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Evaluation of Obesity Frequency and Quality of School Life in Primary School Students: Descriptive-Cross-Sectional Study

İlköğretim Öğrencilerinde Obezite Sıklığı ve Okul Yaşam Kalitesinin Değerlendirilmesi: Tanımlayıcı Kesitsel Çalışma

Şemsinnur GÖÇER[a], Nursel ÜSTÜNDAĞ ÖCAL[b], Ahmet ÖZTÜRK[c]

[a]Yozgat Bozok University School of Sarıkaya Physiotherapy and Rehabilitation, Yozgat, Türkiye
[b]Yozgat Bozok University Vocational School of Health Services, Yozgat, Türkiye
[c]Department of Public Health, Erciyes University Faculty of Medicine, Kayseri, Türkiye

ABSTRACT Objective: In this study, it was aimed to assess obesity frequency and quality of school life in grade 5, 6, 7, and 8 students from elementary schools in Yozgat Province. **Material and Methods:** This descriptive and cross-sectional study included 1,200 students studying in grades 5, 6, 7, and 8 during the spring semester of the 2019-2020 school year in 4 elementary schools affiliated with the Provincial Directorate of National Education in Yozgat Province. No sampling was performed as it was aimed to encompass the whole study population. Data were collected using individual data sheets and the Quality of School Life Scale (QSLS) via face-to-face interview method. Overall, the study included 936 students. **Results:** In the study population, the mean age was 12.2±1.2 years and 50.9% were boys. Of the students, 45.5% were attending a school assigned to have the low socioeconomic level. Based on body mass index (BMI) assessment, it was found that 16.7% of subjects were overweight or obese. Among students, the mean score was 120.5±22.7 points while the minimum score was 39 points maximum point was 171 on the QSLS. No significant correlation was found between BMI and quality of school life. **Conclusion:** It is important to implement measures directing long-term unfavorable consequences at preschool period in order to prevent overweight and obesity in childhood.

Keywords: Student; obesity; quality of school life

ÖZET Amaç: Bu çalışmada, Yozgat ili merkezindeki ilköğretim 5, 6, 7 ve 8. sınıf öğrencilerinde obezite sıklığı ve okul yaşam kalitesinin değerlendirilmesi amaçlanmıştır. **Gereç ve Yöntemler:** Tanımlayıcı ve kesitsel tipteki bu araştırmaya 2019-2020 eğitim-öğretim yılı bahar yarıyılında Yozgat ilinde İl Milli Eğitim Müdürlüğüne bağlı 4 ilköğretim okulunda 5, 6, 7 ve 8. sınıflarda öğrenim gören 1.200 öğrenci dâhil edilmiştir. Araştırma evreninin tamamına ulaşılması hedeflenmiş, örneklem seçilmemiştir. Veriler kişisel bilgi formu ve Okul Yaşam Kalitesi Ölçeği [Quality of School Life Scale (QSLS)] kullanılarak yüz yüze görüşme yöntemiyle toplanmıştır. Çalışma 936 öğrenciyi içermektedir. **Bulgular:** Çalışma popülasyonunda ortalama yaş 12,2±1,2 idi ve %50,9'u erkekti. Öğrencilerin %45,5'i sosyoekonomik düzeyi düşük olarak belirlenen bir okula devam etmektedir. Beden kitle indeksi (BKİ) değerlendirmesine göre deneklerin %16,7'sinin fazla kilolu veya obez olduğu tespit edildi. Öğrencilerin QSLS ortalama puanı 120,5±22,7 olup, minimum 39, maksimum ise 171 puandır. BKİ ile okul yaşam kalitesi arasında anlamlı bir ilişki bulunmadı. **Sonuç:** Çocukluk çağında fazla kilo ve obezitenin önlenmesi için okul öncesi dönemde uzun vadeli olumsuz sonuçlara yönelik önlemlerin alınması önemlidir.

Anahtar Kelimeler: Öğrenci; obezite; okul yaşam kalitesi

Obesity is a chronic, metabolic disorder resulting from excessive fat accumulation, which is a public health issue seen in all age groups, races, ethnicity and many countries. The obesity frequency is consistently increasing in both adolescents and children.[1] Recent studies have shown that obesity is a threat for both adults and children.[2]

It is known that genetics, socioeconomic conditions, environmental factors and dietary habits as well as psychosocial problems are involved in the development of obesity. In many studies, it was found that psychological problems including depression, low self-esteem, problematic social interactions, impaired eating attitudes and body dysmorphic disorder were

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Correspondence: Şemsinnur GÖÇER
Yozgat Bozok University School of Sarıkaya Physiotherapy and Rehabilitation, Yozgat, Türkiye
E-mail: semsinnurgocer@gmail.com

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more common in obese adolescents when compared to non-obese adolescents.[3] In addition, it was suggested that academic success was lower in obese children when compared to peers and that obese children experienced more problem in the family and with friends.[1,4]

The quality of school life is based on quality of life which is a more general concept. The quality of life is addressed as a general and continuous well-being while assessment of quality of life is focused on positive experiences inducing happiness, pleasantness and satisfaction and negative experiences and emotions. These experiences are assessed in the frame of family, colleagues, school, work and leisure which are important for individual's life.[5] Therefore, education is issued as one of the important domains of quality of life. Thus, Epstein et al. evaluated quality of school life by using domains of quality of life in general.[6] The quality of school life, considered as a marker for general well-being in children, can be defined as a general well-being resulting from interaction with school life and integration to school.[7,8]

While balanced, sufficient nutrition is a principle condition for healthy and quality life, nutrition becomes more important at school age where growth is accelerated and functions of learning and comprehension are of important.[2]

MATERIAL AND METHODS

STUDY DESIGN

This is a descriptive and cross-sectional study conducted between April 2019 and June 2019.

STUDY POPULATION AND STUDY SAMPLE

The study population consisted of 1,200 students studying in grades 5, 6, 7, and 8 during the spring semester of the 2019-2020 school year in 4 elementary schools affiliated to the Provincial Directorate of National Education in Yozgat Province. No sampling was performed as it was aimed to encompass whole study population.

The schools were chosen based on socioeconomic level as rated by the Provincial Directorate of National Education, including 2 schools with high socioeconomic level (510 students) and 2 schools with low socioeconomic level (426 students) in Yozgat Province. Overall, the study included 936 students.

DATA COLLECTION TOOLS

Data were collected using individual data sheets developed by researchers and the Quality of School Life Scale (QSLS) via face-to-face interview method.

Individual Data Sheet: The individual data sheet included questions regarding demographic characteristics such as age, gender, grade, and education level of parents as well as 19 questions about the dietary habits of students.

QSLS: The QSLS was developed by Sari.[9] It includes 35 items in 5 sub-dimensions: teachers (9 items), student-student communication (9 items), feelings toward school (8 items), administrator (6 items), and status (3 items). Each item was rated by a 5-point Likert scale: 1, strongly disagree; 2, disagree; 3, partly agree; 4, agree; 5, strongly agree. In the scale, 15 negative statements (items 3, 4, 7, 8, 10, 14, 16, 18, 22, 23, 25, 27, 29, 32, 35) are rated inversely. The maximum and minimum scores are 175 and 35 points, respectively. Higher scores indicate the perception of higher quality of school life while lower scores indicate the perception of inadequate quality of school life. The QSLS was revised in 2012 and the revised QSLS was used.[9]

Evaluation of Body Mass Index: The weight and height measurements were performed by researchers and body mass index (BMI) was calculated for each child. The height was measured using a tape measure. The students without shoes were placed in a standing position with united feet and an erected head. The weight was measured using an electronic scale (maximum capacity: 150 kg; sensitivity: 100 g).[8] BMI was calculated by dividing weight (kg) by the square of height (m^2). Body weight categories were defined as follows: underweight, BMI<5 percentile; healthy weight, BMI 5 - 85 percentile; overweight, BMI>85 percentile; and obesity>95 percentile.[10,11]

ETHICS APPROVAL

The study was approved by Ethic Committee on Clinical Trials of Yozgat Bozok University (approval date: May 8, 2019; approval number: 2019/307). In

addition, all students and their parents provided written informed consent. The study was conducted in accordance with the tenets of Helsinki Declaration.

STATISTICAL ANALYSIS

The BMI calculated was classified according to the reference range established by the National Center of Health Statistics. Overweight was defined as BMI>85 percentile while obesity was defined as BMI>95 percentile.[10,11] The scores in QSLS were assessed according to instruction of scale. Data were analyzed by IBM SPSS Statistics for Windows, Version 24.0. Armonk, NY, IBM Corp. using the chi-square test. $p<0.05$ was considered as statistically significant.

RESULTS

In the study population, the mean age was 12.2±1.2 years 50.9% were boys and 45.5% of subjects were attending a school with a low socioeconomic level. In addition, it was found that 77.1% of mothers were housewives while 69.9% of fathers were working. Of the subjects, 52.7% reported income status as good. In addition, 10.8% of subjects reported that he/she had a chronic disease while 4.4% reported chronic medication. It was found that 16.7% of subjects were overweight or obese based on BMI values (Table 1).

Of the subjects, 78.2% reported that they had regular breakfast; 85.4% reported that they consumed ≤3 meals daily; 82.3% reported that they had refreshments, and 63.9% reported that consumed fruit as refreshments. It was found to be the toast-ayran was main food consumed (34.1%) while water was the main beverage consumed (83.4%) during playground. Of the subjects, 64.6% reported that they consume fast-food ≥2 times per week. The main physical activities were running (56.0%) and football (49.4%) in the school while 61.6% of subjects reported that they walk to school (Table 2). Table 2 presents the relationship between descriptive parameters and BMI.

Based on BMI assessment, it was found that 16.7% of subjects were overweight or obese while 18.3% of girls were overweight or obese. However, no significant correlation was found between gender and BMI. In addition, it was found that the rate of overweight or obesity was 16.9% in students at schools with low socioeconomic levels whereas 16.4% in students at high socioeconomic levels, indicating no significant difference. The overweight or obesity rate was 18.7% in children of working mothers while it was 17.6% in children of unemployed fathers, indicating no significant difference regarding the employment status of parents. Of subjects who reported good income levels, 18.7% were overweight or obese, indicating a significant difference between groups. It was found that 17.1% of subjects without chronic disease and 16.8% of subjects without chronic medication were overweight or obese, indicating no significant correlation between BMI and chronic disease or medication (Table 3).

Of the subjects reported to have regular breakfast, 18.2% were overweight or obese; however, no significant correlation was found between BMI or having regular breakfast. It was found that 16.8% of subjects having ≥4 meals/day were overweight or obese but no significant correlation was found between groups. It was also found that 17.5% of subjects having refreshment were overweight or obese; however, no significant difference was found in BMI according to refreshment. The overweight or obese rate was 18.4% among subjects consuming fast-food once monthly or less with a significant difference between groups. Obesity or overweight rate was 16.8% in subjects walking or cycling to school while it was 16.4% in those using motor vehicle for going school. No significant difference was found between mode of school arrival and BMI (Table 4).

Mean total QSLS score was 120.5+22.7 (minimum-maximum: 39-171 points). And no significant correlation was found between BMI values and mean QSLS score ($p>0.05$).

DISCUSSION

In our study, it was found that frequency of overweight or obesity was 16.7% in elementary school students.

In a study on elementary school students, the frequency of overweight and obesity were found to be 12.4% and 6.5%, respectively.[8] In previous studies, the obesity prevalence was found as 4.4% in children aged 6-12 years, 5.4% in children aged 12-17 years,

TABLE 1: Nutritional habits, food types consumed, frequency and physical activities in children.

		n	%
Having breakfast	Yes	732	78.2
	No	204	21.8
Number of meals	≤3	799	85.4
	≥4	137	14.6
Having refreshment	Yes	770	82.3
	No	166	17.7
Frequently consumed refreshment	Fruits and vegetables	598	63.9
	Biscuit. chocolate etc.	528	56.4
	Milk	339	36.2
	Yogurt	321	34.3
	Dried nuts	301	32.2
Frequently consumed foods during break time in school*	Toast-ayran	319	34.1
	Fruits and vegetables	251	26.8
	Foods and beverages with sugar	174	18.6
	Dried nuts	130	13.9
	Crisp and cola	60	6.4
	Hamburger and cola	20	2.1
	No food	173	18.5
Frequently consumed beverages*	Water	781	83.4
	Tea-coffee	350	37.4
	Milk	274	29.3
	Fruit juice	203	21.7
	Ayran	161	17.2
	Cola	123	13.1
Fast food consumption frequency	None or 1 per month	331	35.4
	≥2 per week	605	64.6
Mode of transportation	By walking or cycling	577	61.6
	By motor vehicle	359	38.4
Physical activities in the school*	Running	524	56.0
	Football	462	49.4
	Volleyball	306	32.7
	Basketball	351	37.5
	Skipping rope	198	21.2
	Swimming	30	3.2

*More than one option was selected.

and 3.0% in elementary school students.[12,13] Similar results were obtained in studies from Türkiye. In our study, 15.1% of boys and 18.3% of girls were overweight or obese.

In a Turkish study on elementary school students, it was found that obesity was more common in boys than girls (12.5% vs. 9.6%).[14] Again, in studies from Canada and Michigan, it was found that obesity rate was higher among boys than girls (15.1% vs. 13.3 and 16% vs. 13%, respectively).[15] In the study by Kaya, it was found that obesity prevalence was higher in girls than boys (7.0% vs. 2.5%).[16] In our study, the rate for overweight or obesity was higher in girls than boys but the difference did not reach statistical significance.

In our study, frequency of obesity or overweight was numerically higher in students of working mothers (18.7%) and those of unemployed fathers (17.6%) when compared to other groups. In the literature, it has been reported that parental education level and occupation had direct influence on obesity status of children.[17]

TABLE 2: Comparison of BMI percentile results according to some defining characteristics.

		BMI percentile*						
		<5 percentile		5-85 percentile		>85 percentile		
Total	**936**	**n**	**%**	**n**	**%**	**n**	**%**	**χ^2, p****
		257	**27.5**	**523**	**55.9**	**156**	**16.7**	
Gender								
Boy	476	132	27.8	272	57.1	72	15.1	1.684 0.431
Girl	460	125	27.2	251	54.6	84	18.2	
School type								
Low SEL	426	121	28.4	235	55.2	70	16.4	0.352 0.839
High SEL	510	136	26.7	288	56.5	86	16.9	
Maternal employment status								
Housewife	722	192	26.6	414	57.3	116	16.1	2.754 0.252
Working	214	65	30.4	109	50.9	40	18.7	
Paternal employment status								
Unemployed	654	87	30.9	154	54.6	41	14.5	2.905 0.234
Working	282	170	26.0	369	56.4	115	17.6	
Income status								
Good level	493	126	25.6	275	55.8	92	18.7	10.700 0.030
Moderate level	418	118	28.2	239	57.2	61	14.6	
Poor level	25	13	52.0	9	36.0	3	12.0	
Chronic disease								
Yes	101	26	25.7	62	61.4	13	12.9	1.715 0.424
No	835	231	22.7	461	55.2	143	17.1	
Medication								
Yes	41	15	36.6	20	48.8	6	14.6	1.794 0.408
No	895	242	27.0	503	56.2	150	16.8	

*BMI percentile: The BMI was classified according to the reference range established by the National Center of Health Statistics; **Statistical analysis: Chi-square test; BMI: Body mass index.

Again, in previous studies, it was found that parental education level has influence on healthy lifestyle in adolescents.[18-20]

In a study on elementary school students, it was reported that obesity rate was significantly higher in children of working mothers while majority of children (70.4%) of housewives were non-obese.[14] In Çıtırak's study, it was reported that there was a significant relationship between obesity in children and the working status of the mother.[21] In the studies by Uskun et al. and Aslan et al. no significant association was observed between obesity in children and employment status of parents.[13,22]

In our study, it is thought that higher rates of overweight and obesity in children of working mothers can be due to irregular eating habits and increased consumption of fast-food. Again, it is though that higher rate of overweight and obesity in children of unemployed fathers may be due to failure to maintain balanced diet because of income loss and need

TABLE 3: Comparison of BMI percentile according to nutritional habits and mode of transportation.

		BMI percentile*						
		<5 percentile		5-85 percentile		>85 percentile		
Total	**936**	**n**	**%**	**n**	**%**	**n**	**%**	**χ^2, p****
		257	**27.5**	**523**	**55.9**	**156**	**16.7**	
Having breakfast								
Yes		190	26.0	409	55.9	133	18.2	7.306 0.026
No		67	32.8	114	55.9	23	11.3	
Number of meals								
≤3		223	27.9	443	55.4	133	16.6	0.591 0.744
≥4		34	24.8	80	58.4	23	16.8	
Having refreshment								
Yes		217	28.2	426	55.3	127	16.5	1.144 0.564
No		40	24.1	97	58.4	29	17.5	
Fast-food frequency								
0 or 1 per month		75	22.7	195	58.9	61	18.4	**6.094 0.048**
2 or more per week		182	30.1	328	54.2	95	15.7	
Mode of transportation								
By walking or cycling		150	26.0	330	57.2	97	16.8	1.654 0.437
By motor vehicle		107	29.8	193	53.8	59	16.4	

*BMI Percentile: The BMI was classified according to the reference range established by the National Center of Health Statistics; ** Statistical analysis: Chi-square test; BMI: Body mass index.

TABLE 4: Quality of School Life Scale score and variance analysis for perception of quality of school life according to BMI percentile.

		Minimum	**Maximum**	**$\bar{X}$**	**Median**	**SD**	**Minimum**
Quality of School Life Scale		**39**	**171**	**120.547**	**122.000**	**22.780**	**39**
	BMI percentile*	n	$\bar{X}$	SD	df	f**	p value
Quality of School Life	<5 percentile	257	119.80	22.51	2	0.331	0.718
	5-85 percentile	523	120.57	22.80			
	>85 percentile	156	121.68	23.24			

*BMI percentile: The BMI was classified according to the reference range established by the National Center of Health Statistics; **f: Analysis of variance; BMI: Body mass index; SD: Standard deviation; df: Degree of freedom.

for switch to carbohydrates and fats with higher caloric contents which are more inexpensive and accessible.

In our study, it was found that 16.4% of children attending to the schools with low socioeconomic level and 16.9% of children attending to the schools with high socioeconomic level were overweight and obese. In addition, rate of overweight of obesity was significantly higher (18.7%) in children reported good income level.

In a previous study, it was reported that rate of overweight or obesity was 39.4% in a private school whereas 14.5% in a school at a small town and that obesity prevalence was higher in state school with high socioeconomic level than the school with low socioeconomic level.[8] In the literature, it was reported

that obesity prevalence is higher in students with better socioeconomic level and students attending to private school.[22,23]

This suggests that adequate and balanced diet is perceived as excessive food consumption and that sedentary lifestyle can lead higher rate of obesity in families with high income.

In another study, it was seen that obesity/overweight rate was higher among children from families with higher household income. In regional study by Uskun et al., it was concluded that higher income level led an increase in obesity.[13] Based on data from Türkiye Demographic and Health Study 2013 report, it was found that obesity rate in children had greater association with income level of the family: the rate of obese/overweight children reached up to 16% among families with high income leveel.[24]

Obesity rate can be seen at considerable levels in groups with low socioeconomic level due to the limited sources for nutrition and resultant simplex nutrition in such groups.[25] Eating habits and physical activity are factors underlying the relationship between socioeconomic level and obesity. In individuals with socioeconomic level, the obesity is explained by the fact that healthy diet requires higher expenses while fat- and carbohydrate-enriched foods with high energy content are more readily available.[26] In addition, it was also found that children from low socioeconomic level have less opportunity for sport and other physical activities.[27]

In our study, 18.2% of the subjects reported to have regular breakfast were overweight or obese; however, no significant correlation was found between breakfast status and BMI. In a previous study, it was found that rate of having irregular breakfast habits was higher among obese students.[28] In a Saudi Arabian study on boys aged 10-14 years, it was reported that obesity frequency was higher among children rarely having or not having breakfast at home.[29] In a study by Aslan et al. no significant correlation was found between obesity and having regular breakfast in agreement with our study.[22]

The content of breakfast is also as important as having regular breakfast. The presence of overweight and obese individuals among those having regular breakfast can be explained by consumption of foods with high content of fat and carbohydrates such as bread and pastry.

In our study, it was found that 16.8% of students having ≥4 meals per day and 17.5% of students having refreshment were overweight or obese; however, no significant correlation was detected between BMI and these parameters.

Skipping meal is a common problem among children at school age. It may lead problems associated with malnourishment. In our study, there was a significant correlation between refreshment status and obesity ($p<0.05$) but no significant correlation was detected with main meal status and obesity ($p>0.05$). The obesity frequency was higher in children having no refreshment. In a study by Aslan et al., no significant correlation was found between obesity and having regular meals.[22]

In a study, it was found that obesity frequency was 21.2% among subjects skipping a meal but there was no significant correlation between obesity and skipping meal.[30] It was reported that there was no significant correlation between obesity and having regular lunch in the studies by Uskun et al. and Aslan et al.[13,22] In addition, Kaya et al. and Aslan et al. reported that there was no significant relationship between having regular dinner and obesity.[16,22] Moreover, in the study by Çıtırak et al., it was found that the overweight and obesity rates were 5.6% and 8.0% in children eating properly whereas 7.5% and 10.8% in children skipping meal, respectively.[21]

As similar to breakfast, number of meals or refreshment alone is not sole factor; the amount and content of meals are rather important. For instance, the consumption of foods with high fat and carbohydrate content despite having regular meals (3 meals per day) could result in increased frequency of obesity.[30] In addition, it is known that decreased energy level due to skipping a meal leads consumption of foods with higher caloric content during rest of the day.[21]

In our study, 18.4% of subjects consuming no fast-food or monthly were overweight or obese, indicating significant difference.

In a study by Aslan et al. no significant correlation was found between frequency of fast-food con-

sumption and obesity.[22] Again, there are studies in the literature reporting that there is no significant relationship between fast food consumption frequency and obesity prevalence.[14,30]

In our study, higher rate of overweight and obesity among students with no or low fast-food consumption suggest that effects of other foods consumed and amounts of fast-food.

In a previous study, it was found that there was no significant association between fast-food consumption and obesity in agreement with our study.[31]

Although it was found that rate of overweight and obesity was higher in children with lower frequency of fast-food consumption, it has been reported that the increased fast-food consumption is one of the factors effective in childhood obesity.[32]

In our study, 16.4% of students walking or cycling to school and 16.8% of students using motor vehicles to arrive school were overweight or obese.

Kaya reported no significant difference in obesity prevalence according to mode of transportation in agreement with our study.[16] On the other hand, there are studies demonstrated a significant correlation between obesity and mode of transportation.[13] In our study, mean QSLS score was 120.5±22.7 (minimum-maximum: 39-171 points), indicating moderate quality of school life.

Given that majority of childhood is spent in school, quality of school life is highly important. It is known that school has a great influence in both learning and socialization of a child. Mok and Flynn consider quality of school life as a preparation for many aspects of future social life, while Verkuyten and Thijs emphasized that the satisfaction in school is not only associated with individual characteristics of students but also with structure of classes in their study in which general satisfaction is effective on quality of school life.[33,34]

In our study, no significant difference was found in mean score of QSLS according to BMI values. It is suggested that obesity has negative impact on self-esteem, social relationship, opportunity to having good marriage and even on finding employment.[34]

Due to the fact that our research was conducted in a single provincial center, the results may not be generalized to all primary school-aged children. Additionally, the comparability of our study is limited by the scarcity of research employing similar assessment methods for obesity classification. Comparisons with studies using different methods constitute a limitation of our research.

CONCLUSION

It is important to implement measures directing long-term unfavorable consequences at pre-school period in order to prevent overweight and obesity in childhood.

We recommend to detect students with diagnosis of obesity and obese family member by screening in school settings; to plan preferential interventions; to take measures for limiting time of TV or PC time; to provide education on nutrition and obesity; and to add topics of nutrition and physical activity in curriculum.

Source of Finance

During this study, no financial or spiritual support was received neither from any pharmaceutical company that has a direct connection with the research subject, nor from a company that provides or produces medical instruments and materials which may negatively affect the evaluation process of this study.

Conflict of Interest

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working conditions, share holding and similar situations in any firm.

Authorship Contributions

Idea/Concept: *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Design:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Control/Supervision:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal, Ahmet Öztürk;* ***Data Collection and/or Processing:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Analysis and/or Interpretation:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Literature Review:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Writing the Article:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal;* ***Critical Review:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal, Ahmet Öztürk;* ***References and Fundings:*** *Şemsinnur Göçer, Nursel Üstündağ Öcal.*

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