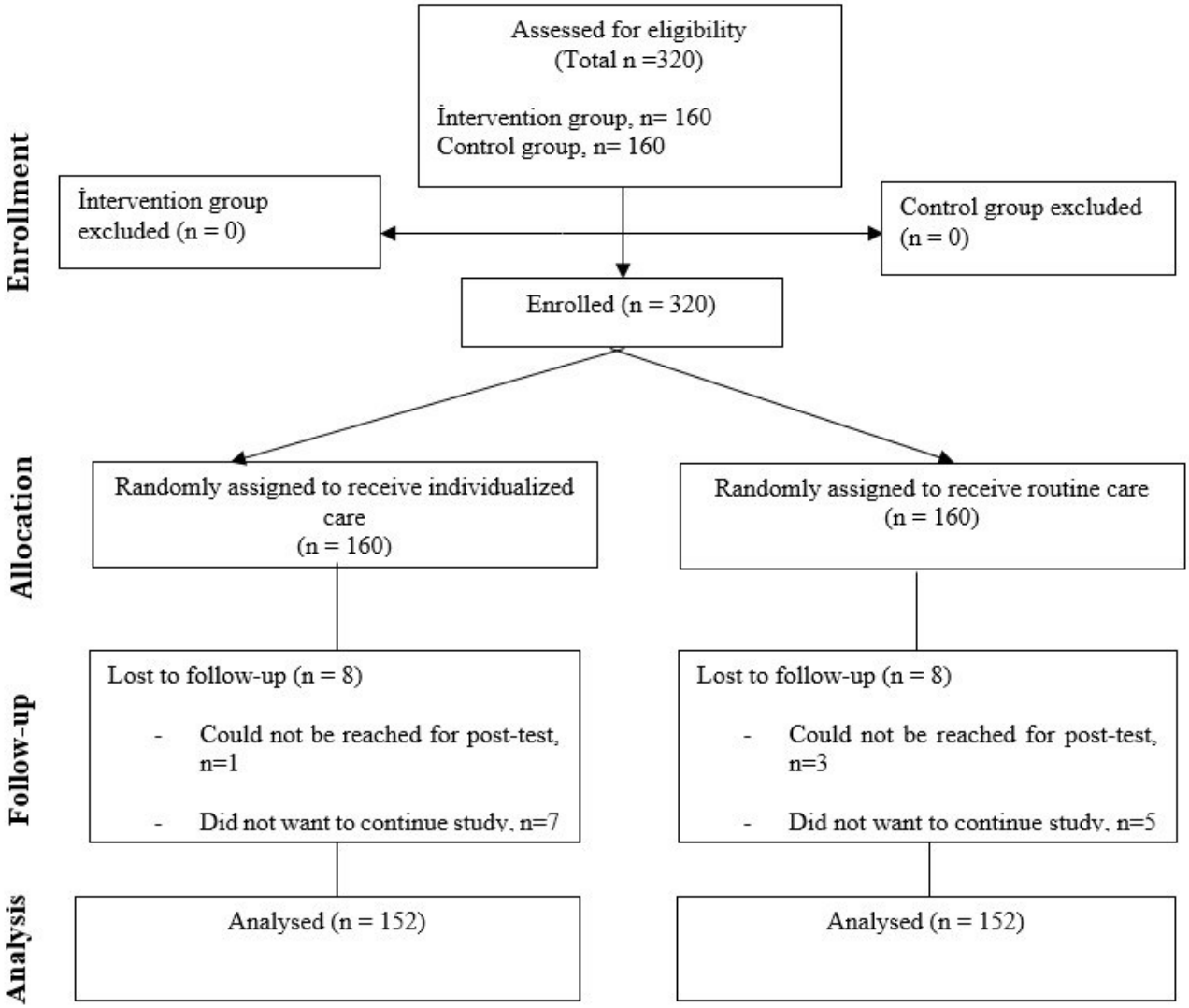

Figure 1. Follow diagram of study

Randomization

The number of 0-6 week-old infants was identified for randomization in FHC. Random numbers were generated on the Excel program to determine the intervention and control groups and to achieve randomization. Each infant's mother was given a number. The numbers created were written on paper and placed in envelopes so that mothers could not see them. Mothers who volunteered to participate in the study were asked to choose an envelope. According to the number in the envelope, the mother's study group was determined.

Data collection tools

The data were collected using the "Personal Information Form" and ''Breastfeeding Behaviors and Traditional Practices Assessment Form''.

The researchers created the Personal Information Form in line with the literature, designing it with eight questions that pertained to demographic data such as the mother's age, her status of education and employment, the mother's age at marriage, the type of family, income status, the place of residence and the baby's age.

The Breastfeeding Behaviors and Traditional Practices Assessment Form; By using the breastfeeding guidelines by the researchers, questions were prepared in accordance with the content of the breastfeeding training provided.[15-19] In order to evaluate the appropriateness of the questions, the opinions of 10 experts in the fields of pediatric nursing and midwifery were obtained. This form was containing 10 open ended questions to evaluate the mother's breastfeeding behaviors and use of traditional practices that related to factors such as the duration of breastfeeding, number of breastfeedings, position, problems, traditional practices used in breastfeeding and increasing breast milk.

Data collection procedure

The researchers filled the Personal Information Form with the technique of face-to-face interview with the mothers before the planned individual breastfeeding training. Each mother included in the study was taken to the lactation room in the FHC and they were observed to breastfeeding patterns their babies. The mothers' breastfeeding behaviors were observed. They administered the pretest and filled out the personal information form prior to the planned individual education. The mothers in the control group left the room after filling the this form. After the breastfeeding, each mother was provided an average 30-minute session of individual education. The content of the training program has been created using national[15] and international[16-19] guidelines. The same researcher applied the training program to all mothers in the intervention group. Auditory and visual materials were used during the training program applied to the mothers. The researcher trained the mothers on breastfeeding practices in an effort to support them to improve the ability of rightly using the positions taught and then the mothers were asked to apply what they had learned. The researcher took care to be positive and support whenever the mother attempted the right move in breastfeeding while also providing encouraging feedback when something went wrong. Topics covered in the training program: Breast-milk composition and benefits of breastfeeding, breastfeeding sessions, breast milk supply, factors that reduced and increased breast milk supply, factors that reduced and increased breast milk supply, breast care before, breastfeeding positions and tips for mother and infant, the steps for breastfeeding, burp a baby, expressing and storing breastmilk, and the other breastfeeding problems. One month following the training, mothers' breastfeeding behaviors and traditional practices were re-evaluated.

Data analysis

Statistical analyses were performed with the IBM SPSS (Statistical Package for Social Sciences) Statistics 22 software. Descriptive statistics (frequency and percentage values) were used to assess the results. Whether the data was normally distributed was confirmed with Kolmogorov-Smirnov test. The Chi-squared test was used to compare the characteristics (women's education level, employment status, income level, family type, location of residence, age, age at marriage) in the intervention and control groups. Because data on maternal age, age at marriage, infant age and infant weight were not normally distributed, we used the Mann-Whitney U Test. Chi-square, Mann-Whitney U and Kruskal-Wallis Tests were used to compare infant weight, traditional practices and breastfeeding behavior in the intervention and control groups. Multinomial Logistic Regression Test was used to evaluate the relationship between breastfeeding training and traditional practices, breastfeeding behaviors. The $p<0.05$ value was considered significant in statistical tests.

Ethical Statement

Permission for the study was obtained from the institution and the Karatay University Faculty of Medicine, Pharmaceuticals and Non-Medical Devices Research Ethics Committee (Decision No 2018-001). The principles of the Declaration of Helsinki were complied with while conducting the study. The purpose of the study was explained to the mothers included in the study and their voluntary consent was obtained. Informed consent form were signed the participants.

Results

The mean age of the mothers in the study was 26.83±4.19 years in the intervention group and 27.07±5.06 years in the control group. The mean age of the infants was 2.87±1.74 months in the intervention group, 2.88±1.60 months in the control group. More than half of the mothers in the intervention (61.2%, n=93) and control (63.8%, n=97) groups were graduates of high school or higher institutions. Furthermore, it was found that the intervention (62.5%, n=95) and control (69.1%, n=105) group mothers were for the most part unemployed. In both groups, close to all of the mothers were living in a nuclear family (Intervention: 90.1%; Control: 88.2%). Most of the mothers in both the intervention (84.2%, n=128) and control (83.6%, n=127) groups lived in the city centre. No significant differences were found between the intervention and control groups in the study in terms of the mothers' and infants' descriptive characteristics (p>0.05), (Table 1).

Table 1. Comparison of descriptive characteristics.

Characteristics	**Intervention n=152**		**Control n=152**		**Test***
	n	**%**	**n**	**%**	
Level of Education					
Elementary School	38	25.0	33	21.	x^2=4.011 df=3 p=0.260
Middle School	21	13.8	22	14.5	
High School	54	35.5	69	45.4	
University and above	39	25.7	28	18.4	
Employment Status					
Employed	57	37.5	47	30.9	x^2=1.462 df=1 p=0.227
Unemployed	95	62.5	105	69.1	
Family Type					
Nuclear	137	90.1	134	88.2	x^2=0.306 df=1 p=0.580
Extended	15	9.9	18	11.8	
Income Status					
Income Less than Expenditure	17	11.2	21	13.8	x^2=0.728
Income Equal to Expenditure	91	59.9	92	60.5	df=2
Income Greater than Expenditure	44	28.9	39	25.7	p=0.695
Location of Residence					
Village	9	5.9	6	3.9	x^2=1.075
Town	15	9.9	19	12.5	df=2
City	128	84.2	127	83.6	p=0.584
	Mean±SD		**Mean±SD**		**Z** **p**
Infant's Age/month	2.87±1.74		2.88±1.60		-0.263 0.792
Infant's weight/gr (Pre-training)	3174.41±405.15		3194.61±386.60		-0.571 0.568
Mother's Age	26.83±4.19		27.07±5.06		-0.310 0.756
Mother's Age at Marriage	21.97±2.87		22.58±3.17		-1.392 0.164

x^2=Chi-squared Test, Z= Mann-Whitney U Test

* None of the table cells in the analysis had an expected count below five. Fisher's Exact Test was not used.

No statistically significant difference was found between the intervention and control groups in terms of the traditional practices employed in breastfeeding prior to the breastfeeding training (p=0.340). On the other hand, after the training, it was seen that the difference between the groups was statistically significant (p=0.001). The rate of those who did not use traditional breastfeeding practices in the pre-training intervention group was 19.7%. The rate of those who did not consider using traditional breastfeeding practices after the training (78.3%) increased significantly. No statistically significant difference was found between the intervention and control groups in terms of the nourishment provided to increase breast milk before (p=0.740) and after (p=0.055) the training (Table 2).

Table 2. Comparison of traditional practices.

Characteristics	Pre-training		Post-training	
	Intervention n (%)	Control n (%)	Intervention n (%)	Control n (%)
Traditional practices in breastfeeding				
Not letting the infant have colostrum	20 (13.2)	21 (13.8)	0 (0.0)	18 (11.8)
Giving sugar water	46 (30.3)	59 (38.8)	23 (15.1)	68 (44.7)
Waiting for 3 calls to prayer	56 (36.8)	43 (28.3)	10 (6.6)	34 (22.4)
Not using traditional practices	30 (19.7)	29 (19.1)	119 (78.3)	32 (21.1)
Test*	x^2=3.358 df=3, p=0.340		x^2=103.469 df=3, p=0.001	
Traditional food consumed to increase breast milk				
Molasses	30 (19.7)	24 (15.8)	43 (28.3)	30 (19.7)
Hapisa	39 (25.7)	36 (23.6)	20 (13.2)	34 (22.4)
Syrup	41 (27.0)	46 (30.3)	32 (21.1)	40 (26.3)
Herbal teas	42 (27.6)	46 (30.3)	57 (37.5)	48 (31.6)
Test*	x^2=1.256 df=3, p=0.740		x^2=7.605 df=3, p=0.055	

x^2=Chi-squared Test
Post-training results show that mothers decided not to use traditional practices.
* None of the table cells in the analysis had an expected count below five. Fisher's Exact Test was not used

When the mothers breastfeeding behavior was examined, it was seen that there was no significant difference between the groups before the training (p>0.05). There was no difference in infant weight gain between the two groups after the training, the result was close to significance (p=0.067). The rate of the mothers in the intervention group who breastfed their babies 5-6 hours a day before the training (46.1%) increased significantly after the training (56.6%) and the rate of the mothers in the intervention group who breastfed their babies 11-15 times a day before the training (54.6%) increased significantly after the training (57.9%). The rate of women in the intervention group having problems in breastfeeding before the training was 71.7%. However, this rate decreased to 46.8% after the training. The most common breastfeeding problem was insufficient secretion of milk. The number of this problem in the intervention group before the training (n=31) decreased significantly after the training (n=21). In the training group, the rates of the mothers who breastfed their babies in the correct position (60.5%), and whose babies latched onto the breast correctly (53.3%) increased significantly after the training (71.7% and 77.0% respectively). In an examination of the breastfeeding duration (p=0.002), number of breastfeeding (p=0.006), problems with breastfeeding (p=0.002), breastfeeding issues (p=0.007), breastfeeding positions (p=0.030) and babies' latching onto the breast (p=0.001), statistically significant difference was found between the intervention and control groups (Table 3).

In the multinomial logistic regression analysis, in the mothers who received breastfeeding training, the rate of the mothers not having a breastfeeding problem increased 2.974 times (1.557-5.682 CI, p=0.01), that of the mothers breastfeeding their babies in the correct position increased 2.285 times (1.192-4.379 CI, p=0.013), that of the mothers breastfeeding their babies 8-10 times a day increased 4.349 times (1.467-12.892 CI, p=0.008), that of the mothers breastfeeding their babies 11-15 times a day increased 6.515 times (2.317-18.317 CI, p=0.000). On the other hand, the rate of the mothers who breastfed their babies 1-2 hours a day decreased 0.305 times (0.115-0.809 CI, p=0.017), that of the mothers who breastfeed their babies for 3-4 hours a day decreased 0.381 times (0.191-0.761 CI, p=0.006), that of the mothers who waited for 3 calls to prayer to initiate breastfeeding decreased 0.053 times (0.021-0.134 CI, p=0.000), and that of the mothers who considered giving sugary water to their baby decreased 0.063 times (0.031-0.130 CI, p=0.000), (Table 4).

Table 3. Comparison of breastfeeding behavior.

Characteristics (n=304)	Pre-training		Post-training	
	Intervention Mean±SD	Control Mean±SD	Intervention Mean±SD	Control Mean±SD
Infant's weight/gr	3174.41 ± 405.15	3194.61 ± 386.60	5386.18 ± 938.58	5155.92 ± 950.04
Test	Z=-0.571, *p*=0.568		Z=-1.823, *p*=0.067	
Characteristics (n=304)	**n (%)**	**n (%)**	**n (%)**	**n (%)**
Breastfeeding duration (in a day)				
1-2 hours	27 (17.8)	36 (23.7)	18 (11.8)	30 (19.7)
3-4 hours	55 (36.2)	57 (37.5)	48 (31.6)	67 (44.1)
5-6 hours	70 (46.1)	59 (38.8)	86 (56.6)	55 (36.2)
Test**	x^2=2.259, df=2, *p*=0.323		x^2=12.955, df=2, *p*=0.002	
Number of breastfeeding (in a day)				
8-10	41 (27.0)	53 (34.9)	49 (32.2)	64 (42.1)
11-15	83 (54.6)	78 (51.3)	88 (57.9)	61 (40.1)
16 and over	78 (18.4)	21 (13.8)	15 (9.9)	27 (17.8)
Test**	x^2=2.687, df=2, *p*=0.261		x^2=10.312, df=2, *p*=0.006	
Problems with breastfeeding				
Yes	109 (71.7)	108 (71.1)	71 (46.7)	98 (64.5)
No	43 (28.3)	44 (28.9)	81 (53.3)	54 (35.5)
Test**	x^2=0.016, df=1, *p*=0.899 Fisher kesin test *p*=1.000		x^2=9.714, df=1, *p*=0.002 Fisher kesin test *p*=0.003	
Breastfeeding issues*				
Insufficient milk	31 (20.4)	42 (36.5)	21 (13.8)	42 (31.5)
Breast pain	16 (10.5)	16 (10.5)	10 (6.6)	12 (7.9)
Fullness in the breast	20 (13.2)	19 (19.5)	13 (8.6)	17 (11.2)
Inverted nipple	17 (11.2)	8 (12.5)	12 (7.9)	6 (3.9)
Cracked nipples and Breast infection	25 (16.4)	23 (15.1)	15 (9.9)	21 (13.8)
No breatfeeding problems	43 (28.3)	44 (28.9)	81 (53.3)	54 (35.5)
Test**	x^2=5.018, df=5, *p*=0.414		x^2=16.115, df=5, *p*=0.007	
Breastfeeding position				
Right	92 (60.5)	83 (54.6)	109 (71.7)	91 (59.9)
Wrong	60 (39.5)	69 (45.4)	43 (28.3)	61 (40.1)
Test**	x^2=1.091, df=1, *p*=0.296 Fisher kesin test *p*=0.353		x^2=4.735, df=1, *p*=0.030 Fisher kesin test *p*=0.040	
Baby's latching onto breast				
Right way	81 (53.3)	65 (42.8)	117 (77.0)	82 (53.9)
Wrong way	71 (46.7)	87 (57.2)	35 (23.0)	70 (46.1)
Test**	x^2=3.374, df=1, *p*=0.066 Fisher kesin test *p*=0.085		x^2=17.822, df=1, *p*=0.001 Fisher kesin test *p*=0.001	

x^2=Chi-squared Test
Z=Mann-Whitney U Test
* The analysis techniques were applied to those who were experiencing breastfeeding issues
** None of the table cells in the analysis had an expected count below five. Fisher's Exact Test was not used.
The Mann-Whitney U and Chi-squared Tests given in the horizontal line indicate the pre- and post-training comparisons of the training group and the control group.

Discussion

Breastfeeding is the customary way of nourishing infants in all traditional societies.[20] According to Stuart-Macadam & Dettwyler, breastfeeding is not only a biological process in human beings but also a behavior that is dictated by cultural norms.[21] It was observed in our study that prior to the training, the mothers in both the intervention and control groups practiced the traditional customs of refraining from giving the infant colostrum, feeding the baby sugar-water, and waiting for three prayer times before the first breastfeeding. After the training, however, it was found that most of the mothers in the intervention group (78.3%) decided not to engage in these traditional practices. Moreover, all of the mothers in the intervention group said that they would give the baby colostrum if they ever had another one. In addition, in the mothers who received

breastfeeding training, the number of not having breastfeeding problems, breastfeeding in the right position, and the duration and frequency of breastfeeding increased. However, in the same mothers, the number of those who thought about waiting for three azans to initiate breastfeeding and those who thought of giving sugary water to their babies decreased. In a study reported that mothers more than 25% either did not give their infants colostrum or disposed of it entirely.[22] The other study conducted in Delhi, researchers reported that most mothers threw away the colostrum and kept away from the infant to breastfeed for a few days. Furthermore, most of the mothers waited for religious rituals to end before they started to breastfeed their infants and breastfeeding was delayed.[20] It was reported in another study that in Australia, breastfeeding was regarded as a shameful act according to cultural beliefs. It was stressed that this perception made it difficult for mothers to decide on breastfeeding.[23] Studies have indicated that social and cultural beliefs have an influence on breastfeeding behaviors.

Table 4. Multinomial regression analysis of the views of the mothers receiving breastfeeding training on the use of traditional practices in breastfeeding and their breastfeeding behaviors (n=304).

		B	Wald	Exp (B)	95% Confidence Interval		*p*
					Lower	Upper	
Breastfeeding Training							
Those who did not receive the training*							
Those who received the training	No breastfeeding problems	1.090	10.886	2.974	1.557	5.682	**0.001**
	Breastfeeding in the right position	0.826	6.199	2.285	1.192	4.379	**0.013**
	Breastfeeding number: 8-10 times a day	1.470	7.031	4.349	1.467	12.892	**0.008**
	Breastfeeding number: 11-15 times a day	1.874	12.625	6.515	2.317	18.317	**0.000**
	Those breastfeeding their babies 1-2 hours a day	-1.188	5.686	0.305	0.115	0.809	**0.017**
	Those breastfeeding their babies 3-4 hours a day	-0.964	7.478	0.381	0.191	0.761	**0.006**
	Traditional practices in breastfeeding–Waiting for 3 calls to prayer	-2.943	38.170	0.053	0.021	0.134	**0.000**
	Traditional practices in breastfeeding- giving sugar water	-2.761	56.693	0.063	0.031	0.130	**0.000**

* Reference category

We determined that in their efforts to increase their flow of milk, the mothers in both the intervention and control groups made use of molasses, hapisa, syrup and herbal teas. It was noticed however that following the training, the mothers in the intervention group increased their use of some of the products (molasses and some herbal teas) and decreased their intake of some of the traditional products (hapisa and syrup). The study was demonstrated that the most of mothers added ghee or jaggary (unrefined sugar from palm trees or sugarcane) to the milk they drank to facilitate the secretion of milk.[20] A study conducted in Turkey indicated that mothers drank syrup in order to increase their breast milk.[24] Our findings in the period before the training were consistent with those in the literature. It was determined however that after the training, the mothers in the intervention group embraced healthy habits such as eating molasses and drinking fennel tea, and limited their use of harmful products such as hapisa and syrup.

There was no difference observed between the groups before the training in terms of their breastfeeding behavior. After the training, however, it was found that the duration of breastfeeding among the intervention group mothers was longer, the number of times they breastfed was greater, they experienced fewer

problems with breastfeeding, most of them used the correct breastfeeding position and placed the infant in the optimum manner. In a study pointed out that half of the participating mothers breastfed their babies every time the baby cried. The same study also reported that more than half of mothers breastfed their babies for only five minutes and close to half did not breastfeed at all during the night. Furthermore, more than half of the mothers refrained from breastfeeding because of experiencing breastfeeding issues such as nipple pain. This finding suggests that these mothers may not have been able to position the infant properly.[20] Another study conducted in the coastal district of Karnataka, India, it was indicated that the knowledge, attitudes and practices of mothers who had received prenatal care and training in breastfeeding techniques improved significantly.[25] In a study in Myanmar that reviewed the effects of a breastfeeding promotion program, it was observed that the rate of breastfeeding in the first 6 months was higher though not statistically significant in the regions included in the program compared to the areas that had not been included. The authors commented on this finding by recommending that programs of training emphasize the importance of keeping infants exclusively on breast milk in the first six months of life.[26] The results of our study suggest that breastfeeding training can remedy adverse outcomes and point to the importance of training in experiencing effective breastfeeding.

There was no difference between the two groups for the infant's weight after the training. The cohort study reported that breastfeeding was inversely associated with weight gain rate, BMI and overweight risk in the first year of life.[27] The results show that although all breastfeeding behaviors of the mothers developed positively one month after breastfeeding training, this period was not sufficient for the change in the infant's weight.

Limitations

The study reached its goals. However, our study had several limitations. First, only one province was used in the study, and therefore the findings may not be representative of others in different geographical locations. Secondly, because mothers were not called by appointment, more than one mother presented at the FHC at the same time, it took a long time to reach the target sample size.

Conclusion

In this study, the effect of individual breastfeeding training on breastfeeding behaviors and traditional practices were determined. The individual breastfeeding training improved the breastfeeding behaviors and the use of harmful breastfeeding traditional practices decreased. In line with this, health professionals should be aware of harmful traditional practices prevalent in the community and should perform breastfeeding counseling and support for mothers during the breastfeeding period.

Ethics Committee Approval

Permission for the study was obtained from the KTO Karatay University Ethics Committee (Decision No 2018-001). The principles of the Declaration of Helsinki were complied with while conducting the study.

Informed Consent

The purpose of the study was explained to the mothers included in the study and their voluntary consent was obtained. Informed consent form were signed the participants.

Author Contributions

Study design: AD, ES; Data collection: AD, ES; Data analysis: AD; Interpretation of the findings: AD, ES; Manuscript writing and revisions: AD, ES; All the authors read and approved the final draft.

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Conflict of interest

The authors have no conflicts of interest to declare.

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Research Article/Özgün Araştırma

The determination of the Boehler tuber joint angle and Gissane critical angle in Turkish population according to age and gender

Yaş ve cinsiyete göre Türk populasyonunda Gissane kritik açısı ve Boehler tuber eklem açısının değerlendirilmesi

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Abstract

Aim: Boehler angle and Gissane angle was aimed to determine in Turkish population aged between 18-79 years.

Materials and Methods: It is a retrospective study Boehler angle and the Gissane angle measurements were obtained from lateral ankle-foot radiographs taken from 236 healthy population.

Results: The significance wasn't found in both two angle parameters between gender (p=0.283 for the Boehler angle; p=0.485 for the Gissane angle). Additionally, according to age groups, there was a decrease in Boehler angle from decade 1 to the decade 7, the Boehler's angle increased again. Also, the Gissane angle reached a maximum degree in the decade 7, whereas the lowest value obtained in the decade 2.

Conclusion: There were a difference in calcaneal angle reference values in terms of gender, race and age. The knowledge of the calcaneal angles reference values can provide an important data for clinicians, radiologist and orthopedists with reference and normal values for healthy population.

Keywords: Calcaneal angle; Gissane angle; Boehler angle.

Öz

Amaç: Yaşları 18-79 arasında değişen Türk populasyonunda Boehler açısını ve Gissane açısını belirlemek amaçlandı.

Gereç ve Yöntem: Bu çalışma retrospektif bir çalışmadır. Boehler açısı ve Gissane açısı ölçümleri 236 sağlıklı kişiye ait lateral ayak bileği ve ayak radyografilerinden elde edildi.

Bulgular: Cinsiyet arasında her iki açı parametrelerinde anlamlı farklılık bulunmadı (p=0,283, Boehler açısı için; p=0,485, Gissane açısı için). Ayrıca, yaş gruplarına göre 1.dekattan 7.dekata kadar Boehler açısında bir azalma vardı ve Boehler açısı 7.dekatta tekrar artış gösterdi. Ayrıca, Gissane açısı 2.dekatta en düşük değerine ulaşırken, 7.dekatta maksimum seviyeye ulaştı.

Sonuç: Kalkaneal açı referans değerleri cinsiyet, ırk ve yaş açısından farklılık gösterdi. Kalkaneal açı (Boehler and Gissane açıları) referans değerlerinin bilinmesi klinisyenler, radyologlar ve ortopedistler için sağlıklı populasyonla ilgili referans ve normal değerlerin ortaya konmasını sağlayabilir.

Anahtar Kelimeler: Kalkaneal açı; Gissane açısı; Boehler açısı.

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Introduction

Foot bones occur from 26 bones which are from rear to forefoot: talus, calcaneus, navicular, cuboid, 3 cuneiforms, (medial, intermediate, and lateral cuneiforms), 5 metatarsals, and 14 phalanges.[1,2] The calcaneus is the largest of the seven tarsal bones and constitutes the heel pad of the foot.[3,4] It has many articulations and ligamentous and tendinous attachments. Calcaneus participates to the longitudinal arch posterior side, it plays a significant role supporting of the talus and providing weight bearing.[3,5] The most frequent type of traumatized bone is the calcaneus. Calcaneal fractures account for 60% of the hindfoot fractures, and 2% of all fractures.[6,7] The mainly reasons of calcaneal fractures are fall from height and motor vehicle accidents.[7,8] This type fractures occur are commonly due to high velocity trauma.[9] The calcaneal fractures are the most disabling fractures and common between 21 to 45 years.

Additionally calcaneal fractures is common among industrial workers.[7] So, the treatment of calcaneus fractures are difficult and time consuming and this makes Calcaneal fractures a huge socioeconomic burden to society.[8] The Boehler angle (BA) is a parameter used in evaluate the integrity of the calcaneus. Also, BA is the one of the calcaneal angles and a very useful parameter in evaluation and diagnosis of calcaneal fractures. Additionally, the BA often ranges from 20° to 40°. It is often used in lateral radiograph to evaluation the degree and severity of intraarticular deformity aberration from the calcaneus.[6] If BA is less than 20-28 degrees, calcaneal fractures can think for diagnosis. It was accepted that BA less than 20°-28° made think the presence of calcaneal fracture.[4,9] The BA is an important in determination of calcaneus entirety.[4] In 1931, BA, was introduced by Dr. Lorenz Boehler as the tuber joint angle, and a decrease in this angle indicates that weight bearing posteriorly facet depression when BA decreases in calcaneal fractures or take a negative value. In Boehler's study, the normal range of BA was accepted as 30°-35 degree.[10,11] In studies perfomed with different population BA took various values such as 25°-40°; 14°-50°; 28°-38°;20°-50°; 16°-47°; and 20°-40 degree.[3,11-17] Likewise, the Gissane angle (GA) is other angle used in assesment of the calcaneal fractures. GA is a significant measurement parameter in assessment of calcaneal fractures. In the other studies, the normal limit of GA ranged from 96° to 152°; 100° to 130°; 120° to 145°; 95° to 105°. There were no completely limit for fracture.[11] The knowledge of the normal values of the calcaneal angles may provide to assessment of the calcaneal deformity degree, and quality of reduction, to predict the morbidity after calcaneal fractures to clinicians.[11] In a few studies of the calcaneal angles, the differences between gender and age related changes were observed.[3,11]

The aim of this study is to determine the values of the calcaneal angles of the Turkish population and to determine their distribution according to age and gender.

Materials and Methods

The type and sample of the research

This study was carried out from the 236 adult subjects (101 males; 135 females) aged 18-79 years. The study period extended from January 2014 to January 2019. All radiographic records were measured using lateral plain radiographs of the foot and ankle, collected from the Department of Radiology in Adana Medline Hospital (Turkey). The radiograph measurements were taken and reported by the radiologist and their evaluations were performed by radiologist and anatomists. This study is a retrospective observational study.

Healthy adult subjects were selected by criteria of optimal health.

The main exclusion criteria were:

- Adult subjects who were history of fractures regarding with tarsal bones, metatarsal bones or phalanges.
- Adults who were undergone surgery about foot and ankle.
- Adult subjects who have history of congenital or acquired deformities and arthritic changes.

Ethics committee approval

All the test procedures were conducted after ethic approval. This study was approved by the

Institutional Review Ethics Committee at Cukurova University (Decision no: 2019/93-34). The research study was explained to each participant prior to data collection and volunteers receipted volunteer consent form. All the test procedures were performed after ethics committee approval according to the Helsinki Declaration of Principles.

Analysis of data

The data were divided into both two groups as healthy adult female and male subjects, and seven groups according to ages. Age groups were as follows:

- Decade 1: 18-20 years
- Decade 2: 21-30 years
- Decade 3: 31-40 years
- Decade 4: 41-50 years
- Decade 5: 51-60 years
- Decade 6: 61-70 years
- Decade 7: 71-80 years.

Measurement parameters were as follows.

The angle of Boehler (BA): The angle between the line connecting the uppermost points of the posterior facet and tuber calcanei and the line connecting the uppermost points of the posterior facet and anterior process.[3,11,14]

The angle of Gissane (GA): The angle between the lines drawn on lateral border of the posterior facet and the line drawn on the linear opacity of the anterior facet.[3,11,14]

Statistical methods

The SPSS 22.0 program was used for statistical analysis of the measurement results. From these measurements, means, standard deviations (SD), minimum and maximum values were calculated. Normality were evaluated by Shapiro Wilks test and the data tested were normally distributed. Also, ANOVA test were one of the parametric tests were chosen to determine the significance between gender and age groups. Additionally, the $p<0.05$ value was considered as significant.

Results

The means, associated standard deviations, and range of values for the angle measurements from calcaneal region were presented in Table 1-4. There were no significant difference in the GA and the BA between age groups ($p>0.05$) (Table 2). In males, the mean of the BA in the decade 5 was found as the highest value (31.53±5.29°), whereas this angle in the decade 6 was the lowest value (26.23±4.62°) (Table 3). The GA took the highest value (130.10±6.58°) in the decade 6, while the lowest value was obtained in the decade 1 (123.87±4.51°) in males (Table 3). In females, the mean of the BA in the decade 7 was found as the highest value (33.05±3.18°), whereas this angle in the decade 6 was the lowest value (26.04±5.34°). The GA in the decade was the highest value (129.60±3.54°), while the lowest value was obtained in the decade 6 (124.66±5.84°) in females (Table 4). The comparison of the present study and other population's studies related with Boehler and Gissane angles in tables 5-6.

Discussion

Calcaneus is the one of the key bones supporting the body weight. Calcaneus fracture is common (slipping from stairways and motor vehicle accidents).[5,7,8] Radiological measurement of the BA and the GA of the calcaneus plays major role in calcaneal fracture diagnosis, management and assessment of prognosis, intra operative reduction and fixation.[5] The BA is called as calcaneal angle, tuber joint angle or salient angle. This angle is used for evaluation the loss of calcaneal inclination or ankle dorsi flexion impingement. Also, in decrease of BA the weight bearing surface of the calcaneus collapses, and this leads to shifting of the weight of the body anteriorly. The reduction of BA indicates mainly the degree of proximal displacement of the calcaneal tuberosity.[5,18] However, BA play an important role as a guide in evaluation outcome following surgical or non surgical treatment of calcaneal fractures.[5,19,20]

Table 1. The distribution of the Boehler and Gissane angles according to gender.

Measurements	**Female (135) Mean±SD (Min.–Max.)**	**Male (101) Mean±SD (Min.–Max.)**	***p* value**
The angle of Boehler (degree)	29.30±5.45 (19.10°-42.40°)	30.06±5.30 (19.90°-42.30)	0.283
The angle of Gissane (degree)	126.46±6.13 (111.80°-142.60°)	125.91±5.77 (112.50°-143.70°)	0.485

SD: Standard Deviation; Min.: Minimum; Max.: Maximum; *p*=The significance value

Table 2. The Boehler and Gissane angles according to age groups.

Measurements	**Decade I (18-20 years) N=39**	**Decade II (21-30 years) N=41**	**Decade III (31-40 years) N=53**	**Decade IV (41-50 years) N=55**	**Decade V (51-60 years) N=24**	**Decade VI (61-70 years) N=18**	**Decade VII (71-80 years) N=6**
	Mean±SD Min.-Max.	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**
Boehler's angle	31.00±5.84 (21.40-42.40)	30.36±5.07 (20.00-40.00)	29.93±4.99 (20.00-42.30)	29.21±5.54 (19.10-41.70)	28.88±4.99 (19.90-37.00)	26.07±5.10 (20.30-36.60)	30.35±5.96 (23.50-38.10)
P value				0.056			
Gissane angle	126.39±7.11 (111.80-142.60)	125.46±6.05 (114.20-135.50)	127.00±6.27 (112.75-143.70)	126.03±5.24 (112.50-137.50)	126.22±5.32 (118.00-136.60)	125.57±6.12° (117.20-134.40)	127.28±4.54 (120.60-132.70)
P value				0.915			

SD: Standard Deviation; Min.: Minimum; Max.: Maximum; *p*=The significance value

Table 3. The Boehler and Gissane angles according to age groups in males.

Measurements	**Decade I (18-20 years) N=21**	**Decade II (21-30 years) N=18**	**Decade III (31-40 years) N=24**	**Decade IV (41-50 years) N=22**	**Decade V (51-60 years) N=9**	**Decade VI (61-70 years) N=3**	**Decade VII (71-80 years) N=4**
	Mean±SD Min.-Max.	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**	**Mean ±SD Min.-Max.**
Boehler's angle	30.49±5.57 (21.40-40.00)	30.33±4.73 (21.90-40.00)	30.02±4.69 (21.70-42.30)	29.58±6.22 (20.30-41.70)	31.53±5.29 (19.90-37.00)	26.23±4.62 (20.90-28.90)	29.00±6.96 (23.50-38.10)
P value				0.845			
Gissane angle	123.87±4.51 117.10-134.90	124.27±5.69 115.10-136.20	127.20±6.42 112.75-143.70	126.81±5.71 112.50-137.50	126.79±6.42 118.00-136.60	130.10±6.58 122.50-133.90	126.13±4.98 120.60-132.70
P value				0.268			

SD: Standard Deviation; Min.: Minimum; Max.: Maximum; *p*=The significance value

Table 4. The Boehler and Gissane angles according to age groups in females.

Measurements	Decade I (18-20 years) N=18	Decade II (21-30 years) N=23	Decade III (31-40 years) N=29	Decade IV (41-50 years) N=33	Decade V (51-60 years) N=15	Decade VI (61-70 years) N=15	Decade VII (71-80 years) N=2
	Mean±SD Min.-Max.	Mean ±SD Min.-Max.	Mean ±SD Min.-Max.	Mean ±SD Min.-Max.	Mean ±SD Min.-Max.	Mean ±SD Min.-Max.	Mean ±SD Min.-Max.
Boehler angle	31.59±6.24 (24.00-42.40)	30.38±5.43 (20.00-38.20)	29.85±5.30 (20.00-40.80)	28.97±5.13 (19.10-40.80)	27.28±4.20 (20.10-37.00)	26.04±5.34 (20.30-36.60)	33.05±3.18 (30.80-35.30)
p value				0.041			
Gissane angle	129.33±8.49 111.80-142.60	126.39±6.28 114.20-138.50	126.83±6.26 115.40-137.40	125.50±4.92 116.80-136.00	125.87±4.75 118.50-134.30	124.66±5.84 117.20-134.40	129.60±3.54 127.10-132.10
p value				0.338			

SD: Standard Deviation; Min.: Minimum; Max.: Maximum; *p*=The significance value

GA is known as the critical angle of Gissane angle. The normal value ranges between 120 degree and 140 degree.[5] This study present the normal values of Boehler and Gissane angles between both gender and age groups range from 18 to 79. This study reported a range from 19.10° to 42.40° in BA and 111.80° to 142.60° in GA in Turkish females. The same measurements was stated a range from 19.90° to 42.30° in BA and 112.50°-143.70° in Turkish males. The results of the BA and the GA in present study provide the evaluation and decision treatment of calcaneal fractures among Turkish population. Also, these values showed that both the BA and the GA in the Turkish population had a wider range like many published values (Table 5-6). [3,5,7,11,13,14,21-24]

An interesting finding was that the highest value was obtained in the decade 2 for the BA and in the decade 7 for the GA (Table 2). Also, group of the decade 5 had the highest value for the BA; whereas, the lowest value of the GA was obtained in the group of the decade 6 years in males. Also, the highest value was obtained in the decade 7 for both BA and GA in females. Additionally, the lowest means of both the BA and the GA were in the decade 6. In present study, the BA (p=0.845) and the GA (p=0.268) in males, and the GA (p=0.338) in females showed no significant differences between age groups. However, the significant difference were no found in the BA (p=0.283) and the GA (p=0.485) between gender. Moreover, the BA and the GA results may show the race variation between different populations. A few researches indicated that the BA correlated with age.[21] Although some studies showed a relationship between gender and the BA or the GA.[15] Our study findings were found to be compatible with studies performed with the radiographic method.

In this study, no relationship was found between the BA or the GA and gender. Also, accorrding to age groups, there were no found in the values of the BA and the GA of both gender (except the BA in females; p=0.041). When comparing the literature with BA findings in our study, we observed that there were differences between Saudi, Turkish, Nigerians, Indians, New Zeland populations. However, the BA findings are similar to Turkish and American populations. The differences between races may originate from the variation in some activities like built and load bearing.[5] We found significant differences in the mean value of the GA of Indians, Saudi, Turkish, Egyptian, and New Zeland population with our Turkish population; from this data, our results are greater than above studies (Table 6). We consider that these discrepancies could be a result of such factors like race or ethnic differences, and participant age. Interestingly, our angle results indicated that the significant difference was found the Boehler only in females. In total (without taking into account for gender), there were no significant difference in the Boehler angle (p=0.056) or the Gissane angle (p=0.915).

Table 5. The comparison of the present study and other population's studies related with Boehler's angle.

Study	Year of study	Race	Mean	Range
Chen et al.	1991	American	29° (female) 30° (male)	14°-50°
Didia and Dimkpa	1999	Nigerian	32.81° (female) 32.84° (male)	28°-38°(total)
Kroshhal et al.	2004	Saudi	31.24° (female) 31.15° (male)	18°-43° (female) 16°-47° (male)
Seyahi et al.	2008	Turkish	33.5° (female) 34.3° (male)	20°-46° (total)
Shoukry et al.	2010	Egyptian	30.14°	22°-40°
Boyle et al	2011	New Zeland	39.2°	26.2°-54.9°
Sengodan &Karthikeyan	2012	Indian	31.4°(female) 31.6° (male)	18°- 43° (total)
Ramachandran&Shetty	2015	South Indian	31.82°	18.7°-46.2°
Siminovic et al	2017	Croatian Caucasian	33.73°	20.9°-46.3°
Yang et al.	2019	Chinese	-	28.96°-31.26°
Present study	2019	Turkish	30.06 (male) 29.30 (female)	19.90-42.30 19.10°-42.40°

Table 6. The comparison of the present study and other population's studies related with Gissane angle.

Study	Year of study	Race	Mean	Range
Kroshhal et al.	2004	Saudi	116.39° (female) 115.66° (male)	96°-152° (female) 98°-136° (male)
Seyahi et al.	2008	Turkish	114.8° (female) 115.4° (male)	100°-133°
Shoukry et al.	2010	Egyptian	122.92°	108°-138°
Boyle et al.	2011	New Zeland	113.8°	97.10°-132.00°
Sengodan&Karthikeyan	2012	Indian	119.8° (female) 121.4° (male)	100°-145°
Ramachandran&Shetty	2015	South Indian	108.7°	87.5°-137.8
Present study	2019	Turkish	126.46 (female) 125.91 (male)	111.80°-142.60° 112.50°-143.70°

The normal values of the Boehler and the Gissane angles of Turkish population was shown in present study. The knowledge of the calcaneal angles may be important for in orthopaedic surgeons in the foot fractures.

Ethics committee approval

This study was approved by the Institutional Review Ethics Committee at Cukurova University (Decision no: 2019/93-34). All the test procedures were performed after ethics committee approval according to the Helsinki Declaration of Principles

Informed Consent

The research study was explained to each participant prior to data collection and volunteers receipted volunteer consent form.

Author Contributions

Idea, design, collection of resources, analysis and interpretation of results: SP, AGK, MÖ, YÖ. literature, written and critical: SP, AGK, MÖ, YÖ.

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Conflict of Interest

There is no conflict of interest among the authors.

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There is no financial disclosure.

Statements

These research results have not previously been presented.

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Research Article/Özgün Araştırma

Are fungi and EBV effective in cholesteatoma etiology?

Kolesteatom etyolojisinde mantar ve EBV etken mi?

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Abstract

Aim: Cholesteatoma is a commonly seen disease whose pathogenesis remains unknown. Although not a neoplastic process, it may progress to a fatal condition with local bone destruction. In this study, we aimed to present new insights concerning the etiology of cholesteatoma triggered by an inflammatory process.

Materials and Methods: The study included 34 patients diagnosed with cholesteatoma upon mastoidectomy performed between 2011-2019. Due to a provisional diagnosis of cholesteatoma. The cases were investigated for the latent membrane protein (LMP-1) encoded by the Epstein-Barr Virus (EBV) using the immunohistochemical method and for the presence of fungi using Grocott's methenamine silver (GMSII) stain.

Results: No fungi was detected in any of the 34 patients by GMSII staining. Thirty-two of the 34 patients were negative with but a suspicious result was seen in 2 patients with the immunohistochemical EBV antibody. EBV-encoded RNA (EBER) analysis was applied to these 2 cases with the silver in situ hybridization method and no reaction was observed.

Conclusion: In our study, we investigated the presence of fungi and EBV, which can trigger the inflammatory process. However, no EBV or fungi was detected in the tissues. Our study is the first to investigate the presence of EBV and fungi in formalin-fixed tissue in cases of aggressive cholesteatoma.

Keywords: Cholesteatoma; Etiology; Fungi; EBV.

Öz

Amaç: Kolesteatom, patogenezi bilinmeyen, toplumda sık görülen bir hastalıktır. Neoplastik bir süreç olmamasına rağmen lokal kemik destrüksiyonu ile mortal hastalık olabilir. Çalışmamızda inflamatuvar süreç ile tetiklenen kolesteatometyolojisine yönelik yeni bilgiler sunmayı hedefledik.

Gereç ve Yöntem: Çalışmaya 2011-2019 yılları arasında mastoidektomi yapılankolesteatom tanılı 34 hasta dahil edildi. Olgular, immünohistokimyasal yöntem kullanılarak Epstein-Barr virüsü (EBV)'nın kodladığı gizli membran proteini (LMP-1) ve Grocott's methenamine silver boyası ile mantar varlığı araştırıldı.

Bulgular: 34 hastada GMSII boyama ile mantar tespit edilmedi. Bu 34 hastanın 32'si immunohistokimyasal EBV antikoru ile negatif, ancak 2'si şüpheli değerlendirildi. Bu 2 olguya silver in situ hibriditasyon yöntemiyle EBER uygulandı ve reaksiyon elde edilmedi.

Sonuç: Araştırmamızda inflamatuvar süreci tetikleyebilecek mantar, EBV varlığını araştırdık. Ancak dokularda EBV, mantar tespit edilmedi. Çalışmamız agresif kolesteatom olgularında formalin fikse dokuda EBV ve mantar varlığını araştıran ilk araştırmadır.

Anahtar Kelimeler: Kolesteatom; Etyoloji; Mantar; EBV.

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Introduction

Cholesteatoma is an inflammatory lesion that often occurs in the middle ear or the mastoid, or rarely in both, and may also be seen in the temporal bone. Although not neoplastic in nature, these lesions mostly occur as a destructive process that is locally invasive in the form of a unilateral lesion. The histopathology of cholesteatoma is characterized by connective tissue accompanied by proliferated squamous epithelium and inflammatory cells surrounding desquamative keratin bundles in a cystic structure. In 1838, Johannes Müller coined the term, "cholesteatoma" considering this lesion as a tumor of adipose tissue with "chole" for cholesterol, "steat" for fat and "oma" representing tumor formation, resulting in misnomer of these lesions.[1] Annual incidence of cholesteatoma is 3/100,000 in children and 9.2/100,000 in adults. The incidence appears to be higher in males compared to females (M/F: 1.4/1). Cholesteatoma located in the middle ear is more common in those younger than 50 years of age.[1] Cholesteatoma is divided into three categories; the congenital form seen in children, the acquired type that may affect both adults and children, and the unspecified type. Congenital cholesteatoma is typically a cystic mass of keratinized squamous epithelium that extends towards the intact tympanic membrane. The most widely accepted hypothesis of congenital cholesteatoma etiology is the 'epithelial rest' theory. Epithelial cells referred to as the epibranchial placode are located behind the intact tympanic membrane and are normally absorbed by involution at 33 weeks of gestation. In the event of involution failure, congenital cholesteatoma may develop due to the damage in the surrounding tissue. According to another theory, i.e. the invagination theory, squamous epithelium migrates from the tympanic membrane to the middle ear, ending up in the external canal and resulting in congenital cholesteatoma. Acquired type cholesteatoma is assumed to develop due to Eustachian tube dysfunction following a previous disease of the middle ear. However, there is not yet an accepted mechanism that fully describes the development of acquired cholesteatoma despite the presence of multiple pathophysiological theories suggested thus far. Acquired type cholesteatoma is further divided into subclasses referred to as the retraction pocket variant and non-retraction pocket variant. The retraction pocket variants of cholesteatoma usually occur in secondary fashion in patients with acute otitis media. There are three different theories concerning the development mechanism of these lesions, namely the epithelial migration theory, the squamous metaplasia theory and the basal cell hyperplasia theory.[1,2] It remains unknown why the benign epithelium covering the external ear canal leads to erosion of bony structures after migration to the middle ear. In histological terms, papillomatous growth and koilocyte clusters are typical features of bone destructive sites seen in aggressive cholesteatoma.[3] The effect of cell debris and keratinocytes that accumulate in the retraction pocket interfere with self-clearance mechanisms, which is accompanied by local infection consisting of Langerhans and T-cells as well as macrophages. There is a vicious cycle between epithelial proliferation, keratinocyte differentiation and maturation, prolonged apoptosis and disruption of the self-clearance mechanisms. The inflammatory stimulus induces epithelial proliferation together with the expression of lytic enzymes and cytokines. Bacteria that may be colonized in the retraction pocket produce certain antigens that subsequently activate different cytokines and lytic enzymes. These cytokines lead to disruption of the extracellular bone matrix, proliferation, bone erosion and finally, progression of disease, thereby resulting in activation and maturation of osteoclasts. Currently, the etiological role of bacterial infection is under investigation upon the identification of biofilms.[1]

Cholesteatomas often remain asymptomatic for years without causing any potential harm. In general, these lesions are left untreated until the rapid progression phase and the potential risk of invasion in intratemporal structures. Several patients suffering from cholesteatomas describe a frequently recurring and foul-smelling otorrhea characterized by purulent discharge. Otalgia, headache, vomiting and

fever are atypical presentations of cholesteatoma; however, the occurrence of these symptoms may indicate the likelihood of intratemporal or intracranial complications. In this regard, prevention of fatal outcomes requires immediate assessment and timely treatment. Despite robust research on the treatment of acquired cholesteatoma, effective non-surgical treatment remains an unmet need. The surgical treatment in question primarily aims to control the condition, in other words, achieve a dry, unproblematic state in the ear without recurrence.[4,5,6] The aim of our study is to investigate the role of fungi and/or EBV in the etiology of aggressive cholesteatoma patients undergoing Canal Wall Up (CWU) and Canal Wall Down (CWD) mastoidectomy and provide insight on the clinical prognosis and treatment of such cases.

Materials and Methods

The type and sample of the research

This retrospective study included a total of 34 patients diagnosed in 2011-2019 with cholesteatoma. The slides of these 34 patients were retrieved from the archive and reassessed by two pathologists under an Olympus BX46 light microscope. Age and gender of the patients were recorded. Using the paraffin-embedded tissues of these cases, 4-micron sections were obtained, and the sections were then transferred onto positively charged slides. The sections were allowed in an incubator at 60°C for an hour and deparaffinized with xylene for 15 minutes. The samples were hydrated through descending-grade series of alcohol and washed in distilled water. They were then placed into a BenchMark XT device (Cell Marque EBV–RTU) for the antibody analysis and slides were placed in a BenchMark Special Stains histochemistry device to undergo GMSII staining. The samples stained in the automated staining device were covered using fluid-based covering material. These slides were examined under a BX46 Olympus light microscope at x40 magnification for fungal hyphae and spores with GMSII stain. The anti-EBV antibody for EBV targets the latent membrane protein (LMP-1) encoded by the BNLF1 gene and produces brown-colored membranous staining in positive cells.[6]

Analysis of data

To evaluate EBV, cytoplasmic and membranous staining pattern was scored on a scale of 0-1 as follows; 0: no staining, 1: membranous staining in squamous epithelial cells. To evaluate GMSII, the extracellular staining pattern was scored on a scale of 0-1 as follows; 0: no staining, 1: staining present.

Statistical method

Patient demographics were analyzed using the SPSS 24 program.

Ethics committee approval

The protocol was approved by the Ethics Committee of Tekirdağ Namık Kemal University' Faculty of Medicine (Approval date and number: 28.05.2020/2020.102.05.03). The research has been prepared in accordance with the Declaration of Helsinki Principles.

Results

Of the 34 patients who underwent surgery due to mass in the middle ear, 15 (44.1%) were female and 19 (55.9%) were male. The Male-Female ratio was 1.26. Mean age was 37.6 years (min: 10, max: 68). The main clinical presentation was loss of hearing and chronic ear discharge. HRCT was used for the radiological evaluation in all patients. Contrast-enhanced technique was utilized for those with suspected intracranial lesion. Identified in 44% of the patients, combined pars flaccida and pars tensa cholesteatoma were the most common type (Table 1). Acquired cholesteatoma extending to mastoid antrum was the most common localization with 67% of the patients, followed by mesotympanum cholesteatoma in 17% of the patients (Table 2). Scutum and lateral attic wall erosion was the most common finding seen in 76% of the patients, followed by eroded superior and posterior meatal wall in 73% of the cases (Table 3). One the patients died due to brain abscess as an intracranial complication of the cholesteatoma.

Immunohistochemical analysis for the EBV antibody yielded negative results in 32 patients while 2 were deemed as suspicious and further examined by silver in situ hybridization

(SISH) for EBER. No reaction was observed in these two cases, therefore all patients included in the study were deemed as EBV-negative. GMSII histochemical analysis did not reveal fungal hyphae or spores in any of the tissues.EBV and GMS analysis of the cases by gender is presented in Table 4. Figure 1 shows samples of Hematoxylin and Eosin (H&E), EBV and GMSII staining of one of our patients. Figure 2 and 3 shows samples of GMS and EBV staining of control positives.

Table 1. Presents the type of cholesteatomas.

Type of cholesteatoma	No. of patients	%
Combined cholesteatoma	15	4
Pars tensa cholesteatoma	9	6
Parsflaccidacholesteatoma	10	0

Table 2. Localization of cholesteatomas.

Localization and extension	No. of patients	%
Atticoantral	5	14
Mesotympanum	6	17
Extended to mastoid antrum	23	67

Table 3. Shows the erosion in middle ear cavity.

Middle ear bony wall erosion	No. of patients	%
Eroded scutum and lateral attic wall	26	76
Eroded tegmen	4	11
Thinning of the tegmen	8	23
Eroded superior and posterior meatal wall	25	73
Eroded lateral semicircular canal	4	11
Eroded Koerner's septum	17	50

Table 4. EBV and GMSII staining distribution ofthe cases by gender.

Sex	Male	Female
EBV-negative	19	15
EBV-positive	0	0
GMSII-negative	19	15
GMSII-positive	0	0

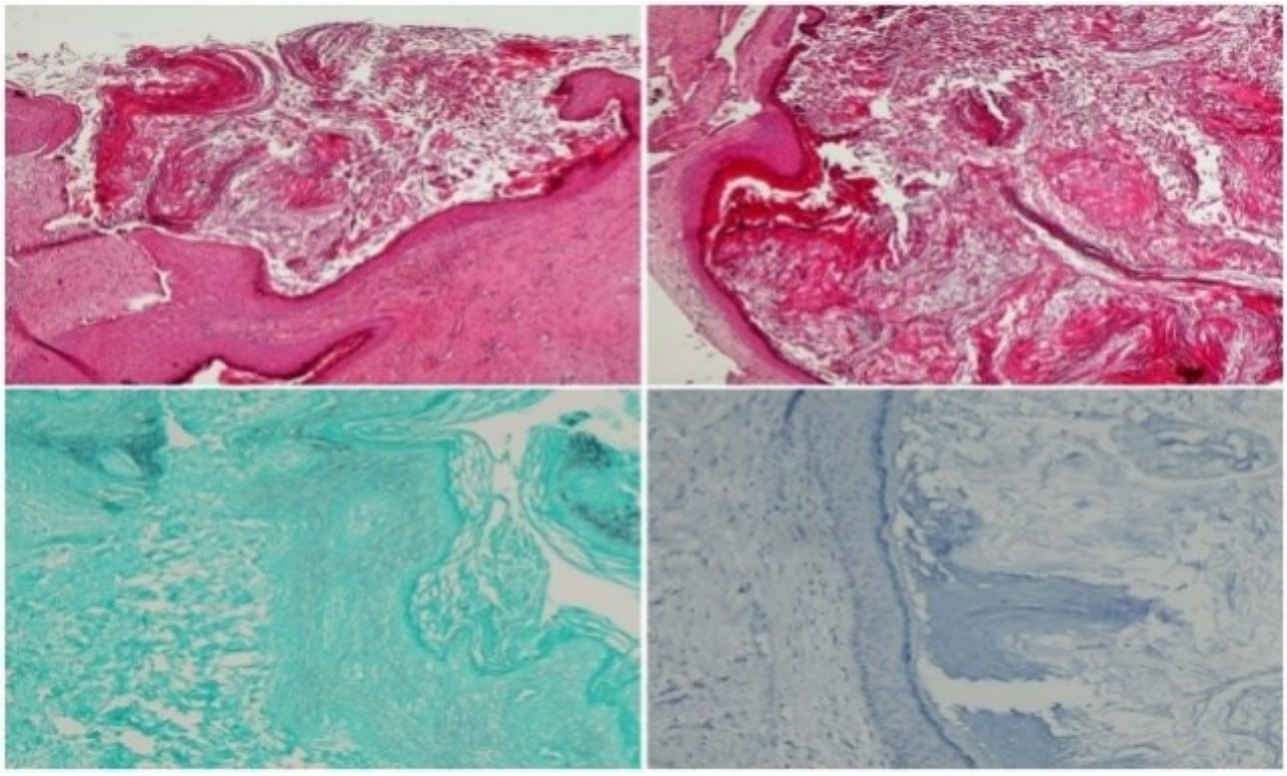

Figure 1. Cholesteatoma A) H&E x40 B) H&E x100 C) GMSII x100 D) Anti-EBV x100

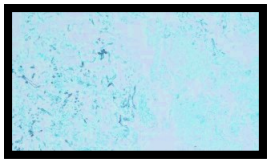

Figure 2. GMSII positive control x40

Figure 3. Anti-EBV positive control x100.

Discussion

Cholesteatomas often exhibit variable clinical courses. They may remain silent and progress slowly over years or spread rapidly and progress with mortal complications such as meningitis and destructive damage in local bone structures.[3,6,7,8] The clinical differences are thought to result from the microorganisms that may colonize in the proliferated squamous epithelium in the retraction pocket during the development of acquired cholesteatoma and the damage caused by T-lymphocytes, histiocytes, monocytes as well as the interleukins and cytokines these cells release.[2,3,9,10] Based on this hypothesis, the present study aims to investigate fungi in paraffin-embedded block tissue sections of relevant cases. For this purpose we used GMSII, a dye produced with a specific silvering technique that is highly effective in showing fungal hyphae and spores. However, we did not detect any fungal spores in the light microscopic evaluation of paraffin block sections.

In the literature, a prospective case series byEffat and Madany investigated the incidence and structure of fungal elements in keratin samples derived from cholesteatoma excised by primary mastoid surgery. Their study included 13 males and 5 females in the age group of 9-45 years and identified fungi in samples of 17 patients (89%).[10] We think that we could not detect fungi in our study, since we were investigating fungi in blocks embedded in paraffin, not in fresh tissue. However, in daily routine practice, we set up our study on paraffin-embedded tissues, as the tissues are embedded in paraffin for pathological examination, the tissues can be stored in this way for a long time and are suitable for other investigations.

In our study, minimum age was 10 and maximum age was 68 years, which is a distribution consistent with the literature.[2,11] Gender distribution was also consistent with the relevant literature, with a slightly higher incidence in females.[2,9,11] A prospective study by Singh et al.[12] investigating the prevalence of fungi in patients with cholesteatoma and suppurative otitis media enrolled a total of 46 patients. They analyzed fungal colonization in samples by means of microbiological methods.[12] While postoperative cholesteatoma was observed in 40 out of the 46 patients included in their study, fungal colonization was identified in 17 (42.5%) of these cases.[12] Additionally, the authors reported a statistically significant correlation between permanent otorrhea and fungal colonization of cholesteatoma.[12] Studies have shown that EBV in carrier form may be present up to 90% in the head and neck region.[13] EBV is frequently detected in malignancy samples from nasopharyngeal carcinoma and cervical lymph nodes by means of the polymerase chain reaction (PCR) method. Tsai et al. evaluated EBV results using PCR in nasopharyngeal swab samples and SISH in formalin-fixed paraffin-embedded block sections of nasopharyngeal biopsy samples. They compared EBER SISH versus PCR and recommended EBER SISH in that this method supports nasopharyngeal malignancy.[14] In this study, as in the study of Tsai et al.[14] we investigated the presence of EBV in formalin-fixed paraffin-embedded block sections by immunohistochemistry, and we used EBER SISH in two suspicious cases and negative results were found.

Reports on the expression of HPV 6 and 11 in cholesteatomas range from 3.1 to 27.3% based on PCR studies. HPV is also a potential etiological factor in cholesteatomas with aggressive growth. Koilocytic alterations and papillomatous growth suggest a possible viral etiology in histological terms that may be confirmed by PCR.[6,8] We investigated another viral agent in our study upon the detection of viral agents in the etiology of cholesteatoma.

In our study, the EBV agent could not be searched with the SISH method, which is more sensitive to the agent, due to the lack of budget.

Conclusion

In the literature, the presence of fungi and EBV has not been investigated in formalin-fixed paraffin block tissue sections in an attempt to understand the etiopathogenesis of cholesteatomas. Further studies with the collaboration of microbiology and pathology to explore the factors that trigger inflammation

are needed in order to elucidate the etiology of cholesteatomas.

EBV and fungi have not been investigated simultaneously in the etiopathogenesis of aggressively disseminated cholesteatomas.

Ethics Committee Approval

The protocol was approved by the Ethics Committee of Tekirdağ Namık Kemal University Faculty of Medicine (Approval date and number: 28.05.2020/2020.102.05.03). The research has been prepared in accordance with the Declaration of Helsinki Principles.

Informed Consent

Informed consent forms were obtained from all participants.

Authors' Contributions

Conception–A.İ.A.; Design–A.İ.A, T.E.; Supervision–A.İA., T.E.,S.K.; Materials–A.İA., S.K.; Data collection and/or processing–A.İ.A, S.K.; Analysis and/or Interpretation–A.İ.A., S.K.; Literature review A.İ.A, S.K.; Writer–A.İ.A,; Critical Review–A.İ.A, T.E,S.K.

Conflict of Interests

The authors declare that they have no conflict of interest.

Financial Disclosure

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Peer-review

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Research Article/Özgün Araştırma

Is food insecurity a newly identified risk factor in febrile convulsion?

Gıda güvencesizliği febril konvulziyon'da yeni tanımlanan bir risk faktörü mü?

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Abstract

Aim: Food insecurity status was evaluated in the cases diagnosed with febrile convulsions (FC) and whether food insecurity was a risk factor in FC was investigated.

Materials and Methods: A questionnaire consisting of 18 questions was applied to the parents of 40 patients who were diagnosed with febrile convulsions in order to determine food insecurity (Study group). The parents of the patients who were admitted to the general pediatric outpatient clinic were included in the study as the control group.

Results: A statistically significant difference was found between the groups in terms of food insecurity (p=0.019). The data obtained in the study were found to increase the febrile convulsion food security status 1.67 times and the county of residence 0.45 times

Conclusion: The high rate of food insecurity in the patients diagnosed with FC indicates a new risk factor in addition to existing FC risk factors

Keywords: Food insecurity; Febrile convulsion; Sociodemographic characteristic; Children; Risk
.

Öz

Amaç: Febril konvülziyon (FK) tanısı konulan olgularda gıda güvencesizliği durumunu değerlendirilmesi ve gıda güvencesizliğinin FK'da risk faktörü olup olmadığı araştırıldı.

Gereç ve Yöntem: Febril konvülziyon tanısı konulan 40 hastanın ebeveynine, gıda güvencesizliğini belirlemek amacı ile 18 sorudan oluşan anket uygulandı (Çalışma grubu). Çalışma ile aynı dönemde, genel çocuk polikliniğine başvuran, hastaların ebeveynleri kontrol grubu olarak çalışmaya dahil edildi.

Bulgular: Gruplar arasında gıda güvencesizliği açısından istatiksel olarak anlamlı fark saptandı (p=0,019). Çalışmada elde edilen veriler febril konvülziyonda gıda güvenliği durumunu 1,67 kat, ikamet yeri 0,45 kat arttırdığı tespit edilmiştir.

Sonuç: FK tanılı hastalarda gıda güvencesizliği oranının yüksek olması FK risk faktörlerine ek yeni bir risk faktörüne işaret etmektedir.

Anahtar Kelimeler: Gıda güvencesizliği; Febril konvülsiyon; Sosyodemografik özellik; Çocuklar; Risk.

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Introduction

Febrile convulsions (FC) are seizures seen in children between 6 month and 5 years of age, accompanying febrile diseases other than central nervous system (CNS) infection, without previous neonatal convulsion or afebrile convulsion history, and not meeting other acute symptomatic convulsion criteria.[1] However, there are few studies focusing on the effects of common environmental components such as socio-demographic characteristics, economic status of the family and educational status of the parents in the patient groups diagnosed with febrile convulsion.[2,3]

Food insecurity exists whenever "the availability of nutritional adequate and safe foods or ability to acquire acceptable foods in socially acceptable ways is limited or uncertain".[4] Food insecurity at the family level generally arises from the inadequate food availability due to limited resources.[5] It has been shown in many studies that the academic performances and psychosocial development of children in the family with food insecurity are negatively affected.[6]

There is no study in the literature on food insecurity in the cases diagnosed with febrile convulsions. The purpose of this study was to determine food insecurity status was evaluated in the cases diagnosed with febrile convulsions and whether food insecurity was a risk factor in FC was investigated.

Materials and Methods

The samples of the research

A questionnaire consisting of 18 questions was applied to the parents of 40 patients who were diagnosed with febrile convulsions between 01.05.2019-01.07.2019 in a pediatric neurology outpatient clinic in order to determine food insecurity (Study group). The parents of the patients who were admitted to the general pediatric outpatient clinic in the same period as the study, who were in the age range of 6-60 months were included in the study as the control group (Table 1).

Table 1. Sociodemographic characterictics of the study group and the control group.

		Study Group N=40 (100%)	Control Group N=40 (100%)
Sex	**Male**	21 (52.5%)	19 (47.5 %)
	Female	19 (47.5%)	21 (52.5%)
Years (month)		26.8 ±12.5	29.65±11.53
Mother's mean age (year)		31.1 ±5.31	30.2±4.91
Father's mean age (year)		34.1±4.74	35.3±4.85
Survey Participant	**Mother**	21 (52.5%)	27 (67.5%)
	Father	18 (45%)	12 (30%)
	Others	1 (2.5%)	1 (2.5%)
Caretaker's education level	**Illiterate**	2 (5%)	0 (0%)
	Primary school	29 (72.5%)	24 (60%)
	Middle Schools	6 (15%)	11 (27.5%)
	High School	3 (7.5%)	5 (12.5 %)
	Higher education	0 (0%)	0 (0%)
County of Residence	**Slum**	8 (20%)	5 (12.5%)
	Flat	10 (25%)	23 (57.5%)
	Detached house	22 (55%)	12 (30%)
Economic status*	**<80 $**	7 (17.5%)	1 (2.5%)
	80-160 $	7 (17.5%)	3 (7.5%)
	160-200 $	12 (30%)	19 (47.5%)
	>200 $	14 (35%)	17 (42.5%)
Food insecurity	**Food security**	8 (20%)	15 (37.5%)
	Borderline food security	4 (10%)	11 (27.5%)
	Food insecurity	13 (32.5%)	7 (17.5%)
	Severe food insecurity	15 (37.5%)	7 (17.5%)

* In our country, the equivalent of the minimum wage in dollars. American Dollar Exchange Rate (Avarage of May-July 2019) is equal to 1 $=5.9 TL.

The cases who applied to the pediatric neurology outpatient clinic and were diagnosed with FC were included as the study group. Patients with clinically suspected meningitis or encephalitis, known case of

epilepsy with fever, any neuro-developmental co-morbidity were excluded from the study.

The questionnaire applied was taken from the "Household Food Security Survey Module" of the US Department of Agriculture and adapted to Turkish by us.[7] Survey form is a public, permissionless. The parents were asked to answer the questions in the questionnaire, considering the last 12 months. In cases where the parents filling in the questionnaires were illiterate, the questions were read out face to face, and the parents were asked to answer. The answer to 15 of the questions was "yes" or "no", and the answer to three questions was "almost every month", "some months but not every month" or "only 1 or 2 months" if the answer to the previous question was "yes". All "yes", "almost every month" and "some months but not every month" answers were considered positive. The "no" and "only 1 or 2 months" answers were considered negative. The cases were divided into four groups according to the number of positive answers. The absence of any positive answers was classified as “high food security”, 1-2 positive answers as “marginal food security”, 3-7 positive answers as “low food security” and 8-18 positive answers as “very low food security” (Table 2). Informed consent forms were obtained from all participants.

Table 2. Used questionnaire.

Questions

1. Did you ever worry whether the food for you and your family would run out before you have money to buy more?
   A) Yes B) No
2. Were there times when the food for you and your family just did not last, and there was no money to buy more?
   A) Yes B) No
3. Were there times when you and your family could not afford to eat healthy food?
   A) Yes B) No
4. Were there times when you could only feed your children less expensive foods because you were running out of money to buy food?
   A) Yes B) No
5. Were there times when it was not possible to feed the children a healthy meal because there was not enough money?
   A) Yes B) No
6. Were there times when the children in the house were not eating enough because there was no money to buy enough food? A) Yes B) No
7. Did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food? A) Yes B) No
8. How often did this happen?
   A) Almost every month B) Some months C) 1-2 months
9. Did you ever eat less than you felt you should because there wasn’t enough money to buy food?
   A) Yes B) No
10. Were you ever hungry but didn’t eat because you couldn’t afford enough food?
    A) Yes B) No
11. Did you lose weight because you didn’t have enough money for food?
    A) Yes B) No
12. Did you or other adults in your household ever not eat for a whole day because there wasn’t enough money for food? A) Yes B) No
13 How often did this happen?
    A) Almost every month B) Some months C) 1-2 months
14. Did you ever cut the size of the children’s meals because there wasn’t enough money for food?
    A) Yes B) No
15. Did any of the children ever skip meals be- cause there wasn’t enough money for food?
    A) Yes B) No
16. How often did any of the children ever skip meals because there wasn’t enough money for food?
    A) Almost every month B) Some months C) 1-2 months
17. Were the children ever hungry but you just couldn’t afford more food?
    A) Yes B) No
18. Did your children ever not eat for a whole day because there wasn’t enough money for food?
    A) Yes B)No

The ethical aspect of research

The study protocol was approved by Ethics committee of Adiyaman University Non-invasive Clinical Research Ethics Committee (Decision No. 2019/3-15). The principles of the Declaration of Helsinki were complied with while conducting the study.

Statistical analysis

The SPSS (Statistical Package for Social Sciences) for Windows 23.0 program was used for statistical analyses in the evaluation of the data obtained in this study. The Independent Sample T-test was used for parameters with normal distribution, and the Mann-Whitney U test was used for parameters without normal distribution. Chi-square test was used to evaluate categorical variables. The relationship between febrile seizures and "food security status" and "county of residence" as a risk factor was evaluated with logistic regression (multivariate) analysis. Odds ratios (OR) with a 95% confidence interval (CI) were reported for each risk factor. A *p*-value of <0.05 was considered significant.

Results

40 patients in both groups were included in the study as 21 (52.5%) boys and 19 (47.5%) girls in the study group and 19 (47.5%) boys and 21 (52.5%) girls in the control group. The mean age of the cases included in the study group was 26.8±12.5 months, while the mean age of the cases included in the control group was 29.65±11.53 months. There was no statistically significant difference among the groups with regard to gender (p=0.823) and age (p=0.293).

When the parents who filled in the form in the SG and CG were evaluated, the parent who filled in the form was seen to be the "mother" most often, and there was no statistically significant difference among the groups with regard to the parent filling in the form (p=0.204) (Table 1). There was no statistically significant difference among the SG and CG with regard to the mean age of the mother (p=0.473) and father (p=0.287) (Table 1). There was no statistically significant difference among the parents of the SG and CG groups with regard to educational status (p=0.259). When evaluated with regard to place of residence, it was determined that 14 cases (35%) were living in the village in the SG, and 26 cases (65%) were living in the city center in the CG. There was a statistically significant difference among the SG and CG when compared with regard to place of residence (p=0.017). When the type of house in which the cases were living was examined, it was determined that 22 patients (55%) were living in detached houses in the SG, and 23 (57.5%) were living in apartments in the CG. There was a statistically significant difference among the groups with regard to type of house (p=0.013).

In line with the answers given to our questionnaire, 8 (20%) of the families were with high food security, 4 (10%) were with marginal food security, 13 (32.5%) were with low food security, and 15 (37.5%) were with very low food security in the SG. 15 (37.5%) of the families were with high food security, 11 (27.5%) were with marginal food security, 7 (17.5%) were with low food security, and 7 (17.5%) were with very low food security in the CG. A statistically significant difference was found among the groups with regard to food insecurity (p=0.019) (Table 1).

In multivariate analysis, food security status [OR 1.67 (1.098-2.543), p=0.017], county of residence [OR 0.45 (0.246-0.846), p=0.013] remained associated with febrile convulsion (Table 3).

Table 3. Multivariate regression analyses for association of county of residence and food security status variables for febrile convulsion.

	Multivariate regression analyses		
Variables	**Odds Ratio**	**95%CI**	**p value**
County of Residence	0.456	0.246-0.846	0.013
Food security status	1.671	1.098-2.543	0.017

CI, confidence interval

Discussion

In this study, food insecurity was observed more frequently in the cases who were diagnosed with febrile convulsions compared to the healthy group, which was determined for the first time in the literature. Increasing prevalence of a wide variety of chronic diseases such as epilepsy, asthma, diabetes, depression and cancer has been associated with low socioeconomic status.[8,9] Due to crowded family structure, the possibility of malnutrition, decreased access to health services, increased frequency of infectious diseases, late diagnosis and treatment of diseases is high in the populations with low socioeconomic level.[10]

It has been reported in the literature that febrile convulsions have a higher prevalence in developing countries compared to developed countries. This rate is stated to be 9.7% in Turkey.[11] The low prevalence of FC in developed countries has been emphasized to be associated with high socioeconomic level, more informed patient and family profiles, and better and more accurate hospital records in these countries.[12] Aydin *et al*. researched the relationship among demographic factors and the prevalence of FC in Turkey and noticed that FC was almost 2.13 times more common in the families with low socioeconomic and cultural levels. They emphasized in the same study that the main reason for this was the families who did not have the knowledge of FC and had insufficient access to health services.[11]

It can be anticipated that the parents with good socioeconomic status will have easier access to health facilities and are more likely to obtain information about the disease. With a similar logic, it can be thought that the educational status of the parents will also be effective.[11] Forsgren et al. investigated socioeconomic variables in a case-control study and only reported the educational status of the mothers and full-time day-school attendance as risk factors.[13] They suggested that the literacy level of the parents was associated with the awareness of the symptoms of their children, and on the contrary, the educational status of the fathers was found to be a risk factor in this study.[13,14] In our study, the difference was not statistically significant when educational status was compared among the groups, while there was a statistically important difference with regard to place of residence and type of house in which they were living.

Food insecurity is not being able to obtain enough nutritious and balanced foods in socially appropriate forms and ways or obtaining them in limited quantities.[5] Health problems (acute infections, chronic disease, developmental and mental health problems, depression, anxiety and stress) are more common in the populations with food insecurity.[15-17] It was found that the total number of the families with food insecurity constituted 50.5% (143 families) of 283 families included in the study, and this rate was quite high in a study evaluating the cases who were admitted to a tertiary hospital in Turkey.[18] In another recent study in Turkey, the reported prevalence of food insecurity among Turkish agricultural engineering students is one-third (33.0 %) of the total. In this study, it was found that there are significant relationships between food insecurity status and students' year of study, employment status, grant/credit status and living arrangements.[19]

The most significant risk components for febrile convulsions are the age and body temperature of the child. The risk of FC increases with increasing body temperature. Four risk components have been identified for the first FC as FC history in first-degree family members, neurodevelopmental abnormality, more than 30 days of hospitalization in the neonatal intensive care unit and attending nursery school. FC develops by 28% if two or more of these risk factors are present for the first FC.[14] Atesoglu et al.[20] reported chronic diseases with continuous need for medication, developmental retardation, consanguineous marriage, educational status of the mother, educational status of the father, hospitalization in the neonatal intensive care unit, intrauterine growth retardation and gestational hypertension history as the risk components for the emergence of FC in children in a study published in 2018. As a result of the study, the frequency of food insecurity was statistically significantly higher in the SG compared to the

CG. The data we obtained in our study show that a different risk factor can be determined by examining the families in terms of "food insecurity" in addition to FC risk factors known in the literature. In a letter to the editor published by Nagata in 2019, it was stated that the prevalence of migraine was statistically significantly lower in the patients with food security compared to those with food insecurity.[21]Apart from this study, there are few studies examining the coexistence of food insecurity and neurological diseases.

The small number of cases and the shorter duration of the questionnaire are the limitations of our study.

In conclusion, the high rate of food insecurity in the patients diagnosed with FC indicates a new risk factor in addition to existing FC risk factors. The cases with food insecurity need to be examined with regard to FC, and further studies are needed in this area.

Ethics Committee

The study protocol was approved by Ethics committee of Adiyaman University Non-invasive Clinical Research Ethics Committee (Decision No. 2019/3-15). The principles of the Declaration of Helsinki were complied with while conducting the study.

Informed Consent

Informed consent forms were obtained from all participants

Author contributions

Conception–H.A., I.H.B Design– H.A., I.H.B Supervision– H.A., I.H.B Materials– H.A., I.H.B Data Collection–H.A. Analysis and/or Interpretation–I.H.B. Literature review– H.A., I.H.B. Critical Review– H.A., I.H.B

Conflict of Interest

No conflict of interest was declared by the authors.

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Research Article/Özgün Araştırma

Comparison of the effects of sugammadex and neostigmine on recovery of anesthesia in rigid bronchoscopy in pediatric cases

Pediatrik olgularda uygulanan rijit bronkoskopi işleminde anestezi derlemesinde sugammadeks ve neostigminin etkinliğininin karşılaştırılması

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Abstract

Aim: To compare the efficacy of sugammadex and neostigmine, which are used to reverse rocuronium-neuromuscular blockade in children who underwent rigid bronchoscopy due to tracheobronchial foreign body aspiration.

Materials and Methods: The data of 54 patients who underwent rigid bronchoscopy with the suspicion of foreign body aspiration in children aged 0-18 in our hospital between 2013 and 2018 were retrospectively analyzed.

Results: Thirty of the cases were male and 24 were female. Atropine-neostigmine was administered to 23 patients and sugammadex was administered to 31 patients to reverse neuromuscular blockade. While no complications were found in 41 cases, bronchospasm was found in 6 cases, hypoxia in 5 cases, and laryngospasm in 2 cases. Recovery time was shorter in patients who received sugammadex (p<0.001).

Conclusion: Recovery time is shorter after sugammadex administration in reversing rocuronium-induced neuromuscular blockade in pediatric rigid bronchoscopy anesthesia.

Keywords: Pediatric Rigid Bronchoscopy; Sugammadex; Rocuronium; Neostigmine

Öz

Amaç: Trakeobronşiyal yabancı cisim aspirasyonu nedeniyle rijit bronkoskopi yapılan çocuklarda roküronyumun neden olduğu nöromüsküler blokajın tersine çevrilmesinde kullanılan sugammadeks ve neostigminin etkinliğininin karşılaştırılması amaçlanmıştır.

Gereç ve Yöntem: Hastanemizde 2013-2018 tarihleri arasında 0-18 yaş grubu çocuklarda, yabancı cisim aspirasyonu şüphesi ile rijit bronkoskopi yapılan 54 hastanın verileri geriye dönük olarak incelendi.

Bulgular: Olguların 30'u erkek, 24'ü kızdı. Nöromüsküler blokajın tersine çevrilmesi amacıyla, 23 olguya atropin- neostigmin ve 31 olguya da sugammadeks uygulanmıştı. 41 olguda komplikasyon saptanmazken 6 olguda bronkospazm, 5 olguda hipoksi, 2 olguda laringospazm saptandı. Derlenme süresi sugammadeks uygulanan olgularda daha kısa tespit edilmiştir(p<0,001).

Sonuç: Pediyatrik rijit bronkoskopi anestezi uygulamasında roküronyumun neden olduğu nöromüsküler blokajın tersine çevrilmesinde, sugammadeks uygulanması sonrası derlenme süresi daha kısadır.

Anahtar Kelimeler: Pediyatrik rijit bronkoskopi, Sugammadeks, Roküronyum, Neostigmin.

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Introduction

Foreign body aspiration (FBA) is one of the most common emergencies in childhood. While they may be asymptomatic, they can cause serious respiratory complications and even death. FBA is the leading cause of accidental death in children younger than one year of age.[1]

Bronchoscopy in children has many difficulties. The main of these difficulties are that hunger of patients is not suitable, uncooperative and narrow airway of patients causing oxygenation and ventilation disorders. The patients'head and neck region is used by the surgeon and anesthesiologist simultaneously.[2-4]

Anesthesia management during bronchoscopy is of great importance in reducing the risk of life-threatening perioperative and postoperative complications such as laryngeal edema, laryngospasm, bronchospasm, airway laceration, tracheal rupture, pneumothorax, atelectasis.[5] This can be prevented with neuromuscular blocking drugs or a deep level of anesthesia.[6]

For this reason, the most commonly used neuromuscular blocking drug is rocuronium with steroid structure. Neostigmine and recently sugammadex, one of the new agents with good pharmacokinetic profile, have been used to reverse the effect of rocuronium at the end of the procedure. The residual blocking effect of neostigmine may cause complications such as respiratory depression and hypoxemia.[7] Sugammadex bind the rocuronium by encapsulation method, reduces the plasma level of rocuronium and ensuring its excretion with urine.[7,8]

The aim of our study is to compare the efficacy of sugammadex and neostigmine used in reversing rocuronium-induced neuromuscular blockade in children undergoing rigid bronchoscopy due to tracheo-bronchial FBA and to evaluate postoperative complications.

Materials and Methods

The type of the research

This research was a retrospective observational study, which was conducted in Adıyaman training and research hospital.

The samples of the research

A total of 54 patients were included in the study (30 men, 24 women). The medical records of children aged 0-18 years who underwent rigid bronchoscopy for diagnosis and treatment in the operating room of our hospital between January 2013 and December 2018 for suspected FBA were retrospectively reviewed.

Data collection tools

The records of the cases included gender, age, complaint of admission to the hospital, anesthesia induction and maintenance, level of foreign body obstruction (trachea, right main bronchus, left main bronchus), drugs used for recovery from anesthesia, duration of the procedure, recovery times, complications encountered, terms of length of hospital stay.

Cases with insufficient data, patients supported by spontaneous breathing, patients who did not use recuronium as a neuromuscular blocker, patients who were taken to intensive care were not included in the study.

Data analysis

Data analyzes were carried out using SPPS 25 (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.). Mean±standard deviation, minimum and maximum values for continuous data as descriptive statistics; for categorical data, frequency and percentage were used. The conformity of the variables to the normal distribution was evaluated using the Kolmogorov-Smirnov test, skewness- kurtosis values, and histograms. The frequencies, rates, mean and standard deviations of the patients in terms of different variables are presented as descriptive statistics. Whether the distributions of the research variables meet the normality assumption was evaluated with both skewness and kurtosis levels and the results of Shapiro–Wilk and Kolmogorov-Smirnov tests. Evaluation results show that research variables do not meet the normality assumption. For this reason, the Mann Whitney U test, which is one

of the non-parametric tests, was used in the comparison analysis. In comparison groups, median and Q1 and Q3 values were included. Chi-square Analysis and crosstabs were used to examine the differences between the proportional distributions of categorical data. The level of significance for the analysis results was determined as $p<0.05$.

The ethical aspect of research

The study was started after the approval of the Non-Invasive Clinical Research Ethics Committee of Adıyaman University with the date of 19.11.2019 and the decision number 2019/8-13. The research has been prepared in accordance with the Declaration of Helsinki Principles.

Intraoperative procedures

Patients who underwent routine monitoring procedure were administered methylprednisolone at a dose of 1 mg/kg and midozalam at a dose of 0.01 mg/kg/iv. For anesthesia induction, propofol at a dose of 2.5 mg/kg/iv, rocuronium at a dose of 0.6 mg/kg/iv, and fentanyl at a dose of 1 mcg/kg/iv were administered. Inhaled 2-2.5 % sevoflurane and 0.5-1 mcg/kg/minute/iv remifentanil infusion were used for anesthesia maintenance. All bronchoscopy procedures were performed by pediatric surgeons. During rigid bronchoscopy, respiratory support was provided with intermittent positive pressure ventilation using a catheter mount from the side connection of the bronchoscope device. After the procedure was terminated, atropine plus neostigmine (0.03 mg/kg/iv dose) or sugammadex (2-4 mg/kg/iv dose) was administered to reverse neuromuscular blockade. The cases in which neostigmine was used to reverse the neuromuscular blockade caused by rocuronium applied in intraoperative anesthesia were defined as Group N, and the cases in which sugammadex was used as Group S. Duration of anesthesia; the time from the patient's transfer to the operating table until the patient's transfer to the post-operative care unit (PACU), Procedure time; time from the first insertion of the rigid bronchoscope tip into the patient's mouth to removal of the bronchoscope from the vocal cords, recovery time was defined as the time from the end of the rigid bronchoscopy procedure to PACU admission. Cases where there was no organic or inorganic material but only secretion or mucus plug during bronchoscopy were evaluated as 'no foreign body'.

Results

A total of 54 patients were included in the study (30 men, 24 women). The mean age was 4.17±4.7 years in Group N and 2.8±3.8 years in Group S. Statistically, there was no difference in age between the groups ($p=0.546$).

When the application complaints were examined, there was at least one complaint in 47 (87.5%) cases (Table 1). The most common complaint was cough (38.1%) and the least complaint was difficulty in swallowing (3.7%) (Graph 1). There was no complaint in 7 cases (12.5%) (Table 1).

Table 1. Application complaints of the cases.

Additional complaint		n	%
Cough	yes	33	61.1
	no	21	38.9
Respiratory distress	yes	13	24.1
	no	41	75.9
Bruising	yes	22	40.7
	no	32	59.3
Growling	yes	7	13
	no	47	87
Difficult swalling	yes	2	3.7
	no	52	96.3
Total	yes	47	87.5
	no	7	12.5

When Group N and Group S were compared in terms of age, anesthesia duration, duration of procedure, recovery time and hospital stay, it was seen that Group N recovery time mean rank was significantly higher than Group S recovery time mean rank, $z(52)=-5.62$, $p<0.001$.

However, there was no significant difference between the mean rank of the groups in terms of age, duration of anesthesia, duration of procedure and hospital stay ($p>0.05$) (Table 2).

After rigid bronchoscopy, in 41 (75.9%) cases no complications was observed. In group N; in 4 (17.4%) cases bronchospasm, in 4 (17.4%) cases hypoxia was observed. In group S in 2 (6.5%) cases bronchospasm, in 1 (3,2%)

cases hypoxia and in 2 (6,5%) cases laryngospasm was observed. (Table 3).

Table 2. Age, duration of anesthesia, duration of procedure, duration of recovery and duration of hospitalization of the cases using neostigmine and sugammadex.

Variables	Group	n	Mean±SD	Rank av.	Median	IQR(25-75)	*p*
Age(year)	N	23	4.17±4.7	28.89	2	1-9	0.546
	S	31	2.8±3.8	26.47	1	1-2	
Anesthesia	N	23	58.3±21	29.30	50	45-70	0.463
Time(minute)	S	31	53.8±16.5	26.16	50	40-70	
Process	N	23	39.8±16.9	27.04	35	30-50	0.854
Time(minute)	S	31	39.5±15.8	27.84	38	28-50	
Recovery	N	23	16.4±4.2	41.33	15	13-20	**<0.001**
Time(minute)	S	31	10±2	17.24	10	8-12	
Hospital	N	23	2.6±1.1	24.74	2	2-3	0.245
Time(day)	S	31	3±1.3	29.55	3	2-4	

Values are median (25-75 IQR), Mean±SD:mean±standard deviation

Table 3. Complications.

Complication	Group N(n/%)	Group S(n/%)	*p*
Bronchospasm	4(%17.4)	2(%6.5)	0.095
Hypoxia	4(%17.4)	1(%3.2)	
Laryngospasm	0	(%6.5)	
Total	54	100	

Although the complication rate was lower in Group S, there was no significant difference between the groups (p>0.05) (Table 4). Foreign body was found in 41 (75.9%) of the cases. Thirty (55.5%) of the foreign bodies were organic and 11 (20.4%) were inorganic (Table 5).

Table 4. Distribution of complication rates by groups n (%).

Complication	No	Yes	Total	*p*
Group N	15 (65.2)	8 (34.8)	23	0,113
Group S	26(83.9)	5(16.1)	31	
Total	41(75.9)	13(24.1)	54	

Table 5. Nature and localization of foreign bodies.

Nature of the Object	**n (%)**
organic	30 (55.5)
inorganic	11(20.4)
No foreign body	13 (25.1)
Foreign Body Location	
Main Trachea	7 (13)
Left main bronchus	16 (29.6)
Right main bronchus	18 (33.3)
No foreign body	13 (24.1)
Total	54 (100)

There was no foreign body found in 13 (24.1%) patients. It was found in the right main bronchus in 18 (33.3%) cases, in the left main bronchus in 16 (37%) cases, and in the trachea in 7 (13%) cases (Table 5).

Discussion

Tracheobronchial foreign body aspiration in childhood continues to be an important cause of morbidity and mortality.[1] Delays in diagnosis and treatment can cause severe pulmonary damage and fatal complications; so that urgent intervention is required.[9,10] The gold standard method for the diagnosis and treatment of this condition is rigid bronchoscopy.[11-12] Cough, shortness of breath, hoarseness and wheezing in the first period are among the reasons for admission to FBA; obstructive emphysema, lung abscess, atelectasis, empyema, pneumothorax, and bronchiectasis can be seen among the late-term findings.[5,13,14] In our study, we encountered the most common complaints of cough, shortness of breath and bruising. The mean age of patients was 3.3

There was no foreign body found in 13 patients. According to the study of Karaaslan and Yıldız[13] while foreign body was found in 71 patients, no foreign body was found in 29 patients. The extracted foreign bodies were mostly localized in the main bronchus (n=35, 43.3%), followed by the larynx/trachea (n=20, 24.6%) and the left main bronchus (n=16, 19.7%).[13] In our study, it was found to be in the right bronchus in 18 (33.3%) cases, in the left bronchus in 16 (37%) cases, and in the trachea in 7 cases. There was no foreign body in 13 (24.1%) (Table 5).

Neuromuscular blockade is a routine method used worldwide in the management of general anesthesia to facilitate endotracheal intubation and to keep the patient still during surgery. However, even in those with moderate duration of action of neuromuscular blocking agents, the most important risk is postoperative recurarization.[15] Sugammadex at doses of 2.0 mg/kg or higher safely reverses 0.6 mg/kg rocuronium-induced neuromuscular block in a dose-dependent manner, and the sugammadex-rocuronium complex is excreted unchanged by the kidneys.[16] Sugammadex binds rocuronium molecules in a 1:1 ratio without affecting plasma cholinesterase or muscarinic receptors. Muscarinic effects such as miosis, bradycardia, bronchospasm, increased secretions, and nausea-vomiting do not occur from its use.[17] Compared with neostigmine, sugammadex was faster in reversing neuromuscular block, extubated earlier, and had a lower risk of postoperative residual curarization after extubation, in a meta-analysis of 1384 patients from 13 articles by Carron et al.[18]

In a comparison study of sugammadeks and neostigmine it was fonud that the mean recovery and exubation times were shorter in sugammadex and incidence of nausea, vomiting, tachychardia were higher in neostigmine.[19] Li et al.[20] reported that extubation time and length of hospital stay shorter, hospitalization expences were decreased and postoperative atelectasis was less in sugammadex. Won et al.[21] reported that although there was no significant difference in the incidence of adverse events in pediatric patients, sugammadex provided a faster reversal of rocuronium-induced neuromuscular blockade and a shorter extubation time compared to atropine-neostigmine. Mogahed, et al.[22] reported that sugammadex reversed the effect of rocuronium significantly faster than neostigmine. In our study, recovery time was 10 minutes in patients using sugammadex and 16.4 minutes in patients using Neostigmine. Similar to the literature, the recovery time was found to be shorter in the sugammadex group.

In the study of Karaaslan and Yıldız[13] the most common complications among perioperative complications were desaturation and bradycardia. In the study of Korkmaz et al.[23] in which sugammadex and neostigmine were compared in adenotonsilectomy operations, postoperative agitation rates and complication rates were found to be lower in the sugammadex group. In a case series of 331 case of sugammadex in patients under 2 years of age, no adverse effects were reported.[24]

In our study, the most common complications were bronchospasm and desaturation. When complications were compared between the groups, although complications were higher in the neostigmine group, there was no statistical difference. In the review where the mortality rates in foreign body aspiration were analyzed, the mortality rate was found to be between 0-1.06% in 9 studies conducted in Europe, and between 0-1.8% in 22 studies conducted in Asia.[1] No mortality was observed in our study.

Limitations of the study**;** the retrospective nature of the study and the small number of cases constitute the main limitations of our study.

Conclusion

The use of sugammadex in reverse neuromuscular blockade in rigid bronchoscopy has a shorter recovery time and less complication rate than the use of neostigmine.

Ethics Committee Approval

The study was approved by the Non-Invasive Clinical Research Ethics Committee of Adıyaman University with the date of 19.11.2019 and the decision number 2019/8-13. The research has been prepared in accordance with the Declaration of Helsinki Principles.

Author Contributions

Idea, design: M.D., H.Ö.A., M.Ş.M., M.D., M.T., Ç.D.; collection of resources: M.D., H.Ö.A., M.Ş.M., M.D., M.T.; analysis and interpretation of results and literatüre: M.D., H.Ö.A., M.T., Ç.D.; written and critical: M.D., H.Ö.A., M.Ş.M., M.D., M.T., Ç.D.

Conflict of Interest

There is no conflict of interest among the authors.

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Statements

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Özgün Araştırma/Research Article

Prenatal dönemleri boyunca günde bir saat kesintisiz 900 MHz elektromanyetik alan etkisine maruz kalan 75 günlük Sprague Dawley dişi sıçanların böbrek ve mesane dokularının histopatolojik olarak incelenmesi

A histopathological examination of kidney and bladder tissues of 75-day female Sprague Dawley rats exposed to a one-hour continuous 900 MHz electromagnetic field during the prenatal period

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Öz

Amaç: Prenatal dönemde 900 MHz elektromanyetik alan (EMA) maruziyetinin sıçanların postnatal erişkinlik döneminde böbrek ve mesane dokuları üzerine etkileri araştırılmıştır.

Gereç ve Yöntem: 18 adet dişi sıçan; kontrol, Sham ve EMA olarak üç gruba ayrıldı. EMA grubu, prenatal dönem boyunca 1 saat/gün 900 MHz EMA'ya maruz bırakıldı; Sham grubu gebe sıçanlar EMA sistemi kapalı kafeste tutuldu. Kontrol grubu gebe sıçanlara ve postnatal yeni doğanlara uygulama yapılmadı. Deney süresi bitiminde böbrek ve mesane dokuları histopatolojik olarak değerlendirildi.

Bulgular: Kontrol ve Sham gruplarının böbrek ve mesane örneklerinin normal morfolojide olduğu, EMA grubunda böbrekte tübüler ve glomerular hasar, bowman boşluğunda dilatasyon; mesane ürotelyum epitelinde dejenerasyon izlendi.

Sonuç: Prenatal dönemde 900 MHz EMA maruziyeti, erişkinlikte yavru sıçanların böbrek ve mesane dokusunda ciddi histopatolojik değişimlerin olabileceği kanaatindeyiz.

Anahtar kelimeler: Böbrek; Mesane; Elektromanyetik Alan; Histopatoloji; Sıçan.

Abstract

Aim: The effects on kidney and bladder tissues in postnatal adulthood in rats exposed to 900 MHz electromagnetic field (EMF) in the prenatal period were investigated

Materials and Methods: Eighteen female rats; were divided into three groups, control, sham and EMF. The EMF group was exposed to 900 MHz EMF for 1 hour/day during the prenatal period. Sham group pregnant rats were kept in the EMF system closed cage. No procedure was performed on the control pregnant group rats and postnatal newborns. At the end of the experimental period, kidney and bladder tissues were evaluated histopathologically.

Results: Kidney and bladder specimens from the control and sham groups exhibited a normal morphological structure. Tubular and glomerular damage, dilatation in Bowman's space in kidney tissue and degeneration of the urothelial epithelium in the bladder were observed in the EMF group.

Conclusion: We think that exposure to 900 MHz EMF during the prenatal period may cause severe histopathological changes in kidney and bladder tissue in adulthood.

Keywords: Kidney; Bladder; Electromagnetic field; Adulthood; Histopathology; Rat.

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Giriş

Cep telefonları da dahil olmak üzere gelişen telekomünikasyon teknolojileri, insanları ciddi bir elektrik alan şiddetine maruz bırakmakta ve gün geçtikçe korumasız hale getirmektedir. Özellikle 1990'dan itibaren 900 MHz ve 1800 MHz bandında çalışan cep telefonu baz istasyonlarının yaygın kullanımı sonucu elektromanteyik alanın (EMA) insan sağlığı üzerine muhtemel etkileri büyük bir endişe kaynağı haline gelmiştir.[1,2] 2011 yılında, Dünya Sağlık Örgütü, Kanser Araştırmaları Uluslararası Ajansı, cep telefonu ve diğer kablosuz cihazlardan gelen elektromanyetik radyasyonun, dikloro difenil trikloroethan (DDT), benzinli egzoz, yanan kömür, kuru temizleme sıvıları ve jet yakıtları gibi insanlar için Grup 2B "muhtemel kanserojen" sınıfına dahil olduğunu belirtmiştir.[3] Cep telefonu şirketleri tarafından belirli aralıklar ile ürünlerinin güvenliği konusunda açıklamalar yapılsa da, cep telefonlarının biyolojik sistemler üzerindeki olumsuz etkilerini gösteren çalışmalar gün geçtikçe artmakta ve endişeleri devamlı kılmaktadır.[4-6]

Cep telefonu kaynaklı EMA maruziyetinin biyolojik etkileri, maruziyet süresi, etkilenen organın maruziyet durumu, EMA kaynağından ne kadar uzaklıkta olduğu ve doku çeşidi gibi faktörlere göre değişkenlik göstermektedir.[7,8] EMA, telefonun taşındığı yere göre özellikle böbrek ve karaciğer gibi çeşitli organlar tarafından absorbe edilir. Böbrekler, vücut dışına atılan suyun ve bunun içindeki eriyik madde miktarının düzenlenmesine, metabolizma artıklarının atılmasına, vücut sıvı hacminin kontrolüne, D vitamini, renin, prostaglandin ve eritropoietin gibi hormonların üretilmesine katkı sağlayarak insan vücudunda homeostazisin devamlılığında önemli rol oynar.[9,10] Yapılan çalışmalarda çoğunlukla pantolon kemerlerinde taşınan ve 900 MHz'de çalışan cep telefonları tarafından yayılan radyasyonun diğer organlara oranla çoğunlukla böbrekler tarafından absorbe edildiği,[11] ayrıca radyasyon hassasiyeti yüksek olan bir organ olduğu bildirilmiştir.[12] Koca ve ark.'nın yapmış olduğu bir çalışmada cep telefonlarından yayılan EMA'nın böbrek dokusunda glomerul hasarı, Bowman kapsülünde dilatasyon ve bozulmalar, tübüler hasar ve inflamatuar hücre infiltrasyonuna neden olduğu belirtilmiştir.[11] Günümüzde mesane hastalıkları gün geçtikçe artmakta ve bu hastalıklar bireylerin yaşam kalitesini olumsuz şekilde etkilemektedir. Bu hastalıkların etiyolojisi hala tam olarak bilinmemekle birlikte, EMA ve mesane hasarı arasındaki ilişki araştırılması gereken önemli konulardan biridir.

Bu çalışmada anne karnında prenatal dönem boyunca (21 gün) günde 1 saat 900 MHz EMA etkisine maruz kalan dişi sıçanların, erişkinlik döneminde (postnatal 75. gün) böbrek ve mesane dokusundaki olası etkileri histopatolojik parametreler kullanılarak araştırılmıştır.

Gereç ve Yöntem

Araştırmanın tipi

Bu çalışma özgün araştırma tipindedir.

Araştırmanın evreni ve örneklemi

Çalışmaya Karadeniz Teknik Üniversitesi Cerrahi Uygulama ve Araştırma Merkezi'nden (KTÜCAM) temin edilen Spraque Dawley cinsi dişi sıçanlar dahil edildi. Tüm sıçanlar deney süresince, 22±2 ^{0}C sıcaklık, %50±10 nem ve 12'şer saatlik aydınlık kontrollü standart laboratuar ortamında muhafaza edildi. Deney süresi boyunca tüm sıçanlara standart laboratuar hayvan yemi ve ad libitum su verildi.

Dişi sıçanların elde edilebilmesi için, deneyin başlangıcında 180-250 g ağırlığında ve iki düzenli siklus gösteren Spraque Dawley tipi dişi sıçanlar ile erişkin erkek sıçanlar çiftleşmeye bırakıldı. Çiftleşmenin ertesi gününde vaginal smear örneklerinde sperm görülen dişi sıçan kabul edilerek (gebeliğin 0. günü) çalışmaya dahil edildi. Gebe olan dişi sıçanlar 3 gruba ayrıldı; kontrol grubu gebe sıçanlar (n:3), herhangi bir uygulamaya maruz bırakılmadı. Sham grubu gebe sıçanlar (n:3), deney süresi boyunca (gebeliğin 0-21. günleri), her gün 1 saat boyunca EMA sistemi kapalı konumda iken EMA kafesi içerisine alındı. EMA grubu gebe sıçanlar (n:3), deney süresi boyunca (0-21. günler), her gün 1 saat süre ile 900 MHz'lik EMA etkisine maruz

bırakıldı. Gebelik süresinin bitiminde elde edilen yeni doğan sıçanlara herhangi bir uygulama yapılmadı ve postnatal 21. günde ayrı kafeslere alınarak yeni gruplar oluşturuldu ve çalışmaya devam edildi. Yeni gruplar; Kontrol grubu gebe sıçanlardan elde edilen yavru dişi sıçanlar (KG, n=6), Sham grubu gebe sıçanlardan elde edilen yavru dişi sıçanlar (SG, n=6), EMA grubu gebe sıçanlardan elde edilen yavru dişi sıçanlar (EMAG, n=6) olarak belirlendi. Oluşturulan yeni doğan dişi sıçan gruplarına ise deney süresinin bitimi olan 75. güne kadar herhangi bir uygulama yapılmadı.

Veri toplama araçları

Deney süresince Sham ve EMA uygulamaları, KTÜCAM'da bulunan uygulama odasında gerçekleştirildi. Deneyde kullanılan EMA düzeneği, Odacı ve ark.'nın 900 MHz'lik elektromanyetik alan frekans bandını baz aldığı çalışmalarından modifiye edilerek hazırlandı.[13,14] Düzeneğin parçalarından biri olan ve pleksiglass malzemeden yapılan kafes ise sıçanların serbest hareket edebilmesine engel olmayacak şekilde tasarlandı (40,5 cm x 31,5 cm x 40,5 cm). Sham ve EMA uygulamalarına başlanmadan önce, sıçanlar kafesin içindeyken ve kafes boş durumdayken elektrik alanının dağılımını tespit etmek amacıyla EMA ölçer cihazıyla (C.A 43 Isotropic Electrical Field Intensity Meter, Chauvin Arnoux Group, Paris, France) ölçümler alındı. Sıçanlar kafes içerisindeyken ölçülen başlangıç ve bitiş EMA değerlerinin ortalamaları ile elde edilen verilere göre sıçanların deney süresi boyunca 7.9 V/m'lik elektrik alan şiddetine ve 0.16 W/m^2'lik güç yoğunluğuna maruz kaldığı belirlendi.

Deney süresinin bitiminde (75. gün), tüm gruplara ait dişi sıçanlar servikal dislokasyon yöntemi ile sakrifiye edildi. Ardından abdominal orta hat kesisi yapılarak böbrek ve mesane dokusu çevre dokulardan dikkatlice ayrılarak çıkartıldı ve histolojik değerlendirmeler için %10'luk formalin çözeltisinde tespit edildi. Akabinde rutin histolojik doku takip aşamalarından geçirildi ve parafine gömülerek blok haline getirildi. Tam otomatik mikrotom (Leica RM 2255, Leica Instruments, Nussloch, Germany) yardımı ile parafin bloklardan elde edilen 5 µm'lik doku kesitleri tam otomatik doku boyama cihazında (LEICA auto stainer XL, Minnesota, USA) Hematoksilen-Eozin (H&E) ile boyandı. Ayrıca Masson-Trichrome (Masson Trichrome Stain Kit-Methyl/Aniline Blue, Atom Scientific LTD Manchester; CAS: RRSK20-100) ve Periyodik asit–Schiff (PAS) boyaması ile histopatolojik değerlendirmeler yapıldı.

Mikroskobik incelemeler için böbrek dokusunda Bowman kapsülü hasarı, vasküler konjesyon, ödem, glomerul hasarı ve tübüler hasar skorlaması yapıldı. Mesane dokusunda ise ürotelyum hasarı semikantitatif olarak değerlendirildi. Histopatolojik skorlama sistemi için her bir örnekte on farklı alanda; yok (0), hafif (+), orta (++) veya şiddetli (+++) olarak puanlama yapıldı.[15] Dokulara ait tüm histopatolojik analizler, KTÜ Tıp Fakültesi Histoloji ve Embriyoloji Anabilim Dalı'nda bulunan ışık mikroskobunda (Olympus BX 51; Olympus Optical Co, Ltd, Tokyo, Japan) Analysis 5 Research software programı (Olympus Soft Imaging Solution, Germany) kullanılarak yapıldı ve fotoğraflandı.

Verilerin analizi

Verilerin istatistiksel analizi SPSS 25.0 paket programı (IBM SPSS Inc, Chicago, IL, ABD) kullanılarak yapıldı. Sonuçlar ortalama±standart sapma olarak ifade edildi. Gruplar arası tek yönlü çoklu karşılaştırmalarda Kruskal Wallis H varyans analizi ve grup içi post-hoc ikili karşılaştırmalarda ise Bonferroni testi ve düzeltmesi kullanıldı. $p<0.05$ istatistiksel olarak anlamlı kabul edildi.

Araştırmanın etik boyutu

Yapılan çalışmaya Karadeniz Teknik Üniversitesi Hayvan Deneyleri Yerel Etik Kurul onayı alınarak başlandı (Protokol No:2016/52, Karar No:5) ve bu araştırma Helsinki Deklarasyonunda belirtilen ilkelere uyularak yürütüldü.

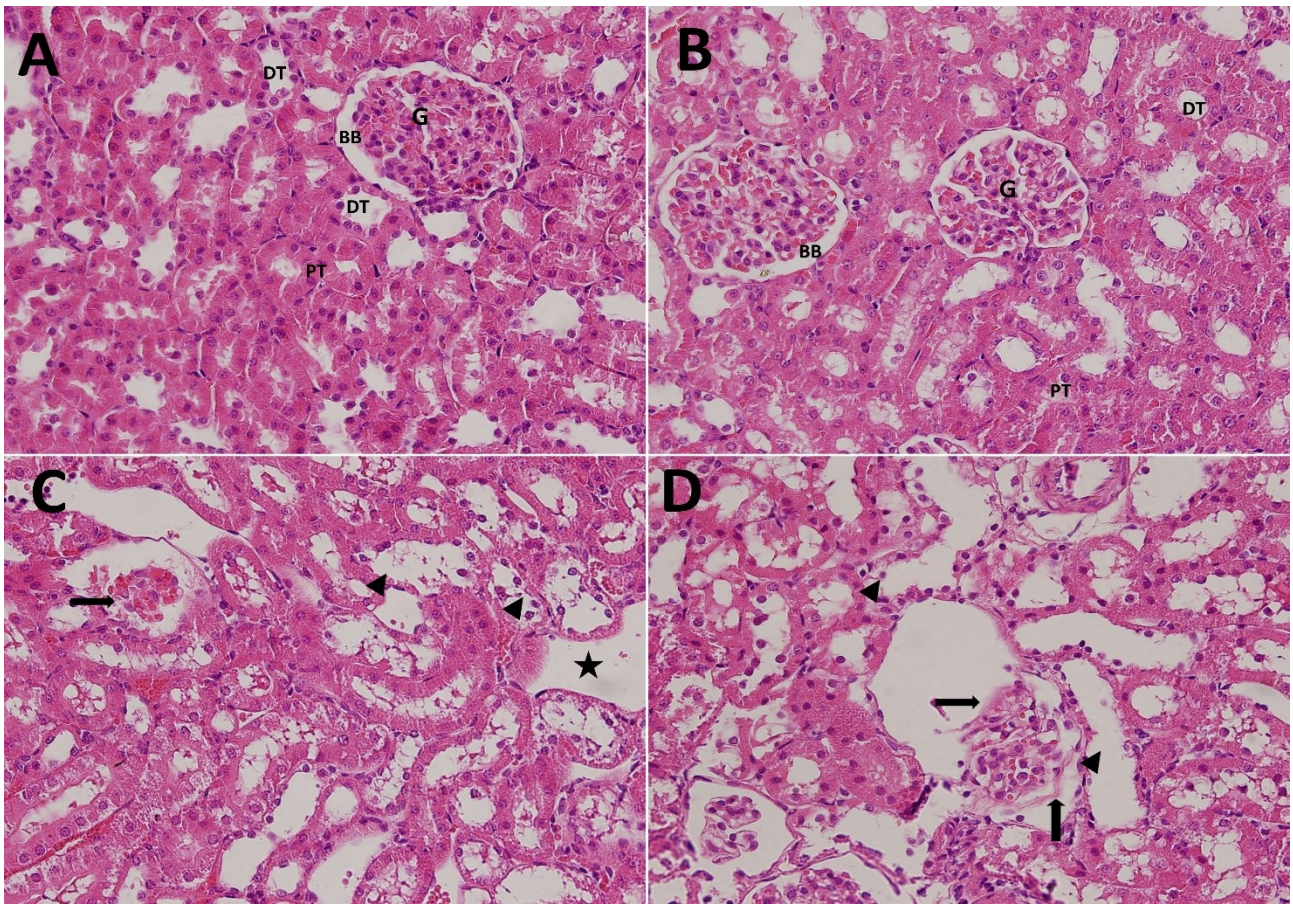
Bulgular

Histopatolojik değerlendirmelere göre H&E ve PAS ile boyanan kesitlerde; KG ve SG'ye ait sıçanların böbrek dokuları normal

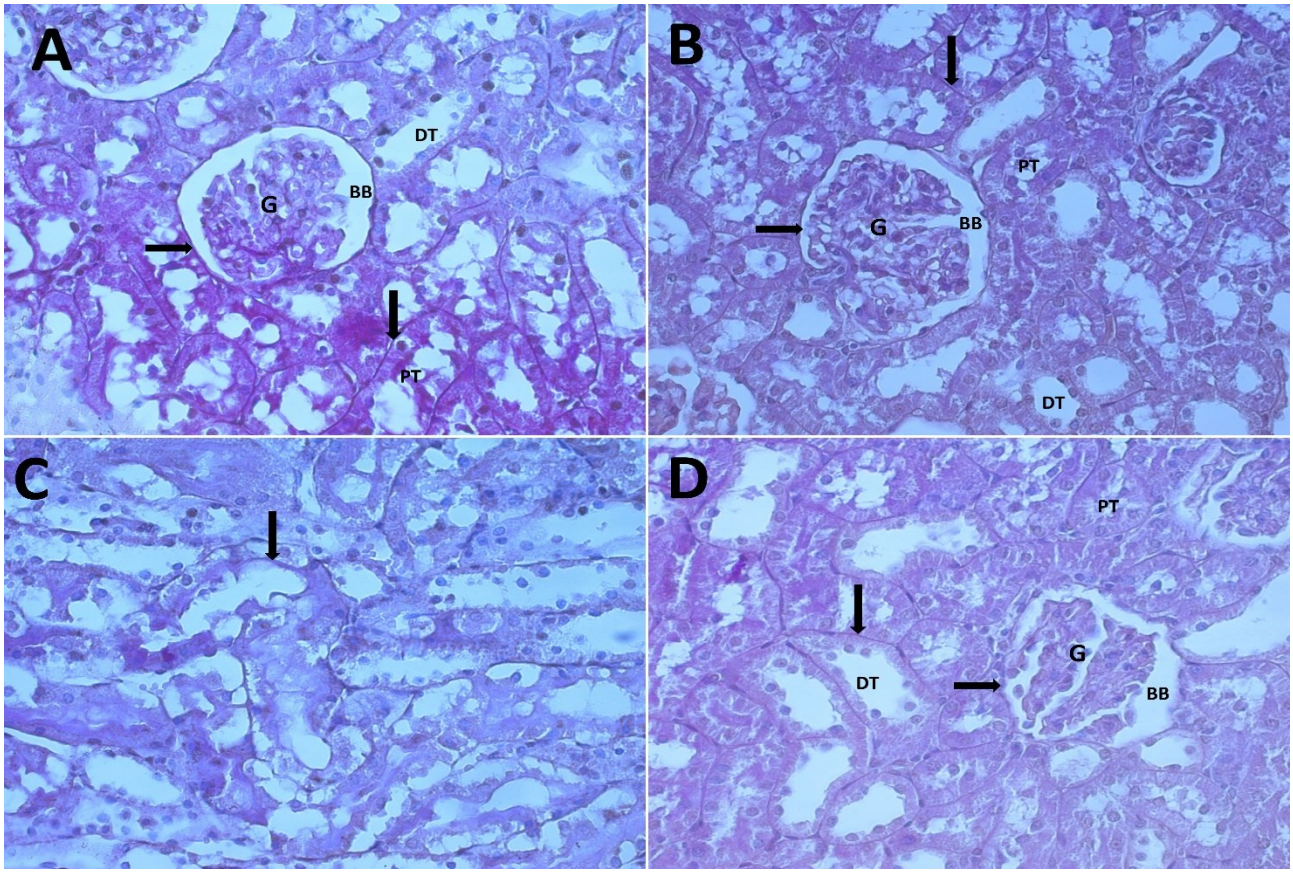
histolojik yapıda olup herhangi bir patoloji gözlenmedi (Şekil 1A, B; Şekil 2C, D). EMAG'a ait böbrek dokusunda ise distal ve proksimal tübüllerde dilatasyon ve vakuolizasyon ile birlikte, tübül epitel hücrelerinde kayıp, büzülmüş glomerul, dilate Bowman boşluğu, Bowman memran dejenerasyonu gibi histopatolojik bulgular izlendi (Şekil 1C, D; Şekil 2C, D). Histopatolojik skorlamada değerlendirilen Bowman kapsül hasarı, ödem, tübüler ve glomerular hasarın EMAG'da KG ve SG'ye göre istatistiksel olarak anlamlı derecede arttığı görüldü (p<0.05), (Tablo 1). Masson Trikrom ve H&E ile boyanan KG ve SG'ye ait mesane dokusu kesitlerinin morfolojik değerlendirmelerinde ürotelyum mukozası, kas tabakası ve adventisyal katmanlarının normal morfolojik yapıda olduğu gözlendi (Şekil 3A, B; Şekil 4A, B, Şekil 4C, D). EMAG'da ise transizyonel epitelyumda dejenerasyon ve stromal düzensizlik izlendi (Şekil 3C, D; Şekil 4E, F). Histopatolojik skorlamada değerlendirilen ürotelyum hasarının EMAG'da, KG ve SG ile karşılaştırıldığında istatistiksel olarak anlamlı derecede arttığı görüldü (p<0.05) (Tablo 1).

Tartışma

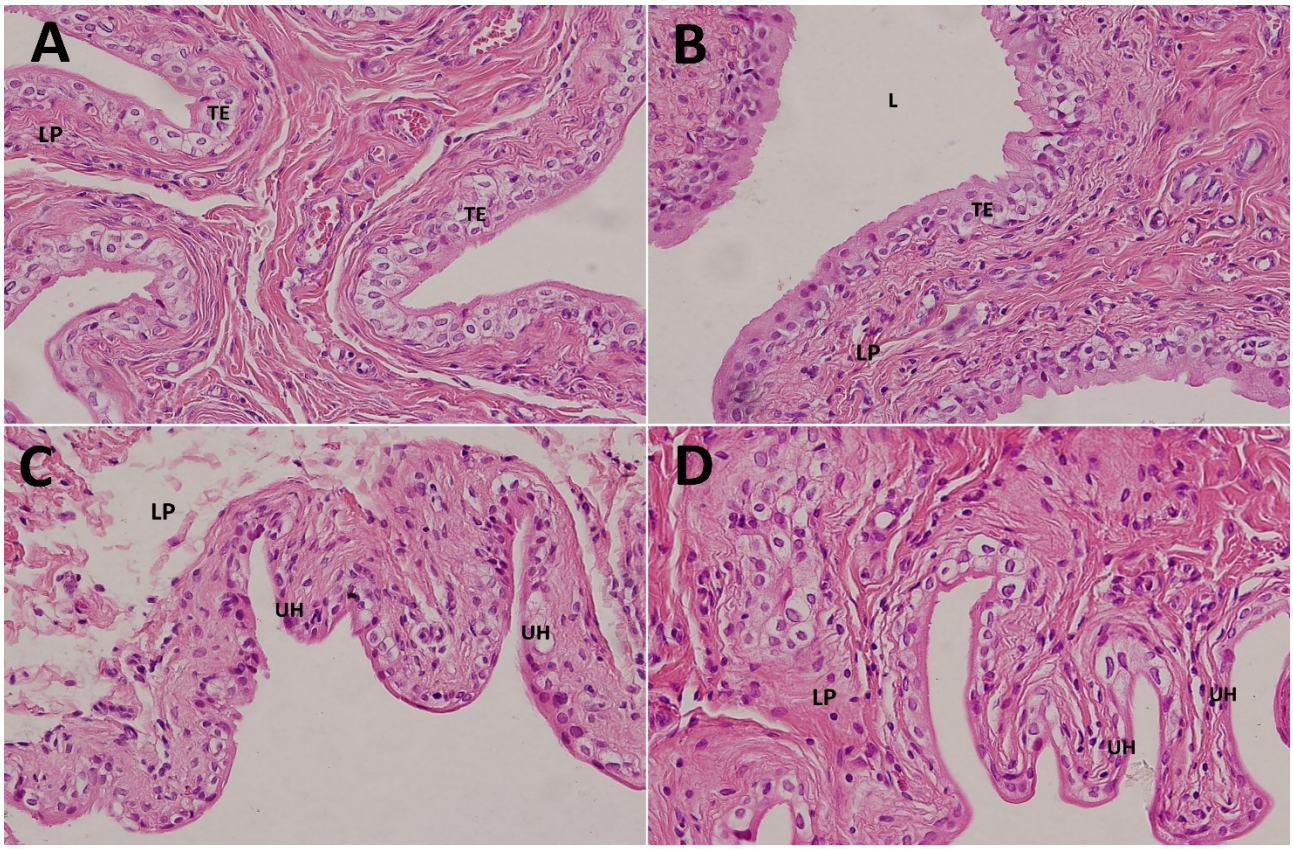
EMA maruziyetinin çeşitli organ ve dokulardaki etkilerini araştıran pek çok çalışma mevcuttur.[7,14,16] Böbrek ve mesane dokusu açısından incelenen literatür bilgiler ışığında prenatal dönem boyunca günde 1 saat EMA etkisinin, doğan dişi yavruların erişkinlik dönemdeki dokularında meydana gelebilecek muhtemel zararlı ektilerinin incelendiği bir çalışmaya rastlanılmamıştır. Ayrıca Türkiye'de GSM 900 sisteminin daha yaygın kullanılmasından dolayı bu çalışmada 900 MHz'lik EMA uygulaması tercih edilmiştir. Çalışmamızda, gebelik boyunca kısıtlı bir şekilde cep telefonu kullanılsa dahi, fötusa ait böbrek ve mesane dokusunun doğum sonrası erişkinlik döneminde bu maruziyetten olumlu/olumsuz olarak hangi düzeyde etkilenmiş olabileceğinin incelenmesi amaçlanmıştır.



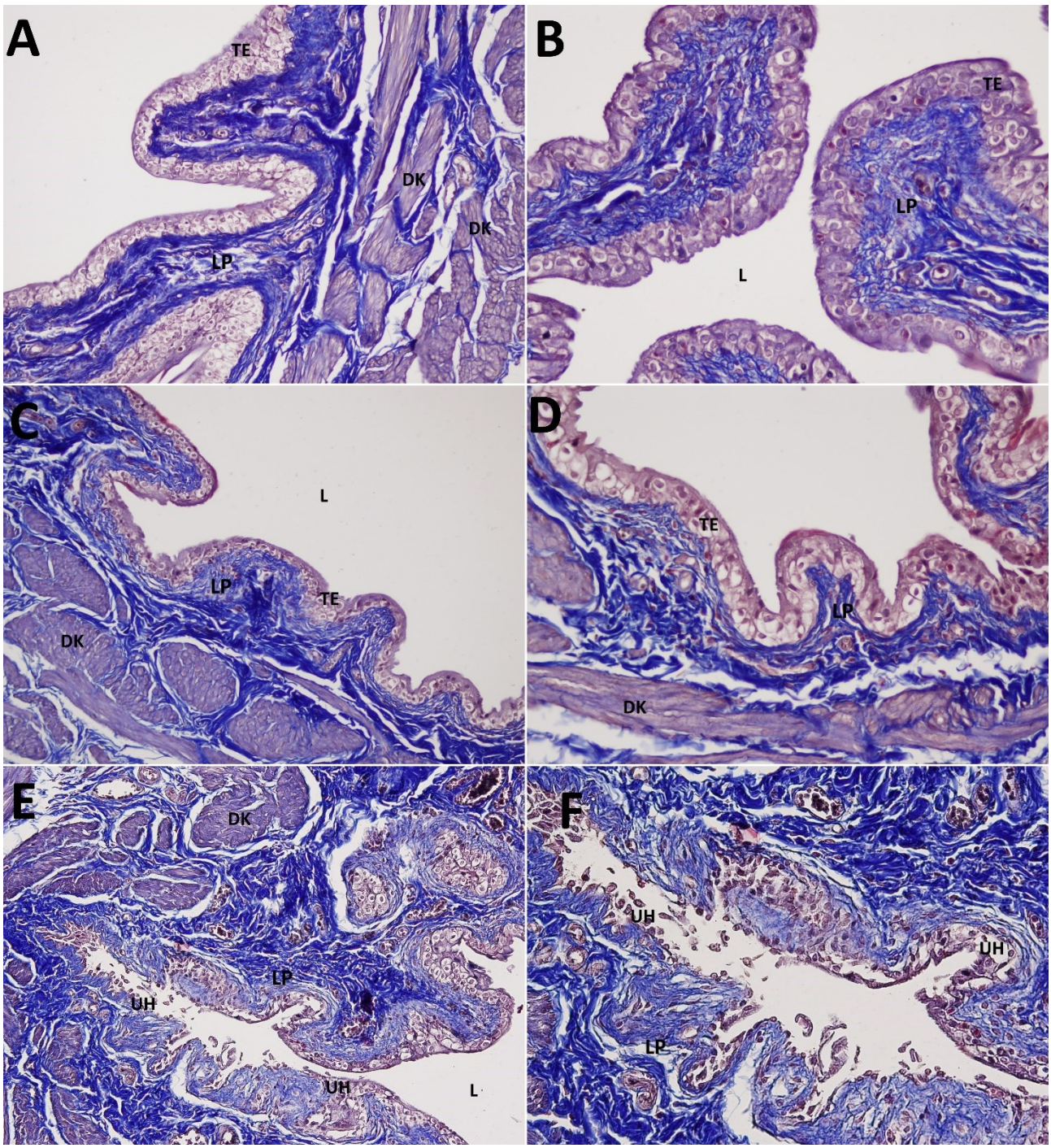
Şekil 1. Kontrol (A), sham (B) ve elektromanyetik alan (C, D) grupları için böbrek dokusunun ışık mikroskobik mikrografları. Tübüler dilatasyon (yıldız), tübüler dejenerasyon (ok başı), glomerul hasarı (sağ ok), bowman boşluğu hasarı (yukarı ok). DT, Distal Tübül; PT, Proksimal Tübül; G, Glomerul; BB, Bowman Boşluğu, (H&E, 40X).



Şekil 2. Her bir grup için böbrek dokusunun periyodik Asit–Schiff (PAS) ile boyanmış fotomikrografları. Kontrol Grubu (A), sham grubu (B) ve elektromanyetik alan grubu (C, D). Tübüler bazal membran (aşağı ok), Bowman membranı (sağ ok). DT, Distal Tübül; PT, Proksimal Tübül; G, Glomerul; BB, Bowman Boşluğu, (PAS, 40X).



Şekil 3. Kontrol (A), sham (B) ve elektromanyetik alan (C, D) grupları için mesane dokusunun ışık mikroskobik mikrografları. TE, Transisyonel Epitel; LP, Lamina Propria; UH, Urotelyum Hasarı; L, Lümen, (H&E, 40X).



Şekil 4. Her bir grup için mesane dokusunun Masson trikrom ile boyanmış fotomikrografları. Kontrol (A, B), sham (C, D) ve elektromanyetik alan (E, F). TE, Transisyonel Epitel; LP, Lamina Propria; DK, Düz Kas; UH, Urotelyum Hasarı; L, Lümen, (Masson trikrom, 20X, 40X).

Tablo 1. Deney gruplarına ait histopatolojik skorlama.

	Parametreler					
	Böbrek (Ortalama±Standart Sapma)					**Mesane (Ortalama±Standart Sapma)**
Gruplar	Tübüler Hasar	Glomerular Hasar	Bowman Kapsül Hasarı	Ödem	Vasküler Konjesyon	Ürotelyum Hasarı
KG (n:6)	0,1 ±0,06	0,08±0,07	0,00±0,00	0,00±0,00	0,00±0,00	0,05±0,05
SG (n:6)	0,3±0,1	0,1±0,08	0,1±0,08	0,2±0,08	0,1±0,06	0,08±0,07
EMAG (n:6)	2,01±0,13[a]	1±0,00[a,b]	1±0,06[a]	0,8±0,21[a]	1,2±0,28[a]	1,36±0,35[a,b]

KG; Kontrol Grubu, SG; Sham Grubu, EMAG; Elektromanyetik Alan Grubu

[a] ; Kontrol grubu ile karşılaştırıldığında $p<0.05$ [b] ; Sham Grubu ile Karşılaştırıldığında $p<0.05$

Dokulardaki EMA absorpsiyon hızının, organların dielektrik özellikleri ve iletkenliği ile doğrudan ilişkili olduğu bilinmektedir. Hamilelik sürecinde artan su ihtiyacı ve alımı nedeniyle, bu süreçte tüm vücudun elektriksel iletkenliği artmakta bu durum gebe kadınları ve fetüsü EMA'ya karşı daha duyarlı hale getirmektedir.[17] Özorak ve ark., tarafından prenatal dönem ile birlikte 6 hafta boyunca cep telefonu kaynaklı EMA etkisi altında büyüyen sıçanların böbrek dokusunda EMA'nın oksidatif hasara neden olabileceği ifade edilmiştir.[18] Böbrekler çok yüksek metabolik aktivite ve kan akışı (oksijen) sergiler. 1 dakikada vücut kanının %20'sini filtreler ve bu nedenle zararlı maddelerden etkilenme riski yüksektir. Yapılan çalışmalarda çoğunlukla pantolon kemerlerinde taşınan ve 900 MHz'de çalışan cep telefonları tarafından yayılan radyasyonun diğer organlara oranla çoğunlukla böbrekler tarafından absorbe edildiği,[11] ayrıca radyasyon hassasiyeti yüksek olan bir organ olduğu bildirilmiştir.[12] Farklı dozlardaki EMA'nın fötal ve postnatal maruziyetinin böbreğin fonksiyonel ve morfolojik özellikleri üzerindeki etkisini araştıran deneysel bir çalışmada, böbrek içi dolaşımda belirgin bir hasar ile birlikte hemodinamik stabilite bozuklukları, stromal ödem, tübüler epitel distrofisi ve interstisyel inflamasyona neden olan periglomerüler skleroz gözlenmiştir. Ayrıca tübüler tutulum da idrarda N-asetil-β-D-glucosaminidaz seviyesinde belirgin bir yükselme olduğu belirtilmiştir.[29]

Odacı ve ark.'nın gebeliğin 13.-21. günleri arasında uygulanan 900 MHz EMA'nın yavru sıçanlar üzerine postnatal 21. gündeki etkilerini inceledikleri çalışmalarında tübül epitelinde dejenerasyon ve primitif tübüllerde kistik yapılar olduğu belirtilmiştir.[13] Ayrıca Bedir ve ark.'nın yaptığı bir çalışmada prenatal dönemde cep telefonu kaynaklı EMA maruziyetinin böbrek dokusunda orta derecede histopatolojik hasara neden olduğu ve postnatal gelişimde bebeklerde böbrek hasarı görülebileceği vurgulanmıştır.[15] Ulubay ve ark.'nın prenatal dönem boyunca günde 1 saat EMA maruziyetinin portnatal 28. gündeki etkilerini stereolojik yöntemler kullanarak inceledikleri çalışmalarında total glomerul sayısında ve kortex-medulla hacminde azalma olduğunu belirtmişlerdir.[20] Koca ve ark.'nın yapmış olduğu 20 gün boyunca günlük 8 saatlik cep telefonu kullanımının araştırıldığı ışık ve elektron mikroskopik bir çalışmada, cep telefonlarından yayılan 900 MHz EMA'nın böbrek dokusunda glomerul hasarı, Bowman kapsülünde dilatasyon ve bozulma, tübüler hasar ve inflamatuar hücre infiltrasyonuna neden olduğu belirtilmiştir. Ayıca elektron mikroskopik incelemelerde kapiller endotelinde düzensizlikler, bazal membranda kalınlaşma ve tübüller arası bağlantılarda hasar olduğu bildirilmiştir. Türedi ve ark.[21] ise çalışmalarında, adolesan dönemde (21.-60. gün) 900 MHz EMA etkisine maruz kalan sıçanların böbrek dokusunda ciddi derecede glomerular dejenerasyon ve yaygın tübüler hasar meydana geldiğini rapor etmişlerdir. Ayrıca TEM değerlendirmesinde, glomerular dejenerasyon, lamina rara interna ve externa kaybı, pedisel dejenerasyonu ile birlikte Bowman kapsülünde daralma izlendiği ifade edilmiştir.[21] Belirtilen tüm çalışmalarda 900 MHz EMA etkisinin farklı gelişim dönemlerindeki etkileri incelenmiştir. Bizim çalışmamızda ise prenatal dönemdeki EMA maruziyetinin yavru dişi sıçanların böbrek ve mesane dokusunda erişkinlik döneminin 75. gündeki etkileri incelenmiştir. Elde edilen bulgularda Bowman kapsülünde ayrılma ile birlikte glomerul dejenerasyonu, distal ve proksimal tübül dejenerasyonu ve tübüler dilatasyonda belirgin derecede artış izlenmiştir. Böbrekte renal tübüler bozukluklarda (akut ve kronik) tübül hasarı önemli bir rol oynamaktadır ve bu hasarın ileri derecedeki ciddiyetini gösteren en önemli belirteç ise glomerul hasarıdır.[11,21] Elde edilen bulgular diğer belirtilen tüm çalışmaları destekler nitelikte olup incelenen literatür bilgiler ışığında farklı gelişim dönemlerinde ve farklı maruziyet sürelerinde EMA etkisinin böbrek dokusunda ciddi histopatolojik değişikliklere neden olduğu söylenebilir.

Mesane içi kimyasal ajanlar ve fizyolojik stres gibi uyarıcılar tarafından oluşturulan deneysel mesane yaralanması modellerinde, glikozaminoglikanların, ürotelyumdaki gap

junctionların ve mast hücre aktivasyonunun önemi nöroimmünendokrin yol ile gösterilmiştir.[22,23] Mesane ürotelyum yapısında meydana gelen bir hasar vazodilatasyonda artışa, bağışıklık maddelerinin biriktirilmesine ve infiltrasyonuna neden olur. Böylece inflamatuar mediatörlerin aşırı salınımı ile birlikte mesane eritemli şişme ve kanama meydana gelir. Mesane duvarındaki düz kas tabakasının disfonksiyonel patolojisi, fibrotik bağ dokusunda artış ve detrusor düz kasında oluşan hiperplazi ya da hipertrofinin bir sonucu olarak mesane duvarının kalınlaşmasıyla sonuçlanır. Bu duruma mesane uyum sağlayamaz ve kas tabakasında patolojik hasar gelişir.[21,24,25] Bizim çalışmamızda EMA grubunda ürotelyum epitelinde dökülmeler ile birlikte bazı ürotelyal hücrelerde dilatasyon, epitel altı lamina propria bölgesinde ayrılmalar gözlendi ve bu bulguların yapılan histopatolojik skorlamada istatistiksel açıdan anlamlı olduğu görüldü. Band ve ark.'nın mesane kanseri görülme oranını araştırdıkları bir vaka-kontrol çalışmasında, elektromanyetik alana maruz kalan kişilerin mesane kanseri olma ihtimalinin yüksek olduğu bildirilmiştir.[26] Gürbüz ve ark. mesane hücrelerinde 1800 MHz GSM modülasyonlu radyo frekanslı radyasyonun (RFR) genotoksik etkisi araştırdıkları çalışmalarında exfoliate mesane hücresi görülme oranının kontrol grubuna göre artış göstermiş olsa da anlamlı bir farklılık olmadığını bildirmişlerdir.[27] Türedi ve ark.'nın 900 MHz EMA maruziyetinin adolesan dönemdeki etkilerini araştırdıkları çalışmada, mesane dokusunda ürotelyumun epitelyal hasarı açısından önemli bulgular elde etmişlerdir.[21] Bununla birlikte incelenen literatür bilgilere göre prenatal dönemde 900 MHz EMA maruziyetinin postnatal erişkin (75. gün) sıçan mesane dokusu üzerinde muhtemel hasar oluşumunu araştıran herhangi bir çalışmaya rastlanmamıştır. Yapılan çalışmalar genellikle radyoterapi tedavisinin akut ve kronik etkilerinin incelenmesine yöneliktir. Bu yönüyle çalışmamız prenatal dönemde cep telefonlarından yayılan 900 MHz EMA etkisine maruziyetin postnatal erişkin dönemde mesane dokusu üzerinde hasar oluşturabileceğini göstermesi yönünden özgün bir çalışma olup pek çok araştırma için referans olma niteliğindedir.

Sonuç

Prenatal dönem boyunca 900 MHz EMA etkisine maruz kalan yavru sıçanların erişkin dönemde böbrek ve mesane dokusunda ciddi histopatolojik değişimlerin olabileceği kanaatindeyiz.

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Fikir, tasarı ve dizayn, veri toplama, analiz ve yorum, eleştirel inceleme; ST, HH, EO*, HÇ, literatür tarama ve yazım; ST. *; EO vefat etmiştir.

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Dış bağımsız.

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Özgün Araştırma/Research Article

Bir ağır araç bakım ve onarım fabrikasında çalışan işçilerin kas iskelet sistemi rahatsızlıklarının ve analjezik kullanımlarının değerlendirilmesi

Evaluation musculoskeletal disorders and analgesic use of workers working in a heavy vehicle maintenance and repair factory

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Öz

Amaç: Bu çalışma bir askeri ağır araç bakım ve onarım fabrikasında çalışan işçilerin kas iskelet sistemi rahatsızlıklarını ve analjezik kullanımlarını belirlemek amacıyla planlanmıştır.

Gereç ve Yöntem: Kesitsel tasarımda olan çalışma Aralık 2020-Mayıs 2021 tarihleri arasında 269 işçi ile yapılmıştır. Verilerin toplanmasında Tanıtıcı Bilgi Formu ve Genişletilmiş Nordic Kas İskelet Sistemi Anketi kullanılmıştır.

Bulgular: İşçilerin son 12 aydır %47,5'inin vücudunun en az bir bölgesinde kas iskelet sistemine yönelik rahatsızlık yaşadığı, %43,5'inin kas iskelet sisteminde yaşadığı ağrıya bağlı olarak analjezik kullandığı ve ilaç kullananların %58,9'unun reçetesiz ilaç kullandığı belirlenmiştir. Kronik hastalık varlığı ve sigara kullanımı, yaşanan kas iskelet sistemi rahatsızlıklarını artırmıştır (p<0,05).

Sonuç: Bu sonuçlar doğrultusunda; iş yeri hekim ve hemşirelerinin işçileri çalışma ortamlarında kas ve iskelet sistemi rahatsızlıkları açısından düzenli olarak değerlendirmesi önerilmektedir.

Anahtar Kelimeler: Kas İskelet Sistemi Rahatsızlıkları; İşçi; Analjezik

Abstract

Aim: This study was planned to determine musculoskeletal disorders and analgesic use of workers working in a military heavy vehicle maintenance and repair factory.

Materials and Methods: The study, which was in cross-sectional design, was conducted between December 2020 and May 2021 with 269 workers. Introductory Information Form and Extended Nordic Musculoskeletal Questionnaire were used to collect data.

Results: It was determined that 47.5% of the workers had a musculoskeletal disorder in at least one part of their body for the last 12 months, 43.5% used analgesics due to the pain they experienced in the musculoskeletal system, and 58.9% of those who used drugs used over-the-counter drugs. Presence of chronic disease and smoking increased musculoskeletal disorders (p<0.05).

Conclusion: In line with these results; It is recommended that workplace physicians and nurses regularly evaluate workers in terms of musculoskeletal disorders in their working environments.

Keywords: Musculoskeletal Disorder; Worker; Analgesic

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Giriş

Kas iskelet sistemi rahatsızlıkları, kemikler, kaslar, tendonlar, bağlar, sinirler, omurlar ve eklemlerde oluşan ağrı ve rahatsızlık gibi çeşitli semptomlarla karekterize enflamatuvar ve dejeneratif durumları kapsamaktadır.[1,2] Kas iskelet sistemi rahatsızlıkları çok faktörlü bir etiyolojiye sahiptir ve bireysel faktörlerin yanı sıra çalışma ortamındaki hem fiziksel hem de psikososyal faktörler etkileyebilmektedir. Özellikle kaldırma, çekme, itme, ayakta durma, yürüme, bükme gibi zorlayıcı ve uygunsuz vücut pozisyonlarında uzun süre boyunca olmasını gerektiren görevler mesleki kas iskelet sistemi rahatsızlıklarını artırmaktadır.[2-5] Araç kullanımı, üretim/imalat, genel işçilik, bakım, onarım ve temizlik alanlarında çalışan işçiler mesleki kas iskelet sistemi rahatsızlıkları açısından en yüksek risk altındadır.[6]

Küresel olarak, meslekle ilişkili kas iskelet sistemi rahatsızlıkları işçi şikayetlerinin en önde gelen nedenleri arasındadır.[7] Çeşitli endüstri alanlarında çalışan işçilerde kas iskelet sistemi rahatsızlıkları prevalansı %41,5-97,3 arasında değişiklik göstermektedir.[8-10] Mesleki kas iskelet sistemi rahatsızlıkları yaygınlık oranları arasında araç onarım işi en yüksek riskli meslekler arasındadır. Araç onarım işçilerinde mesleki kas iskelet sistemi rahatsızlıkları %58 ile %92 arasında bir yaygınlık göstermektedir.[11,12]

Kas iskelet sistemi rahatsızlıkları, çalışanların sağlığını ve yaşam kalitesini etkilemektedir. Tanı ve tedaviye yönelik doğrudan maliyetlerin yanı sıra işe devamsızlık, çalışma süresi kaybı ve uzman personel kaybı gibi nedenlerle de birçok dolaylı maliyete yol açarak sosyoekonomik yük getirmektedir.[13] Son dönemlerde kas iskelet sistemi rahatsızlıkları sıklığında ve maliyetinde görülen bu belirgin artış; çalışanın, işverenin, hükümetin, sağlık hizmet sistemlerinin dikkatini bu konuya çekmiştir. Risk etkenlerini önlemeye yönelik girişimleri kapsayan ergonomi programları ve rehabilitasyon yaklaşımları önem kazanmıştır.[14] Kas iskelet sistemi rahatsızlıklarının tedavi seçenekleri yaşam tarzı değişiklikleri, fiziksel ve bilişsel terapi, ameliyat ve ilaç tedavisinden oluşmaktadır. Ancak klinik tanı eksikliği ve komorbidite, uygun tedavi seçeneklerinin seçimini karmaşık hale getirmekte ve zorlaştırmaktadır. Her şeye rağmen analjezikler bu semptomların hafifletilmesinde sık olarak kontrolsüzce kullanılmaktadır.[15,16]

Analjezi kullanımı, genel popülasyonda ve özellikle de çalışan popülasyonda oldukça yaygındır.[17-19] Reçetesiz analjezi kullanımında, aspirin veya ibuprofen Amerika Birleşik Devletleri'nde haftalık kullanımı sırasıyla 41 milyon ve 38 milyon kişiyle dünya çapında en çok tüketilen ilaçlardır.[20] Birçok ülkede reçetesiz analjeziklere artan erişilebilirlik, çalışanların kas-iskelet sistemine bağlı ağrı yaşadıklarında tıbbi konsültasyon olmadan analjezik kullanarak kendi kendine yönetmelerini sağlamaktadır. Çalışanlar, ağrıyla çalışmada zorlandıklarında analjezi kullanımını ağrıyla başa çıkmada bir strateji olarak görmektedir.[21,22] Her ne kadar analjezikler kas-iskelet sistemi ağrısını kontrol etmeye yardımcı olsa da, uygunsuz kullanım, kardiyovasküler hastalığı, ülseri ve astımı olan kişiler için olumsuz olaylara neden olabilmektedir.[23] Ayrıca, nonsteroid antienflamatuar ilaçların yoğun kullanımı anemi, böbrek yetmezliği, gastrointestinal hastalık ve ciddi hipokalsemi gibi olumsuz sağlık sonuçlarına neden olabilmektedir.[24] Bu nedenle, genel çalışan popülasyonda kas iskelet sistemi rahatsızlıklarını ve buna bağlı ağrı kesici kullanımlarını inceleyen araştırmalara artan bir ihtiyaç vardır. Böylece daha verimli önleme stratejileri uygulanabilir ve toplumsal kampanyalar başlatılabilir. Bu çalışma bir askeri ağır araç bakım ve onarım fabrikasında çalışan işçilerin kas iskelet sistemi rahatsızlıklarını ve analjezik kullanımlarını belirlemek amacıyla yapılmıştır.

Gereç ve Yöntem

Araştırmanın tipi

Araştırma, kesitsel tasarımda yapılmıştır.

Araştırmanın evren ve örneklemi

Araştırma, bir askeri ana bakım ve onarım fabrikasında yapılmıştır. Burası tüm askeri

araç bakımlarının, tamirlerinin ve malzeme üretimlerinin yapıldığı bir fabrikadır. Araştırmanın evrenini bu fabrikada çalışan 400 işçi oluşturmuştur. Araştırmanın örneklemini ise örneklem seçimine gidilmeden bu fabrikada çalışan Aralık 2020–Mayıs 2021 tarihleri arasında izinli ya da raporlu olmayan, çalışmaya katılım konusunda istekli olan, engeli olmayan (işitme ve konuşma), soruları fiziksel, bilişsel veya ruhsal olarak yanıtlayabilmesinde bir engeli olmayan 269 işçi oluşturmuştur. Fiziksel aktivite yapmaya engel oluşturacak ortopedik veya nörolojik problemi olanlar, doğuştan kas-iskelet sistemi deformitesi olanlar çalışmaya alınmamıştır. Araştırmada sürekli değişkenler normal dağılmadığı için çalışma sonrası güç analizi yapılamamıştır.

Verilerin toplama

Veriler, işçilerin çalışma günlerinde ve iş akış düzenini engellemeyecek zaman aralıklarında ve onamları alındıktan sonra toplanmıştır. Araştırma ekibinde yer alan ve çalışmanın yapıldığı kurumda iş yeri hemşiresi olan MB tarafından anketteki sorular sorularak cevaplar formlara işlenmiştir. Soru ve anketlerin yanıtlanması ortalama 15-20 dakika sürmüştür. Verilerin toplanmasında Tanıtıcı Bilgi Formu ve Genişletilmiş Nordic Kas İskelet Sistemi Anketi kullanılmıştır.

Tanıtıcı bilgi formu

Aratırmacılar tarafından literatüre dayalı[12,13,16,17] geliştirilen Tanıtıcı Bilgi Formu; işçilerin yaşını, cinsiyetini, boyunu, kilosunu, eğitim durumunu, medeni durumunu, çalışma süresini, çalışma sırasında genelde durduğu pozisyonu, sigara kullanımını, alkol kullanımını, düzenli egzersiz yapma durumunu, kronik bir hastalığın varlığını, ağrı kesici kullanımlarını sorgulayan sorulardan oluşmuştur.

Genişletilmiş Nordic Kas İskelet Sistemi Anketi

Nordic Kas İskelet Sistemi Anketi ilk kez Kuorinka ve arkadaşları tarafından 1987 yılında geliştirilmiş ve daha sonra Dawson ve arkadaşları 2009 yılında Nordic Kas İskelet Sistemi Anketini geliştirerek Genişletilmiş Nordic Kas İskelet Sistemi Anketini (Extended version of the Nordic Musculoskeletal Questionnaire) oluşturmuştur.[25] Bu ölçeğin Türkçe geçerlilik ve güvenirliliği Kahraman ve arkadaşları tarafından 2016 yılında yapılmıştır.[25,26] Genişletilmiş Nordic Kas İskelet Sistemi Anketinde boyun, omuz, sırt, dirsek, el/el bileği, bel, kalça/uyluk, diz, ayak/ayak bileği olmak üzere dokuz bölgeyi anatomik olarak gösteren bir şekil üzerinde ağrının olup olmadığı; ağrının ilk başladığı yaşı; ağrı nedeniyle hastaneye yatma ve görev değiştirme durumu; son bir hafta, bir ay ve bir yıl içinde ağrı sorunu yaşayıp yaşamadığı; ağrının iş/ev hayatını etkileyip etkilemediği, bu nedenle hekime/fizyoterapiste gidip gitmediği; ağrı kesici kullanımı ve ağrı nedeniyle rapor alıp almadığı sorgulanmaktadır.

Verilerin analizi

Veriler SPSS 23 (Statiscal Package of Social Science) programı kullanılarak %95'lik güven aralığında, anlamlılık $p<0,05$ düzeyinde değerlendirilmiştir. Tanımlayıcı istatistiksel metotlar (frekans, yüzde, ortalama, standart sapma, medyan, IQR) kullanılmıştır. Veriler normal dağılıma uymadığı için nonparametrik testler kullanılmıştır. İşçilerin kas-iskelet sistemi ağrılarının bazı sosyo-demografik özelliklerle ilişkisini incelemek için lojistik regresyon analizi yapılmıştır.

Araştırmanın etik boyutu

Araştırmaya başlamadan önce Akdeniz Üniversitesi Tıp Fakültesi Klinik Araştırmalar Etik Kurulu'ndan (Tarih: 06,11,2019; KAEK-20) onay ve araştırmanın yapıldığı kurumdan yazılı izin alınmıştır (27.12.2019/67391603-1040-E.795405). Araştırma süreci Helsinki Bildirgesi ilkelerine uygun olarak yürütülmüştür.

Bulgular

Araştırmaya katılan işçilerin yaş ortalamasının 39,35±7,59, fabrikada çalışma süresi ortalamasının 9,51±7,06 yıl ve BKI ortalamasının 27,25±3,40 olduğu bulunmuştur. İşçilerin %55,8'inin üniversite mezunu, %86,6'sının evli, %48'nin sigara

kullandığı, %24,5'inin alkol kullandığı ve %73,6'sının düzenli egzersiz yapmadığı belirlenmiştir (Tablo 1).

Tablo 1. İşçilerin sosyo-demografik özellikleri.

Özellikler	**n** **Ortanca (Min-max)**	**%** **Ort / SS**
Yaş	40 (20-57)	39,35 ±7,59
Fabrikada çalışma yılı	8 (1-30)	9,51±7,06
BKI	26,59 (18,75-42,57)	27,25±3,40
Eğitim Durumu		
Okur yazar değil	1	0,4
Okur yazar	3	1,1
İlkokul	3	1,1
Ortaokul	7	2,6
Lise	105	39,0
Üniversite ve üstü	150	55,8
Medeni durum		
Evli	233	86,6
Bekar	36	13,4
Sigara kullanımı		
Evet	129	48,0
Hayır	140	52,0
Alkol kullanımı		
Evet	66	24,5
Hayır	203	75,5
Düzenli egzersiz		
Evet	71	26,4
Hayır	198	73,6

İşçilerin yaklaşık yarısının mesaide ayakta çalıştığı (%49,4), %21,2'sinin kronik bir hastalığı olduğu, %47, 5'inin vücudunun en az bir bölgesinde kas iskelet sistemine yönelik rahatsızlık yaşadığı, %43,5'inin kas iskelet sisteminde yaşadığı ağrıya bağlı olarak analjezik kullandığı ve analjezik kullananların %12,1'inin haftada 3 kez ve üzeri kullandığı ve bununla birlikte %58,9' unun kullandığı ilacın reçetesiz olduğu saptanmıştır (Tablo 2).

Tablo 2. İşçilerin çalışma ve bazı medikal özellikleri.

Özellikler	**n**	**%**
Çalışma pozisyonu		
Oturarak	52	19,3
Ayakta	133	49,4
Duruma göre sık sık pozisyon değiştirme	78	29,0
Diğer	6	2,3
Kronik hastalık varlığı		
Evet	57	21,2
Hayır	212	78,8
Kas iskelet sistemine yönelik bir rahatsızlık yaşama		
Evet	128	47,5
Hayır	141	52,5
Yaşadığı kas iskelet sistemindeki ağrıya bağlı analjezik kullanımı		
Evet	117	43,5
Hayır	152	56,5
Analjezik kullanım sıklığı		
Haftada 3 kez ve üzeri	14	12,1
Haftada 1 kez	28	23,9
Ayda 1 kez	24	20,5
Düzensiz	51	43,5
Kullanılan ilacın reçeteli olma durumu		
Evet	48	41,1
Hayır	69	58,9

İşçilerin son 12 ay ve son 1 ay içinde kas iskelet sistemi rahatsızlık yaşama oranları Tablo 3'te gösterilmiştir. Son 12 ay içerisinde işçiler en çok %22,3 (n: 60) bel, %19,3 (n:52) boyun ve %13,8 (n:37) sırt bölgesinde rahatsızlık yaşamış olmakla birlikte, son 1 ay içerisinde de aynı anatomik bölgeler yüksek oranlara sahip olduğu görülmüştür.

Tablo 3. İşçilerin son 12 ay ve son 1 ay içinde kas-iskelet sistemi sorunu yaşama durumları.

Özellikler	**Sayı (%)**			
	Son 12 ay içinde		Son 1 ay içinde	
	n	%	n	%
Boyun				
Evet	52	19,3	39	14,5
Hayır	217	80,7	230	85,5
Omuzlar				
Evet	33	12,3	22	8,2
Hayır	236	87,7	247	91,8
Sırt				
Evet	37	13,8	29	10,8
Hayır	232	86,2	240	89,2
Dirsekler				
Evet	15	5,6	8	3,0
Hayır	254	94,4	261	97,0
Bilekler/Eller				
Evet	26	9,7	20	7,4
Hayır	243	90,3	249	92,6
Bel				
Evet	60	22,3	51	19,0
Hayır	209	77,7	218	81,0
Kalçalar				
Evet	18	6,7	13	4,8
Hayır	251	93,3	256	95,2
Dizler				
Evet	36	13,4	25	9,3
Hayır	233	86,6	244	90,7
Ayak Bilekleri/Ayaklar				
Evet	19	7,1	13	4,8
Hayır	250	92,9	256	95,2

Son 12 ay içerisinde, bel ağrısı yaşayanların %58,1'inin yaşadıkları ağrıya bağlı olarak ev ya da ev dışı işlerinin aksadığı, %65'inin ağrı nedeniyle sağlık hizmetlerine başvurduğu, %75'inin ağrı nedeniyle ilaç kullandığı, %58,3'ünün ağrı nedeniyle rapor kullandığı; boyun ağrısı yaşayanların %26,9'unun yaşadıkları ağrıya bağlı olarak ev ya da ev dışı işlerinin aksadığı, %48,1'inin ağrı nedeniyle sağlık hizmetlerine başvurduğu, %61,5'inin ağrı nedeniyle ilaç kullandığı, %19,2'sinin ağrı nedeniyle rapor kullandığı; sırt ağrısı yaşayanların %45,9'unun yaşadıkları ağrıya bağlı olarak ev ya da ev dışı işlerinin aksadığı, %40,5'inin ağrı nedeniyle sağlık hizmetlerine başvurduğu, %62,1'inin ağrı nedeniyle ilaç kullandığı, %10,8'sinin ağrı nedeniyle rapor kullandığı belirlenmiştir (Tablo 4).

İşçilerin kas-iskelet sistemi rahatsızlıklarının bazı sosyo-demografik özelliklerle ilişkisine yönelik lojistik regresyon analizi yapılmıştır. Kronik hastalık varlığının omuz ağrıları ile ilişkili olduğu (OR=0,39, p=0,017); sigara kullanımının dirsek ağrıları (OR=2,76, p=0,046), eller ve el bilekleri ağrıları (OR=2,31, p=0,029) ve bel ağrıları (OR=1,88, p=0,030) ile işkili olduğu tespit edilmiştir (Tablo 5).

İşçiler arasında sigara kullananların (p<0,05) ve ağrı kesici kullananların (p<0,01) ağrı şiddetinin daha yüksek olduğu bulunmuştur. Araştırmada işçilerin medeni durumu, eğitim durumu, düzenli egzersiz yapma durumu, kronik hastalık varlığı ve fabrikada çalışma pozisyonu değişkenleri ile ağrı şiddeti arasında istatistiksel açıdan anlamlı farklılık bulunmamıştır (Tablo 6).

Tablo 4. Kas iskelet sistemine bağlı yaşanan ağrıların günlük yaşama etkileri.

	Son 12 ayda ağrı nedeniyle ev ya da ev dış işlerin aksaması n (%)	Son 12 ayda ağrı nedeniyle sağlık hizmetlerine başvurma n (%)	Son 12 ayda ağrı nedeniyle ilaç kullanımı n (%)	Son 12 ayda ağrı nedeniyle rapor kullanma n (%)
Bel Ağrısı Yaşayanlar (n=60)	Evet: 35 (58,3) Hayır: 25 (41,7)	Evet: 39 (65) Hayır:21 (35)	Evet : 45 (75) Hayır:15 (25)	Evet: 35 (58,3) Hayır: 25 (41,7)
Boyun Ağrısı Yaşayanlar (n= 52)	Evet:14 (26,9) Hayır:38 (73,1)	Evet: 25 (48,1) Hayır:27 (51,9)	Evet: 32 (61,5) Hayır:20 (38,5)	Evet: 10 (19,2) Hayır: 42 (80,8)
Sırt Ağrısı yaşayanlar (n=37)	Evet:17 (45,9) Hayır:20 (54,1)	Evet : 15 (40,5) Hayır: 22 (59,5)	Evet: 23 (62,1) Hayır:14 (37,9)	Evet :4 (10,8) Hayır:33 (89,2)

Tablo 5. Kas-iskelet sistemi ağrılarının bazı sosyodemografik özelliklerle ilişkisine yönelik lojistik regresyon analizi.

Değişkenler	**Tahmini Odds Ratio (%95 GA)**				***p****
	Omuz	**Dirsekler**	**Bilekler/Eller**	**Bel**	
Kronik hastalık varlığı[x]	0,39 (0,18-0,84)				0,017
Sigara kullanımı[y]		2,76 (1,01-7,49)[a]	2,31 (1,09-4,90)[b]	1,88 (1,05-3,90)[c]	0,046[a] 0,029[b] 0,030[c]

[x,y]Evet, *p<0,05

Tablo 6. İşçilerin bazı özellikleri ile ağrı şiddeti ortalamalarının karşılaştırılması.

Özellikler		**Ağrı Şiddeti**
		M (IQR)
Medeni durum	Evli	2,00 (8,50)
	Bekar	2,00 (4,75)
z		-0,738
p		0,461
Eğitim durumu	Okur yazar	0,00 (,)
	İlkokul	0,00 (,)
	Ortaokul	0,00 (2,00)
	Lise	2,00 (8,00)
	Üniversite	2,00 (8,50)
x^2		3,718
p		0,591
Sigara kullanımı	Evet	0,00 (7,00)
	Hayır	2,00 (9,75)
z		**2,390**
p		**0,017***
Düzenli egzersiz	Evet	2,00 (8,00)
	Hayır	2,00 (8,00)
z		0,407
p		0,684
Kronik hastalık varlığı	Var	2,50 (12,75)
	Yok	2,00 (7,50)
z		-1,696
p		0,090
Ağrı kesici kullanımı	Evet	3,50 (17,00)
	Hayır	2,00 (6,50)
z		**-2,856**
p		**0,004****
Çalışma pozisyonu	Oturarak	2,00 (8,00)
	Ayakta	2,00 (8,00)
	Sık pozisyon değiştirme	2,00 (11,00)
	Diğer	0,00 (3,75)
x^2		6,330
p		0,176

z: Mann Whitney-U testi, x^2: Kruskal-Wallis H t testi, M: Median, IQR: Interquartile Range, *p<0,05, **p<0,01

Tartışma

Kas iskelet sistemi rahatsızlıkları, işçilerde meslekle ilişkili en yaygın sağlık sorununu temsil etmektedir.[8-10] Bu çalışma kas iskelet rahatsızlıkları ve analjezik kullanımı arasındaki ilişkiyi inceleyen sınırlı sayıdaki çalışmadan biri olduğu için literatüre katkı sağlayacağı düşünülmektedir.

Çalışmada işçilerin yaklaşık yarısının vücutlarının en az bir bölgesinde kas- iskelet sistemine bağlı rahatsızlık yaşadığı ve en çok rahatsızlık yaşanan bölgelerin bel, boyun ve sırt olduğu belirlenmiştir. Türkiye'de özel sektöre ait bir otomotiv fabrikasında beyaz yakalılar ve mavi yakalılarda kas-iskelet rahatsızlıklarının değerlendirildiği çalışmada benzer olarak mavi yakalılarda en çok bel (%55,5) ve boyun bölgesinde (%25,7) rahatsızlık yasadıkları raporlanmıştır.[27] Diğer ülkelerde (Norveç, Bangledeş, Malezya, Etopya) araç onarım işinde çalışan işçilerde yapılan çalışmalarda son 12 ayda kas iskelet sistemi rahatsızlıklarının görülme oranı %47,7 ile %87 arasında değişiklik gösterirken, en çok ağrı ve rahatsızlık bildirilen bölge çalışma bulgumuza uyumlu olarak bel bölgesi olmuştur.[7,9,12,17,28] Bulguların benzerliğine ilişkin olası açıklama, çoğu zaman işçilerin bir aracın altında, içinde ve yanında çalışırken bükülmüş, katlanmış ve/veya diğer nötr olmayan gövde duruşlarında uzun süreli çalışmalarından kaynaklanıyor olabilir.[8] Çalışmanın önemli bulgularından biride bel, boyun, sırt bölgesinde rahatsızlık yaşayan işçilerin büyük çoğunluğunun bu duruma bağlı olarak ev ya da ev dışı işlerinin olumsuz etkilendiği belirlenmiştir. Literatür de benzer olarak[13,29,30] meslek ile ilişkili kas iskelet sistemi rahatsızlıklarını, üretkenlik kaybının ve çalışan devamsızlığının önde gelen nedenlerinden biri olarak göstermektedir. Ayrıca literatür, meslekle ilgili kas iskelet sistemi ile ilgili rahatsızlıklarının sağlık hizmeti kullanımına yönelik artan taleplerle sonuçlandığını, geçici ve kalıcı sakatlıklara neden olduğunu ve yaşam kalitesinin düşmesine neden olduğunu bildirmektedir.[29,30] Bu çalışmada da literatürle uyumlu olarak bel, boyun ve sırt ağrısı yaşayan işçilerin sağlık hizmetleri kullanımının ve rapor kullanım durumlarının yüksek olduğu belirlenmiştir.

Çalışmada kronik hastalık varlığının omuz ağrısı; sigara kullanımının dirsek ağrıları, eller ve el bilekleri ağrıları ve bel ağrıları ile işkili olduğu tespit edilmiştir. Bireysel risk faktörleri ile kas iskelet sistemi rahatsızlıkları arasındaki ilişkiyi değerlendiren çalışmalarda sonuçlar farklılık göstermektedir. Bir çalışmada sigara içenlerin lumbal ağrıda daha fazla aktivite kısıtlaması ve istirahat kullandıkları;[31] başka bir çalışmada sigara içenlerin bel ağrısı riskinin içmeyenlere göre 0,3 kat daha az olduğu;[32] diğer bir çalışmada ise sigara kullanımı ile kas iskelet sistemi rahatsızlıkları arasında bir ilişki olmadığı belirlenmiştir.[33] Kas iskelet sistemi ve kronik hastalıklar arasındaki ilişkiyi inceleyen çalışmalarda, kas iskelet sistemi rahatsızlıklarının kronik hastalığın gelişmesine katkıda bulunabileceği belirtilmektedir.[33,34] Örneğin bir meta analiz çalışmasında kas-iskelet sistemi rahatsızlığı olan kişilerde, olmayanlara göre kronik hastalık gelişme riskinde %17 artış olduğu bildirilmiştir.[34] Bu nedenle iş yeri hemşirelerinin ve hekimlerinin kas iskelet sistemi rahatsızlıklarını değerlendirirken işçilerin bireysel özelliklerini de göz önünde bulundurması önemlidir.

Çalışmada işçilerin yaklaşık yarısı kas iskelet sistemi rahatsızlıklarına bağlı analjezik kullanırken önemli bir bölümünün (%12,1) haftada 3 kez ve üzeri analjezik kullandığı saptanmıştır. 10 bin işçinin kas iskelet sistemi rahatsızlıkları nedeniyle düzenli analjezik kullanımlarını inceleyen çalışmada, düzenli analjezik kullanım oranı %22,3 olarak belirlenirken, bel ağrısı ve boyun/omuz ağrısı yaşayan işçiler için analjezik kullanımlarının daha yüksek olduğu belirlenmiştir.[16] Bu çalışmada da bel ve boyun ağrısı yaşayanlarda analjezik kullanımlarının yüksek olduğu saptanmıştır. Dale ve ark.[17] Norveç'te 40 bin yetişkinde reçetesiz analjeziklerin kullanımını değerlendirdiği çalışmasında, ağrı yoğunluğunun, analjezik kullanımı ile ilişkili olduğu belirlenmiştir. Bu çalışmada da beklenildiği gibi ağrı şiddeti yüksek olanlarda analjezik kullanımının daha yüksek olduğu görülmüştür.

Çalışmanın diğer dikkat çekici bulgularından biri de reçetesiz analjezik kullanım oranının yüksekliğiydi (%58,9). Literatür, toplumlarda reçetesiz olarak satılan analjeziklerin artan mevcudiyetinin kas iskelet ağrısı gibi önemsiz olarak algılanan hastalıkların kendi kendine yönetimini için analjezik kullanımına teşvik ettiğine dikkat çekerken, aynı zamanda analjeziklerin kas-iskelet ağrısını hafifletmeye yardımcı olsa da, güvenli olmayan kullanımın, genel sağlığı daha da kötüleştirebilecek olumsuz olaylara neden olabileceğine de vurgu yapmaktadır.[11,12,19] Benzer olarak işçilerde yapılan diğer çalışmalarda da kas ve iskelet sistemi rahatsızlığına bağlı reçetesiz analjezik kullanımlarının yüksek olduğu bildirilmektedir.[16,17] Özellikle fiziksel güç gerektiren işlerde çalışanlar arasında ağrı kesici ilaçlar bazen ağrı semptomlarını yönetmek için kolayca tercih edilebilir.[21] Bu nedenle iş yeri hekim ve hemşirelerinin işçilerin yaşadığı kas iskelet sistemi rahatsızlıklarını farkında olması, analjezi kullanımlarını sorgulaması ve danışmanlık vermesi olası kötü sonuçların önlenmesi açısından son derece önemlidir.

Araştırmanın kısıtlılıkları

Bu çalışmanın bazı sınırlılıkları mevcuttur. Çalışmanın kesitsel yapısı ve verilerin anket yoluyla toplanmış olması çalışmanın bir sınırlılığıdır. Çalışmanın kesitsel tasarımda yapılması analjezi kullanımı ile kas iskelet sistemi rahatsızlığı arasındaki nedensel çıkarım yapmayı zorlaştırmaktadır. Bununla birlikte, araştırmanın sadece bir fabrikada yürütülmesi bulguların genelleştirilebilirliğini ve etkisini sınırlandırabilir.

Sonuç

Çalışmada işçilerin yarısına yakınının kas iskelet sistemi rahatsızlığı yaşadığı, reçetesiz analjezik kullanımın ve sıklığının yüksek olduğu belirlenmiştir. Bu sonuçlar doğrultusunda, iş yeri hekim ve hemşireleri tarafından iş yerinde kas iskelet sistemi rahatsızlıklarına neden olabilecek risklerin değerlendirilmesi, kurumsal önlemlerin alınmasının sağlanması, kas-iskelet sistemini koruyucu egzersizlere yönelik eğitimlerin düzenli olarak verilmesi, kas iskelet sistemi rahatsızlığı olanların rehabilitasyon olanaklarına ulaşmasında destek sağlanması önerilmektedir.

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Araştırmada fikir, tasarım: İ,Ö.; verilerin toplanması ve işlemesi: M.B.; analiz ve yorum: İ.Ö., D.A.; literatür taraması: İ.Ö., M.B., D.A.; makale yazımı: İ.Ö., M.B., D.A.; eleştirel inceleme: İ.Ö., M.B.; D.A. tarafından yapılmıştır.

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Araştırmada verileri kullanılarak bilimsel katkı sağlayan fabrika çalışanlarına teşekkür ederiz.

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Özgün Araştırma/Research Article

Aile hekimlerinin el hijyenine yönelik inanç ve uygulamalarının incelenmesi

Examining the beliefs and practices of family physician's on hand hygiene

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Öz

Amaç: Bu çalışmada aile hekimlerinin el hijyeni konusunda inanç ve uygulamalarının değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem: Tanımlayıcı tipte olan bu araştırmada aile hekimlerine online anket uygulanmıştır. El Hijyeni İnanç Skalası (EHİS) ve El Hijyeni Uygulamaları Envanteri (EHUE) kullanılmıştır.

Bulgular: Kadınların hem EHİS hem de EHUE ölçek puanları erkeklerin puanlarından anlamlı şekilde yüksek olduğu görülmüştür (p<0,001). EHİS puanının ve cinsiyetin EHUE puanını yordadığı görülmüştür. Yine EHUE puanının ve cinsiyetin EHİS puanını yordadığı görülmüştür.

Sonuç: El hijyeni inancı ile uygulama arasında pozitif bir ilişki olduğu görülmektedir. Hekimlerin el hijyeni konusunda farkındalıklarını arttıracak hatırlatmaların eğitim aracılığı ile yapılması inançlarında iyi yönde değişikliğe yardımcı olabilecektir.

Anahtar Kelimeler: Aile hekimleri; El hijyeni; İnanç; Uygulama.

Abstract

Aim: In this study, it is aimed to evaluate the beliefs and practices of Family Physicians on hand hygiene.

Materials and Methods: In this descriptive study, an online questionnaire was applied to family physicians. The Hand Hygiene Belief Scale (HHBS) and the Hand Hygiene Practices Inventory (HHPI) were used.

Results: It was observed that both the HHBS and HHPI scale scores of women were significantly higher than the scores of men (p<0.001). It was observed that the HHBS score and gender predicted the HHPI score. It was seen that HHPI score and gender predicted the HHBS score.

Conclusion: It is seen that there is a positive relationship between hand hygiene belief and practice. Reminders that will increase the awareness of physicians about hand hygiene through education will help to change their beliefs for the better.

Keywords: Family physicians; Hand hygiene; Belief; Practice.

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Giriş

El hijyeninin sağlanması kişileri bulaşıcı hastalıklardan korumak için oldukça büyük bir öneme sahiptir. Bunun yanında özellikle sağlık çalışanlarının el hijyeninin sağlanması kişisel korunmaya ek olarak sağlık bakım ilişkili (SBİ) enfeksiyonların önlenmesinde de önemlidir. SBİ enfeksiyonlar, dünya genelindeki birçok ülke için, hastanede kalış süresinde uzama, sağlık bakım maliyetlerinde artış, yaşam kalitesinde azalma, mortalite ve morbidite oranlarında artma ile ilişkili olduğu kanıtlanmış önemli bir hasta güvenliği problemidir.[1,2] Gelişmiş ülkelerde hastanede yatan hastaların yaklaşık %5 ila %10'u bu tür enfeksiyonlara yakalanmaktadır ve hastalık yükü gelişmekte olan ülkelerde daha da fazladır.[3] El hijyeninin sağlanması ve bu konuda hassasiyetin gösterilmesi SBİ enfeksiyonların azaltılmasında önemli ve kabul edilebilir bir uygulama olduğu bilinmektedir. Sağlık bakım hizmetlerinde yalnızca el hijyeninin sağlamasıyla bile SBİ enfeksiyonlarının meydana gelme hızının azaldığı görülmektedir.[4,5]

Elleri yıkamak için bir çok neden olabilmekte iken Dünya Sağlık Örgütü'ne göre şu beş nedenle el yıkama endikasyonu bulunmaktadır: "hasta ile temas edilmeden önce, aseptik girişimler öncesi, vücut sıvısıyla bulaş riski sonrasında, hasta ile temas edildikten sonra ve hastanın çevresi ile temas edilmesi sonrasında".[6] Bu endikasyona bağlı olarak ellerin yıkanması ve hijyenin sağlanması sağlık çalışanları için önemli olmakla beraber bu konu üzerine yapılan birçok araştırmada sağlık personelinin el hijyeni kuralarına uyum oranlarının düşük olduğu görülmüştür.[7,8] Fakat bunun yanında sağlık personelinin el hijyeni uyumunun takip edilip ve geri bildirimlerde bulunulduğunda el hijyenine uyumda artış olduğu ifade edilmektedir.[9,10] Bu çalışmada her ne kadar hastalara girişimsel müdahelelerde bulunmasalar bile sürekli hastalar ile karşı karşıya kalan Aile Hekimleri'nin el hijyeni konusunda inançlarının ve bu konudaki pratiklerinin değerlendirilmesi amaçlanmıştır.

Gereç ve Yöntem

Araştırmanın tipi

Çalışma tanımlayıcı tipte dizayn edilen bir araştırmadır.

Araştırmanın evreni ve örneklemi

Çalışmanın evrenini Adıyaman'da bulunan Aile Hekimleri oluşturmuştur. Adıyaman İl Sağlık Müdürlüğünden alınan listeye göre ilçeler dâhil toplam 214 aile hekimi görev yapmaktadır. Çalışma için herhangi bir örneklem sayısı hesaplamadan evrenin tamamına ulaşılması hedeflenmiş ve 195 aile hekimine ulaşılmıştır (cevaplama oranı %91,1).

Veri toplama araçları

Çalışmada kullanılan anket formu üç kısımdan meydana gelmektedir. Anket formunun ilk bölümünde yaş, cinsiyet, medeni durum, ekonomik durum, hekimlik yapma süresi gibi sosyodemografik özellikleri sorgulayan 10 soru yer alırken bu sorular literatür taranarak hazırlanmıştır. Anketin ikinci bölümü El Hijyeni İnanç Skalası (EHİS) ve üçüncü bölümde ise El Hijyeni Uygulamaları Envanteri (EHUE) bulunmaktadır. Anket formu doldurulmaya başlamadan önce, katılımcılardan elde edilen verilerin bu çalışmanın bilimsel platformu dışında kullanılmayacağı katılımcılara belitilmiş olup, anket ve anket soruları hakkında gereken bilgilendirme yapılmıştır. Anket katılımcılara google form üzerinden uygulanmıştır. Anket için online metotun kullanılma sebebi ise hem salgının hala sıcaklığını koruması hem de Adıyaman'da görev yapan aile hekimlerinin çok dağınık yerleşimde bulunması nedeniyle ulaşılma probleminin olmasıdır.

El Hijyeni İnanç Skalası (EHİS) ve El Hijyeni Uygulama Envanteri (EHUE) bireylerin el hijyeni hakkındaki inançlarını ve el hijyenin uyguladıkları durumları belirlemek amacıyla geliştirilmiştir. 2009 yılında Thea van de Mortel[11] tarafından geliştirilen ölçeğin Türkçe ismi "El Hijyeni İnanç Ölçeği ve El Hijyeni Uygulamaları Envanteri" olarak düzenlenmiştir. Ölçeğin Türkçe uyarlamasını, geçerlilik ve güvenirlik çalışmasını Karadağ ve ark.[12] yapmıştır.

EHİS'in orjinal halinde el hijyeni inancına dair 20 madde ve el hijyeninin önemini

(EHÖS) algılamasını ifade eden 3 madde bulunan toplam 23 madde yer almaktadır. Türkçe skalanın pilot çalışmada öğrenciler ölçeğin maddeleri arasında yer alan "Eğer rehberle aynı fikirde değilsem uygulamalarıma yön vermek için araştırma sonuçlarından yararlanırım" maddesi klinik ortamda uygulama rehberi bulunmadığından dolayı yanıt vermekte zorluk yaşadıklarını ifade ettikleri için, bu madde El Hijyeni İnanç ölçeğinden çıkartılmıştır. Bu nedenle Türkçe skala 22 maddeden oluşmuştur. 5'li likert tipte olan ölçek sonunda alınabilecek toplam puan 22-110 arasında değişiklik göstermektedir. Ölçekten alınan yüksek puan el hijyeni hakkında pozitif inancı yansıtmaktadır. EHUE ise içinde 14 maddenin olduğu 5'li likert tipinde hazırlanmış bir ölçektir. EHUE'den anketi dolduran kişilerin alacakları toplam puan 14-70 arasında değişmektedir. Ölçek ortalama puanı arttıkça el hijyenine uyumun da arttığı anlaşılır. Hem EHİS hem de EHUE tek faktörlüdür ve kesme puanı bulunmamaktadır. Türkçe geçerlilik ve güvenirlik çalışmasında iç tutarlılık güvenirlilik katsayısı el hijyeni inanç skalasında 0,76 olarak saptanırken, el hijyeni uygulama envanterinde ise 0,85 olarak tespit edilmiştir.[11,12] Bu çalışmada ise EHİS ölçeğinin Cronbach alpha değeri 0,867 ve EHUS ölçeğinin ise 0,913 olarak bulunmuştur.

Verilerin analizi

Analizler SPSS (Statistical Package for Social Sciences; SPSS Inc., Chicago, IL) 22 paket programı kullanılarak yapılmıştır. Araştırmadan elde edilen tanımlayıcı veriler eğer kategorik veriler ise n, % değerleri kullanılırken, sürekli verilerde ise ortalama±standart sapma (Ort±SS) ve medyan (minimum-maksimum) değerleri kullanılmıştır. Sürekli değişkenlerin normallik testleri Kolmogorov-Smirnov testi kullanılarak yapılmıştır. İkili grupların karşılaştırılması Mann Whitney U-testi ile yapılırken, ikiden fazla kategorili değişkenlerin karşılaştırılmasında ise Kruskal Wallis testi kullanılmıştır. Sürekli değişkenlerin birbiriyle ilişkisinin incelenmesinde Spearman korelasyon testinden yararlanılmıştır. EHİS ve EHUE puanlarının öngörülebilirliğini değerlendirmek için çoklu doğrusal regresyon analizi yapılmıştır. Analizler yapılırken istatistiksel anlamlılık düzeyi $p<0,05$ olarak belirlenmiştir.

Araştırmanın etik boyutu

Adıyaman Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan 21.09.2021 tarihinde 2021/07-18 karar sayısı ile etik onay alınmıştır. Araştırma süreci Helsinki Bildirgesi ilkelerine uygun olarak yürütülmüştür.

Bulgular

Çalışmaya dahil edilen aile hekimlerinin yaş ortalaması 35,2±7,4, ortancası ise 33,0 (min=24,0-maks=59,0) olarak bulunmuştur. Katılımcıların %48,2'si kadın ve %51,8'i erkek olup hekimlerin %69,7'si evli ve %30,3'ü bekardır. Aile hekimlerinin hekimlik yapma süreleri ortalama 9,6±7,1 yıl olup %11,3'ü ekonomik durumunu düşük, %80'i orta ve %8,7'si yüksek olarak algılamaktadır (Tablo 1).

Tablo 1. Aile hekimlerinin sosyodemografik özellikleri (n=195).

		Sayı	%
Yaş, Ort±SS		35,2±7,4	
Ortanca (Min-Maks)		33,0 (24,0-59,0)	
Cinsiyet	Kadın	94	48,2
	Erkek	101	51,8
Medeni durum	Evli	136	69,7
	Bekar	59	30,3
Hekimlik yapma süresi, Ort±SS		9,6±7,1	
Ortanca (Min-Maks)		7,0 (1,0-33,0)	
Ekonomik durum	Düşük	22	11,3
	Orta	156	80,0
	Yüksek	17	8,7

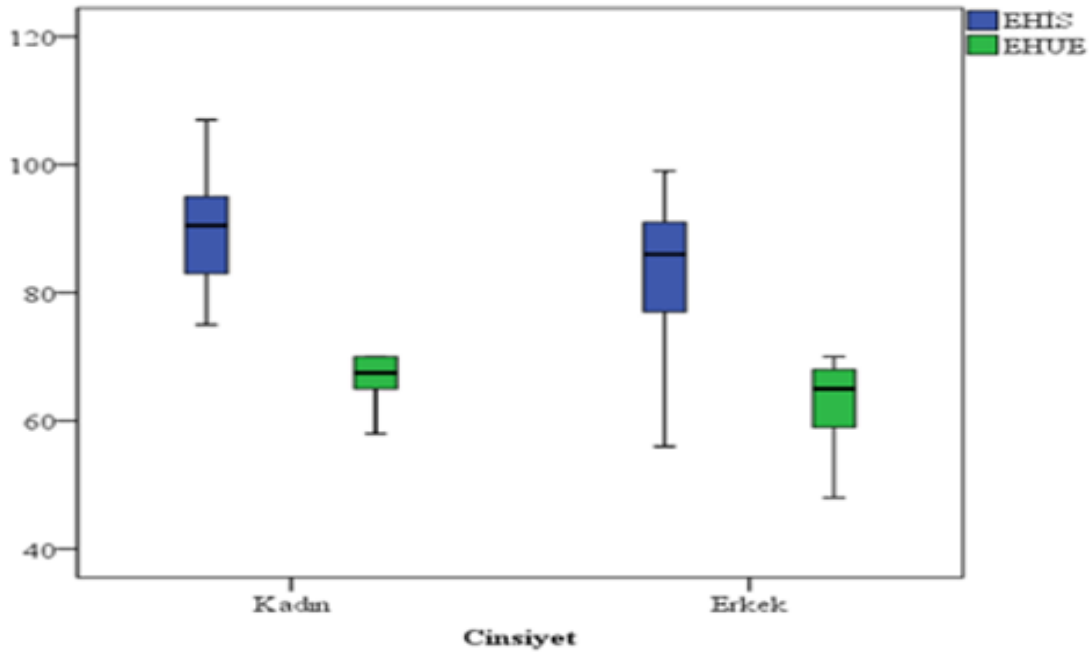
Aile hekimlerinin %9,2'si bazen ellerini yıkama gereksinimi duyarken, %56,4'ü çoğunlukla ve %34,4'ü her zaman duymaktadır. Hekimlerin %10,8'i el yıkarken klorheksidin kullanırken %75,9'u sıvı sabun ve %13,3'ü katı sabun kullanmaktadır. Katılımcıların %17,9'unda elleri eksik yıkama düşüncesi yokken %67,7'sinde ara sıra ve %14,4'ünde çoğunlukla olmaktadır. Aile hekimlerinin %5,6'sı ellerini ara sıra, %50,8'i çoğunlukla ve %43,6'sı ise her zaman kurulamaktadır. Hekimlerin %25,1'i ellerini havlu ile %74,9'u ise kağıt havlu ile kurutmaktadır (Tablo 2).

Tablo 2. Aile hekimlerinin el yıkama ile ilgili özellikleri.

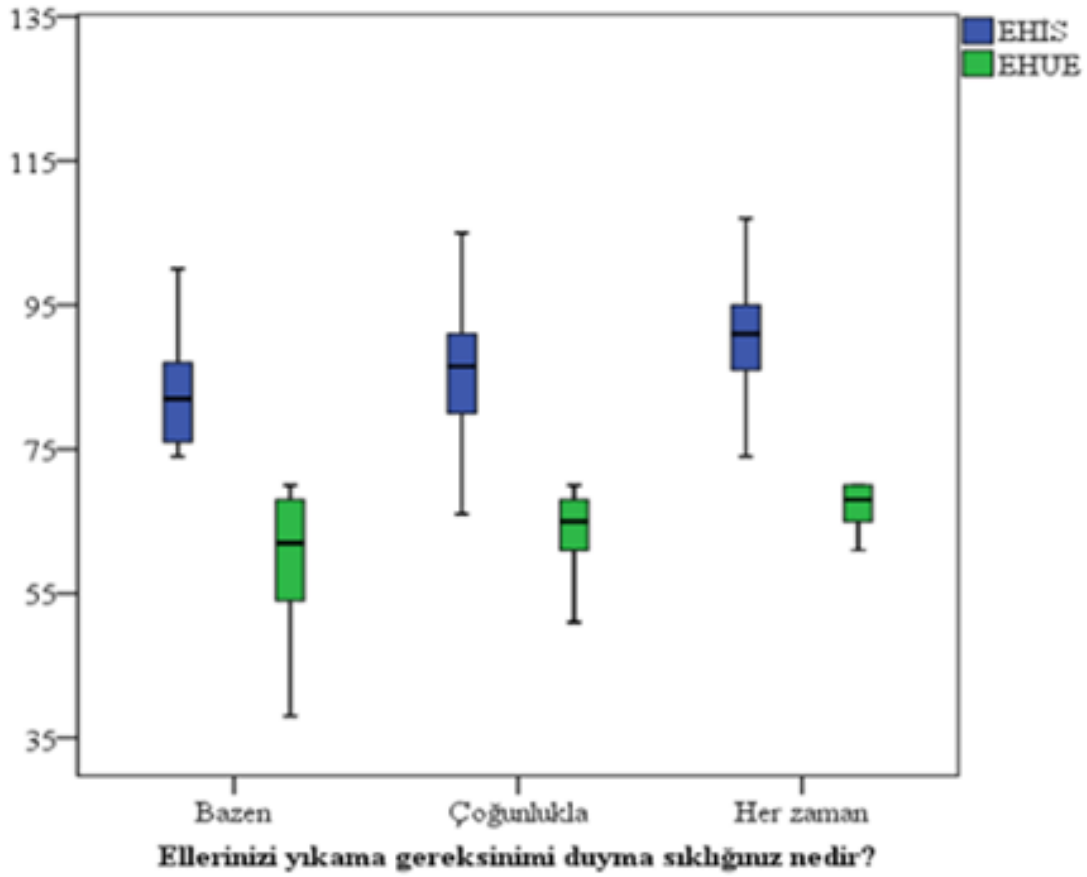
		Sayı	%
Elleri yıkama gereksinimi	Bazen	18	9,2
	Çoğunlukla	110	56,4
	Her zaman	67	34,4
El yıkarken kullanılan dezenfektan ajan	Klorheksidin	21	10,8
	Sıvı sabun	148	75,9
	Katı sabun	26	13,3
Elleri eksik yıkama düşüncesi	Yok	35	17,9
	Ara sıra	132	67,7
	Çoğunlukla	28	14,4
Elleri kurulama sıklığı	Ara sıra	11	5,6
	Çoğunlukla	99	50,8
	Her zaman	85	43,6
Elleri kurularken kullandığınız materyal	Havlu	49	25,1
	Kağıt havlu	146	74,9

Çalışmaya alınan hekimlerin EHİS ortalaması 85,1±12,4 olarak ortancası ise 88 (min=44-maks=107) olarak bulunmuştur. Aynı şekilde EHUE ortalaması 64,1±6,8 olarak ortancası ise 66 (min=38-maks=70) olarak bulunmuştur.

Kadınların hem EHİS hem de EHUE ölçek puanlarının erkeklerin almış oldukları puanlardan anlamlı düzeyde yüksek olduğu saptanmıştır (p<0,001) (Şekil 1). Elleri yıkama gereksinimi kategorileri arasında EHİS (p=0,001) ve EHUE (p<0,001) ölçek puanları açısından anlamlı farklılık olduğu görülmüştür (Şekil 2). Her iki ölçek puanı için de bu farklılık her zaman elleri yıkama gereksinimi duyanlar ile bazen ve çoğunlukla gereksinim duyanlar arasındaki farktan kaynaklandığı görüldüğü belirlenmiştir. Buna göre her zaman ellerini yıkama gereksinimi duyanların EHİS ve EHUE puanı bazen ve çoğunlukla gereksinim duyanların puanından yüksek olduğu görülmüştür (Tablo 3).



Şekil 1. Cinsiyete göre ölçek puanlarının karşılaştırılması.



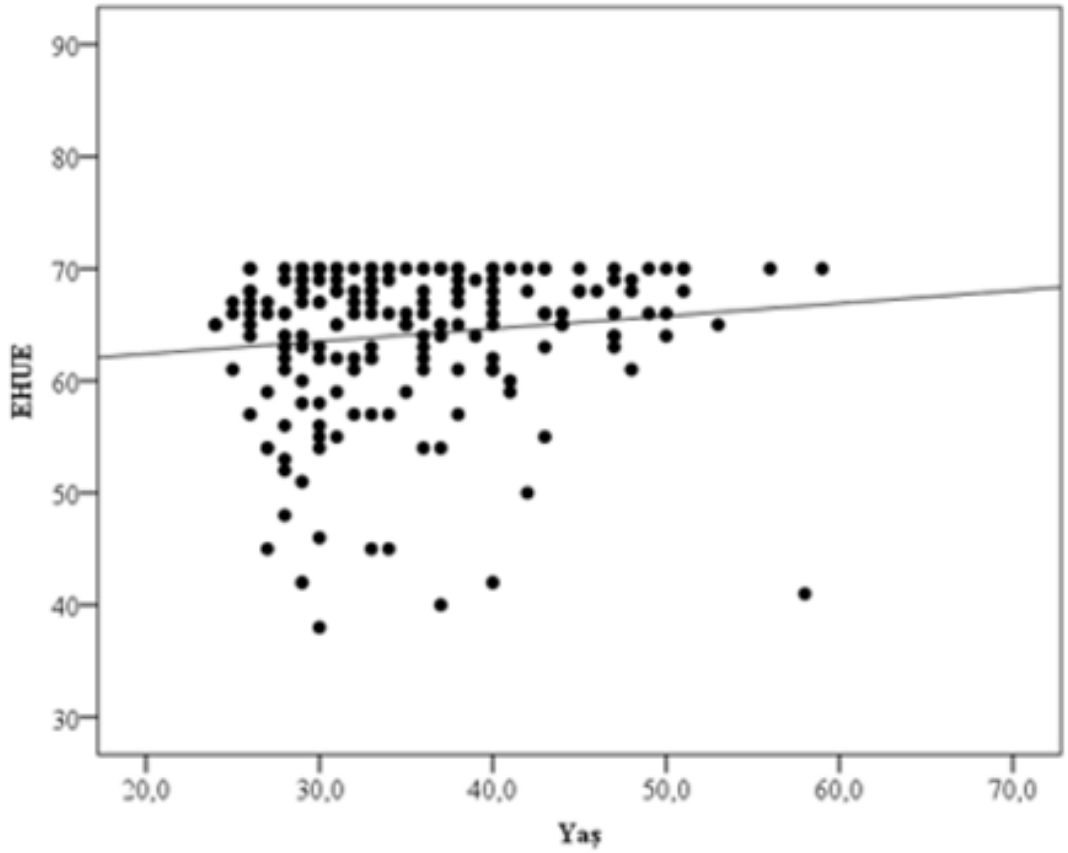
Şekil 2. Elleri yıkama gereksinimine göre ölçek puanlarının karşılaştırılması.

Tablo 3. Aile hekimlerinin ölçek puanlarının çeşitli parametrelere göre karşılaştırılması.

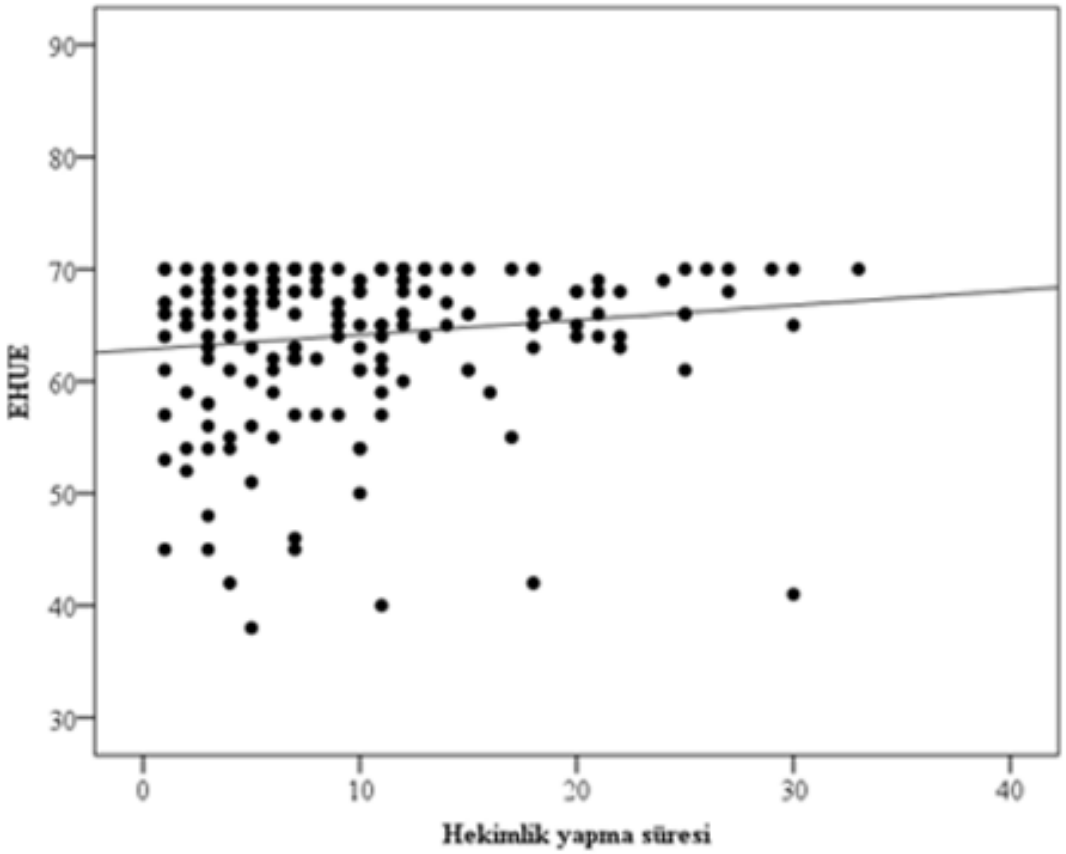
		EHİS*			**EHUE***		
		Ort±SS	Ortanca	*p*	Ort±SS	Ortanca	*p*
Cinsiyet	Kadın	88,6±9,9	90,5	**<0,001**	66,0±4,9	67,5	**<0,001**
	Erkek	81,9±13,5	86,0		62,3±7,8	65,0	
Medeni durum	Evli	84,7±13,7	89,0	0,499	64,6±6,8	66,0	0,062
	Bekar	86,0±8,6	87,0		63,1±6,6	64,0	
Ekonomik durum	Düşük	80,9±17,1	88,5	0,727	62,5±8,5	64,5	0,566
	Orta	85,8±11,5	88,0		64,3±6,4	66,0	
	Yüksek	84,1±12,9	86,0		64,3±7,8	68,0	
Elleri yıkama gereksinimi	Bazen	80,4±11,8	82,0[a]	**0,001**	59,8±9,7	62,0[a]	**<0,001**
	Çoğunlukla	84,2±12,4	86,5[a]		63,0±7,0	65,0[a]	
	Her zaman	87,8±12,0	91,0[b]		67,1±3,7	68,0[b]	
El yıkarken kullanılan dezenfektan ajan	Klorheksidin	84,6±10,2	88,0	0,796	64,5±5,2	67,0	0,963
	Sıvı sabun	85,5±12,2	88,0		64,1±6,6	66,0	
	Katı sabun	83,5±15,2	87,5		63,5±8,6	67,5	
Elleri eksik yıkama düşüncesi	Yok	86,2±10,9	89,0	0,712	64,3±7,1	68,0	0,194
	Ara sıra	85,0±12,9	88,0		63,9±6,7	66,0	
	Çoğunlukla	84,2±11,9	86,0		64,9±7,1	67,5	
Elleri kurulama sıklığı	Ara sıra	78,0±16,8	77,0	0,088	60,9±8,3	60,0	0,108
	Çoğunlukla	84,7±12,4	87,0		63,5±7,4	66,0	
	Her zaman	86,5±11,5	89,0		65,2±5,6	67,0	
Elleri kurularken kullandığınız materyal	Havlu	87,6±9,6	90,0	0,103	64,0±6,5	66,0	0,917
	Kağıt havlu	84,3±13,1	87,5		64,1±6,9	66,0	

*İkili kategorilerde Mann Whitney U testi, Üçlü kategorilerde ise Kruskal Wallis testi kullanılmıştır. [a,b]Farklılığın laynaklandığı grup

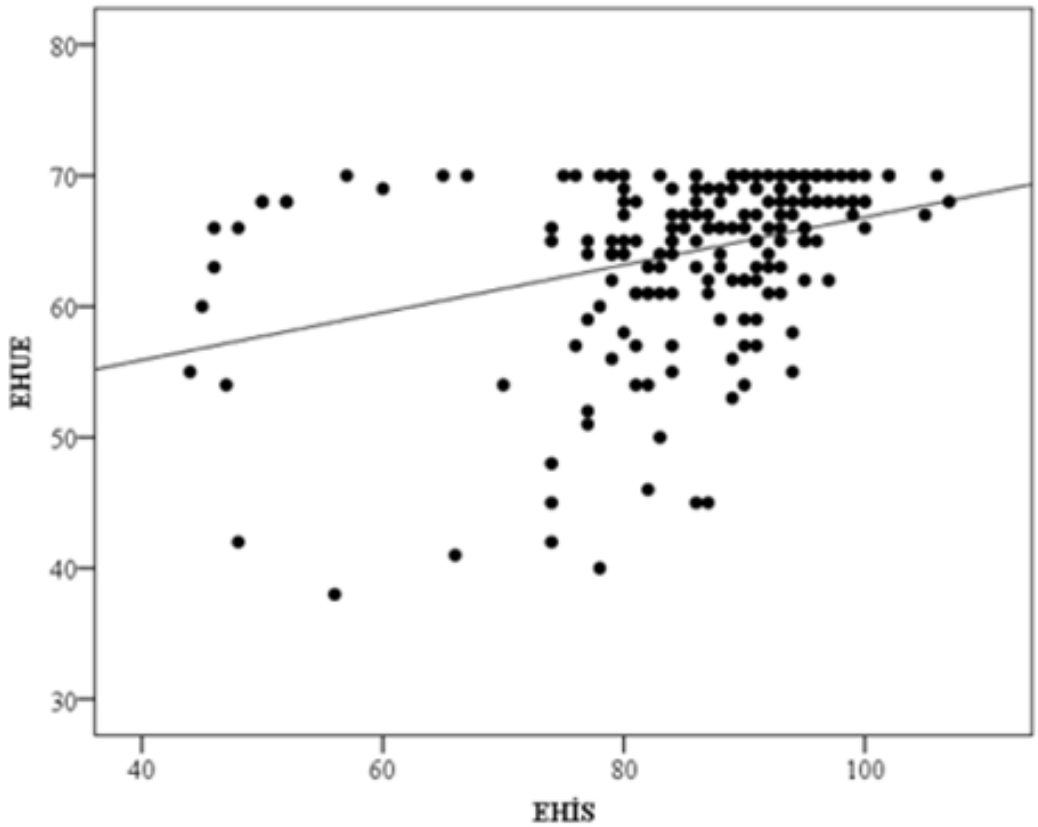
Yapılan korelasyon analizine göre EHUE ile yaş (r=0,163; *p*=0,023) ve hekimlik yapma süresi (r=0,177; *p*=0,014) arasında pozitif yönlü yönde düşük seviyede anlamlı bir ilişki olduğu görülmüştür. EHUE ile EHİS arasında da aynı yönlü orta seviyede istatistiksel açıdan anlamlı bir ilişki olduğu saptanmıştır (r=0,366; *p*<0,001)(Şekil 3-5).



Şekil 3. EHUE ölçek puanı ile yaşın korelasyonu.



Şekil 4. EHUE ölçek puanı ile hekimlik yapma süresinin korelasyonu.



Şekil 5. EHUE ölçek puanı ile EHİS ölçek puanının korelasyonu

Yapılan çoklu doğrusal regresyon analizinden elde edilen sonuçlara göre; EHİS puanının (β=0,149, *p*<0,001) ve cinsiyetin (β=-3,041, *p*=0,002) EHUE puanını anlamlı şekilde yordadığı görülmüştür. Yine EHUE puanının (β=0,514, *p*<0,001) ve cinsiyetin (β=-4,820, *p*=0,007) EHİS puanını anlamlı şekilde yordadığı görülmüştür (Tablo 4).

Tablo 4. EHUE ve EHİS ile ilişkili faktörlerin çok değişkenli regresyon analizi.

	β	SE	Standart β	t	*p*
Bağımlı değişken: EHUE (R^2=0,175)					
EHİS	,149	,038	,272	3,973	**<0,000**
Yaş	,026	,232	,028	,110	,912
Hekimlik yapma süresi	,135	,239	,142	,564	,573
Cinsiyet	-3,041	,948	-,225	-3,207	**,002**
Bağımlı değişken: EHİS (R^2=0,146)					
EHUE	,514	,129	,282	3,973	**<0,000**
Yaş	,113	,430	,067	,262	,793
Hekimlik yapma süresi	-,149	,444	-,086	-,336	,738
Cinsiyet	-4,820	1,774	-,195	-2,718	**,007**

Tartışma

El hijyeninin bulaşıcı hastalıkları önlemedeki rolü açık bir şekilde bilinmesine karşın hijyen davranışlarının uygun şekillerde yerine getirilememesi nedeni ile ihmaller görülebilmektedir. El yıkamanın önemini en çok bilen meslek gruplarından biri hiç şüphesiz ki hekimlerdir. Fakat hijyen kurallarına uyum konusunda önemli engellerden biri elin kirlenmesine neden olan müdahalelerden sonra el yıkama konusunda gereksinimin yeterli düzeyde olmamasıdır. Tüm Türkiye'yi kapsayan ve tabakalı örneklem metotu ile yapılan "Türkiye El Yıkama Araştırması"na (TEYA) göre katılımcıların %6,8'inin ellerini yıkamama nedeni ihtiyaç hissetmemesi olarak bulunmuştur.[13] Bu çalışmada aile hekimlerinin %9,2'si bazen, %56,4'ü çoğunlukla ve %34,4'ü ise her zaman elleri yıkama gereksinimi hissettiklerini bildirmişlerdir. Hekimlerin ellerini yıkama gereksinimi yüksek olsa bile bazı eksikliklerinin olduğu ve bunun el hijyeni

konusunda inanç ve uygulamalarını etkileyebileceği düşünülebilir. Çünkü çalışmanın bir diğer sonucu olan el yıkama gereksinimini her zaman hisseden hekimlerin EHİS ve EHUE puanlarının anlamlı şekilde daha yüksek bulunması bu durumu desteklemektedir. Bu durum inanç, uygulama ve gereksinim hissetme durumunun birbiri ile sıkı ilişki olabileceği fikrini ön plana çıkarmaktadır.

El hijyeninin sağlanabilmesi için gerekli olan ideal materyaller içinde sıvı sabun, kağıt havlu ve ılık su yer almaktadır. Katı sabun kullanılmasının dezavantajı ortak kullanılması durumunda ve köpüğünün üstünde kalması durumunda mikrobik ajanların aktarılma riskinin olmasıdır. Ilık su ve sabunla ellerin yıkanması ve iyi bir kurulama yapılması ellerde bulunan virüs ve bakteri sayılarında önemli miktarda düşüş sağlamaktadır. Aynı zamanda kurulama yaparken de havlunun kullanılması tek kişinin kullanması durumunda bile çeşitli riskler taşımaktadır. Oysa kağıt havlunun tek kullanımlık olması avantaj sağlamaktadır.[14] Şen ve ark.[15] tarafından yapılan çalışmada sağlık çalışanlarının yarısının ellerini su ve sabunla yıkadığı görülmüştür. Kuzu ve ark.[16] tarafından yapılan çalışmada da sağlık çalışanlarının %99,3'ünün ellerini yıkarken sıvı sabun kullandığı ifade edilmiştir. Karaoğlu ve Akın[17] tarafından yapılan çalışmada hemşirelerin %47,6'sı ellerini su ve sabunla yıkadığı, %77,8'i ellerini yıkama sonrası kuruladığı ve %93,7'si ise kağıt havlu ile kuruladığı belirlenmiştir. Bu çalışmada da aile hekimlerinin %75,9'u sıvı sabun ve %13,3'ü katı sabun kullanmıştır. Çalışmamızdaki katılımcıların %50,8'i çoğunluklar, %43,6'sı her zaman ellerini kurularken %74,9'u kağıt havlu kullanmaktadır. Aile hekimlerinin çalışma koşulları düşünüldüğünde hekimlerin kişisel temizlik malzemesi kullanma imkanları sınırlı kalmaktadır. Bundan dolayı ortak kullanımı hijyen şartlarına uygun olan sıvı sabun ve kağıt havlu kullanmaları beklenen bir sonuçtur denebilir.

El hijyenin cinsiyete göre dağılımı diğer hijyen konularında olduğu gibi düşünülebilir. Literatürde yapılan çalışmalar ağırlıklı olarak kadınların bu konuda daha hassas olduğunu ortaya koymaktadır. Karahan ve ark.[18] tarafından sağlık çalışanlarına yönelik yapılan çalışmasında katılımcıların el hijyeni inanç ölçeği puan ortalaması 84,03±8,28 ve el hijyeni uygulama envanteri puan ortalaması 63,97±6,37 olarak görülmüştür ve kadınların her iki puan ortalaması erkeklerin puan ortalamasından anlamlı şekilde yüksek olduğu tespit edilmiştir. Gürlek Kısacık ve ark.[19] tarafından hemşirelik öğrencilerine yönelik yapılan bir çalışmasında öğrencilerin EHİS puan ortalaması 86,01±9,08 olarak EHUE puan ortalaması ise 65,26±5,29 olarak görülmüştür ve kadınların ölçek puanlarının erkeklerin puanından anlamlı şekilde yüksek olduğu ortaya koyulmuştur. Škodová ve ark.[20] tarafından yapılan çalışmada da benzer sonuçlara ulaşılmış olup erkek öğrencilerin el hijyeni becerilerinin kız öğrencilere göre daha yetersiz olduğu sonucuna varılmıştır. Ceylan ve ark.[21] tarafından yapılan çalışmada hemşirelik öğrencilerinin EHİS puanı 89,80±7,98 olarak; EHUE puanı ortalaması ise 66,66±4,05 olarak bulunmuştur ve erkek hemşirelik öğrencilerinin el hijyeni inanç ve uygulama puanlarının kız öğrencilerden anlamlı şekilde düşük olduğu belirlenmiştir. Birgili ve ark.[22] tarafından yapılan çalışmada her ne kadar EHİS açısından olmasa da EHUE açısından cinsiyetler arasında anlamlı farklılık görülmüştür. Bu çalışmada hekimlerin EHİS puan ortalaması 85,1±12,4 olarak EHUE puan ortalaması ise 64,1±6,8 olarak bulunmuştur. Bunun yanından kadın aile hekimlerinin hem EHİS hem de EHUE puanının erkek hekimlerin puanından anlamlı şekilde yüksek olduğu tespit edilmiştir. Sonuçlarımızın literatür ile uyumlu olduğunu göstermektedir. Kadınların el hijyeni konusunda daha yüksek inanç ve pratiğe sahip olmaları kadınların geleneksel aile yapısında aldıkları rol ve öğreticiliğe dayanmaktadır denebilir. Bu durum toplumumuzda kadınlara ev hanımlığı, aşçılık ve annelik rollerin tanımlanması ile alakalı olduğu gerçeği ile uyuşmaktadır denebilir. Bunun yanında kadınların el hijyeni konusunda daha uyumlu olması el hijyeni konusunda eğitim planlamasının yapılması durumunda cinsiyete özel yaklaşımların sergilenmesi çok daha

stratejik olacaktır ve eğitimin kalitesine katkıda bulunacaktır.

El hijyeni konusunda inançlar ile bunların pratiğe dökülmesi arasında bir ilişkinin olduğu bilinmektedir. Karahan ve ark.[18] tarafından yapılan çalışmada iki ölçeğin kendi aralarında zayıf aynı yönde anlamlı korelasyon gösterdiği belirlenmiş; hizmet süresi ile el hijyeni inancı ve uygulaması arasında zayıf anlamlı aynı yönlü ilişkinin olduğu; yaş ile birlikte el hijyenin inancında da artış görüldüğü saptanmıştır. Gürlek Kısacık ve ark.[19] tarafından yapılan çalışmada EHİS puanı ile EHUE puanı arasında pozitif yönde güçlü bir korelasyon görülmüştür. Aynı şekilde Birgili ve ark.[22] tarafından yapılan çalışmada da EHİS ile EHUE arasında pozitif yönde orta düzeyde anlamlı bir ilişki görülmüştür. Bizim çalışmamızda da EHUE ile yaş ve hekimlik yapma süresi arasında aynı yönlü düşük güçte ilişki görülürken; EHUE ile EHİS arasında ise aynı yönlü orta güçte anlamlı ilişki görülmüştür. Bu durum el hijyeni konusunda inançların arttırılması ve bu konudaki farkındalıkların arttırılması hekimlerin el hijyeni konusunda uygulamalarının da iyileştirilmesine yardımcı olacağını göstermektedir. Aynı zamanda yaş ve çalışma süresi arttıkça el hijyeni uygulamalarının da artması tecrübelerin zamanla uygulamaya katkısının olduğu şeklinde değerlendirilebilir.

Kısıtlılıklar

Çalışmada her ne kadar hekimlerin el hijyeni konusunda inanç ve uygulama bir ölçek vasıtası ile ölçülmüş olsa bile el hijyenine uyumun ve bu konudaki uygulamaların gözlemsel olarak incelenmesi daha sağlıklı sonuçlar verecektir. Çalışmamızda bu şekilde sadece bir ölçeğe ve hekimlerin ifadelerine bağlı olarak verinin toplanması çalışmamızın bir kısıtlılığı olarak sayılabilir. Bunun yanında çalışmanın pandemi şartları göz önünde bulundurularak online olarak yapılması hekimlerin anket sorularına yanıt verirken direkt gözlem altında verecekleri cevaplara kıyasla daha az dikkatle yaklaşmaları verinin kalitesinde kayıplara neden olabilmektedir ve bu da çalışmamızın önemli bir kısıtlılığıdır.

Sonuçlar

Sonuç olarak çalışmamızda aile hekimlerinin el hijyeni inançları ve uygulamaları yüksek düzeyde olsa bile hala eksikliklerin olduğu görülmüştür. Kadınların inanç ve uygulamalarının daha iyi olduğu ve el yıkama gereksinimi hissedenlerin inanç ve uygulamalarının daha iyi olduğu görülmüştür. Bunun yanında yaş, hekimlik süresi ve el hijyeni inancı arttıkça el hijyeni davranışının da arttığı görülmüştür. Davranışlarda değişiklik meydana getirmek ve el hijyeni kültürünü iyi seviyelere getirmek için farkındalık programlarının planlanması önerilebilir.

Araştırmanın Etik Boyutu

Araştırma için Adıyaman Üniversitesi Girişimsel Olmayan Klinik Araştırmalar Etik Kurulu'ndan 21.09.2021 tarihinde 2021/07-18 karar sayısı ile etik onay, Adıyaman İl Sağlık Müdürlüğü'nden ise yazılı kurum izni alınmıştır. Araştırma süreci Helsinki Bildirgesi ilkelerine uygun olarak yürütülmüştür. Katılımcılardan anket başında katılmayı kabul ettiklerini belirten onam alınmıştır.

Yazar Katkıları

Çalışma tasarımı: OK, OK; Veri toplama: OK, OK, SG; Veri analizi: OK, OK, SG; Yazma: OK, OK, SG

Teşekkür

Çalışmaya katılan tüm aile hekimlerine teşekkür ediyoruz.

Çıkar Çatışması Beyanı

Yazarların herhangi bir çıkar ilişkisi bulunmamaktadır.

Araştırma Desteği

Çalışma boyunca herhangi bir kişi veya kuruluştan maddi olarak destek alınmamıştır.

Beyanlar

Çalışma herhangi bir kongrede sunulmamıştır.

Hakem Değerlendirmesi

Dış bağımsız.

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