

The Relationship Between Cooking and Food Skills and Obesity in Women: A Cross-Sectional Research

Kadınlarda Pişirme ve Yiyecek Hazırlama Becerileri ile Obezite Arasındaki İlişki: Kesitsel Araştırma

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ABSTRACT Objective: To assess cooking and food preparation skills among women and to evaluate relationship between these skills and obesity. **Material and Methods:** Research was conducted with 200 female individuals aged 19-64. Sociodemographic characteristics, dietary habits, cooking and food preparation knowledge, cooking and food skills scale, and anthropometric measurements were assessed. **Results:** Cooking, food skills and total scale scores were found to be statistically significantly higher in women with less than a high school degree ($p<0.05$). Food skills and total scale scores were found to be statistically significantly higher in married women ($p<0.05$). Cooking, food skills and total scale scores were found to be highest in overweight and obese groups, and a statistically significant difference was found in food skills scores and total scale scores among all groups ($p<0.05$). Cooking, food skills and total scale scores were found to be statistically significantly higher in women who liked to cook compared to those who did not ($p<0.05$). Using underweight and normal individuals according to body mass index classification as a reference, a 1-unit increase in food preparation skills score increases risk of being overweight and obese by 1.022 times ($p=0.009$), while a 1-unit increase in total scale score increases risk of being overweight and obese by 1.013 times ($p=0.031$). **Conclusion:** Cooking and food preparation skills may help individuals meet daily nutritional needs. However, these skills might be linked to obesity depending on how they are used. Potential impact of improper use of these skills on obesity should not be ignored.

ÖZET Amaç: Kadın bireylerde pişirme ve yiyecek hazırlama becerisini ölçmek ve bu becerinin obezite ile ilişkisini değerlendirmektir. **Gereç ve Yöntemler:** Araştırma 19-64 yaşlarında 200 kadın bireyle yürütülmüştür. Sosyodemografik özellikler, beslenme alışkanlıkları, pişirme ve yiyecek hazırlama bilgileri, pişirme ve yiyecek hazırlama becerileri ölçeği ve antropometrik ölçümler değerlendirilmiştir. **Bulgular:** Pişirme becerileri puanları, yiyecek hazırlama becerileri puanları ve toplam ölçek puanları lise mezunu altında olan kadınlarda istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur ($p<0.05$). Yiyecek hazırlama becerileri ve toplam ölçek puanı evli kadınlarda istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur ($p<0.05$). Pişirme becerileri puanları, yiyecek hazırlama becerileri puanları ve toplam ölçek puanları en fazla fazla kilolu ve obez gruplarda saptanmış olup yiyecek hazırlama becerileri puanları ve toplam ölçek puanlarında tüm gruplar arasında istatistiksel olarak anlamlı farklılık belirlenmiştir ($p<0.05$). Pişirme becerileri puanları, yiyecek hazırlama becerileri puanları ve toplam ölçek puanları yemek yapmayı seven kadınlarda sevmeyenlere kıyasla istatistiksel olarak anlamlı düzeyde yüksek bulunmuştur ($p<0.05$). Beden kitle indeksi sınıflandırmasına göre zayıf ve normal bireyler referans alındığında, yiyecek hazırlama becerileri puanındaki 1 birimlik artış fazla kilolu ve obez olma riskini 1.022 kat artırırken ($p=0.009$), toplam ölçek puanındaki 1 birimlik artış fazla kilolu ve obez olma riskini 1.013 kat artırmaktadır ($p=0.031$). **Sonuç:** Yiyecek pişirme ve hazırlama becerileri, bireylerin beslenme yönergeleri doğrultusunda günlük besin öğeleri gereksinimlerini karşılamalarına yardımcı olabilir. Ancak, bu becerilerin kullanımı ile obezite arasındaki ilişkiyi incelemek önemlidir. Bu nedenle yemek pişirme ve gıda hazırlama becerilerinin yanlış kullanımının obezite ile bağlantılı olabileceği göz ardı edilmemelidir.

Keywords: Nutrition; obesity; cooking skills; food skills

Anahtar Kelimeler: Beslenme; obezite; pişirme becerileri; yeme becerileri

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Cooking skills are increasingly integrated into strategies aimed at preventing and managing obesity.^{1,2} These skills influence body weight status and diet quality, thereby affecting the risk of developing nutrition-related diseases. While cooking and food skills contribute to maintaining a healthy diet, improper or uninformed use of these abilities can create a complex relationship with obesity. However, while cooking and food skills are generally associated with healthier dietary patterns, their impact on obesity is complex and influenced by various factors, including the types of foods prepared, portion sizes, and cooking methods used.³

Nutritional knowledge alone is insufficient for implementing dietary recommendations and establishing healthy eating habits. Practical skills, including cooking, meal planning, and food purchasing, are necessary to translate this knowledge into action.² The increasing consumption of ready-to-eat foods and meals out of the house—both connected to rising obesity rates—highlights the necessity of evaluating and promote people's cooking and food skills. While existing research has focused on the positive relationship between cooking skills and healthy eating, there is limited understanding of how different levels and applications of these skills may contribute to or mitigate obesity risk.^{4,6} Recognizing this, Lavalley et al. developed cooking and food skills scale in 2017.⁴ Although studies mostly emphasize that low cooking and food skills cause obesity, it is obvious that the opposite potential is also ignored.⁷ Although overweight and obese individuals mostly tend to eat fast-food-style processed foods, it should not be forgotten that there are also those among these individuals who use cooking and food skills very well.⁵ Cooking and food skills can cause a misconception that it always means producing healthy food. It should not be forgotten that overweight and obese individuals actually spend a lot of time in the kitchen and improve themselves in the use of new recipes and techniques. At this point, in addition to the use of correct techniques, the amount of food produced is also important. Therefore, portion control, which is a very important point for overweight and obese individuals, emerges.⁷ Moreover, no matter how well these skills are used, the issue of which types of food are ul-

timately chosen to cook is also very important. In other words, healthy/unhealthy food selection and the presence/absence of portion control can mask cooking and food skills. In addition to the existence of these abilities, it is essential in which way they are used. This research aims to assess cooking and food skills of women, who play a key role in meal planning in Türkiye Turkey, and examine the relationship between these skills and obesity.

MATERIAL AND METHODS

PARTICIPANTS

This study has a cross-sectional design and aims only to explore correlation. Therefore, it is not possible to establish a cause-effect relationship, only the relationship between variables was examined. This research was conducted with 200 women between the ages of 19-64 in Ankara. The sample selection was made for practical reasons and accessibility. Data were not collected from individuals aged between 19 and 64 years, who were illiterate and did not have the cognitive functions to answer the questions correctly. The research universe was using the G-power (Heinrich Heine University, Düsseldorf, Germany) statistical sample analysis application (significant threshold: 0.05; power: 0.90; effect size: 0.5), it was found that 200 women were sufficient.⁸ Research was carried out in compliance with the Helsinki Declaration and the approval of the Ankara University ethics committee with decision number 410952 was acquired. Participants were asked to sign informed consent forms, stating that confidentiality and voluntariness were essential.

STUDY PLAN

The questionnaire included a total of 45 questions, including questions on demographic characteristics, anthropometric measurements and nutritional status, as well as questions on eating and cooking skills. The cooking and food skills scale consisted of 14 questions assessing cooking skills and 19 questions assessing food preparation skills. The research data were gathered by applying a face to face survey method. In addition, waist measurements (WC), hip (HC) and neck circumference (NC) using a stadiometer for height, body weight, and a non-flexible

tape measure (BW), the percentage of body fat (BFP), lean body mass (LBM) and body water percentage were measured by the researchers with “TANITA-BC-545-N (Tanita Health Co., Ltd, Japan)” in accordance with the rules.⁹⁻¹⁴

COOKING AND FOOD SKILLS SCALE

This study used the “Cooking Skills and Food Skills” scale developed by Lavalley et al. in 2017.⁴ The Turkish validity and reliability of the scale were conducted by Keleş and Akçıl Ok in 2021.¹⁵ Scale has an 8-item likert between from 1 (atrocious) to 7 (excellent) with a never/rare option, and is a 33-item questionnaire originally. Scores ranging from 1 to 7 are added for the skills employed after participants are asked to judge their performance on each assignment. Rarely or never do participants who check receive zero points. Cooking and food abilities improve with a higher overall score.⁴

DATA ANALYSES

Assessed qualitative and quantitative data are presented with descriptive statistics. Quantitative factors was provided as standard deviation (SD) and mean., whilst qualitative variables were evaluated as percentage (%), number (N). The relationship between scale scores and obesity classification was determined using a binary logistic regression model. The connection between measurements of anthropometry and sociodemographic characteristics and the total scale score was evaluated with a linear regression model. The statistical package SPSS 27.0 (IBM Corp., Armonk, NY, USA) was used to assess the data's statistical analysis.

RESULTS

When total scores of women's obesity status and cooking and FS were examined, it was determined that overweight women in the 18-30 age range had the highest score, and obese women in the 31-49 age group and 50-64 age range had the highest score. Generally, obese women have the highest score with 173.6 points. When the scale scores of all individuals based on age groups were evaluated, it was found that the 31-49 age group had the highest score, but there was no difference between the age groups ($p>0.05$) (Figure 1).

Average CS score for women was 75.8 ± 14.8 points, the average FS score was 97.7 ± 22.2 points, total CS and FS score was 170.2 ± 33.3 points. All scores were found to be higher in women who were lower than high school graduates ($p<0.05$). FS and total scale score were found to be higher in married women ($p<0.05$). CS scores, FS scores and total scale scores were determined the most in the overweight and obese groups, while a difference was determined between all groups for FS scores and total scale scores ($p<0.05$) (Table 1).

CS scores, FS scores and total scale scores were determined higher in women who liked to cook compared with those who did not ($p<0.05$). CS scores, food and total scale scores were found higher in those who cooked at home for 5 or more times a week compared to those who cooked at home 3-4 times a week ($p<0.05$). All scores were found higher in those who did menu planning compared to those who did not ($p<0.05$). FS and total scale scores of those who made shopping lists were found higher than those who did not ($p<0.05$). FS and total scale scores of those who read food labels were found higher than those who did not ($p<0.05$). FS scores of those with a cooking time of less than 1 h were found higher than those with a cooking time of 1 h or more ($p<0.05$) (Table 2).

When lean and normal individuals according to BMI classification are taken as reference, 1-unit increase in FS score increases the risk of being overweight and obese 1,022 times ($p=0.009$), while a 1-unit increase in total scale score increases the risk of being overweight and obese 1,013 times

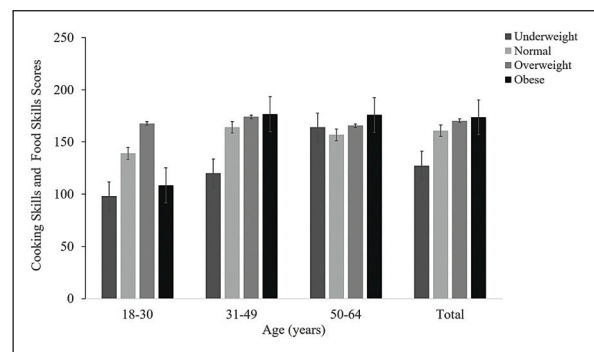


FIGURE 1: CS and FS total score distributions according to age and BMI classification

TABLE 1: Characteristics of women by level of CS and food skills

Characteristics	n (%)	CS and FS score					
		CS		FS		CS and FS (total)	
		$\bar{X} \pm SD$	p value	$\bar{X} \pm SD$	p value	$\bar{X} \pm SD$	p value
Total	200 (100)	75.8 \pm 14.8		97.7 \pm 22.2		170.2 \pm 33.3	
Education status							
Under high school	105 (52.5)	79.5 \pm 13.5	<0.001 ^a	101.2 \pm 19.7	0.017 ^a	175.9 \pm 29.4	0.011 ^a
High school and above	95 (47.5)	71.8 \pm 15.1		93.7 \pm 24.2		163.9 \pm 36.3	
Marital status							
Married	171 (85.5)	76.6 \pm 12.3	0.073 ^b	100.2 \pm 20.4	0.001 ^b	172.9 \pm 29.9	0.046 ^a
Single	29 (14.5)	71.4 \pm 24.8		83.0 \pm 26.7		154.4 \pm 46.3	
Job Status							
Working	177 (88.5)	76.4 \pm 14.5	0.179 ^b	98.4 \pm 21.5	0.187 ^a	171.3 \pm 32.5	0.207 ^a
Not working	23 (11.5)	71.4 \pm 16.4		91.9 \pm 26.9		161.9 \pm 39.2	
Income level (lira)							
Low (\leq 6,000)	155 (77.5)	75.9 \pm 15.4	0.939 ^b	96.6 \pm 23.5	0.142 ^a	169.2 \pm 35.1	0.381 ^a
High (>6,000)	45 (22.5)	75.4 \pm 12.7		101.3 \pm 16.8		173.5 \pm 26.5	
Body weight status (BMI, kg/m ²)							
Underweight (<18.5)	3 (1.5)	63.0 \pm 7.0	0.086 ^d	74.3 \pm 29.8	0.048 ^d	127.3 \pm 33.6	0.022 ^c
Normal (18.5-24.9)	24 (12.0)	72.8 \pm 14.0		88.6 \pm 26.7		160.8 \pm 37.6	
Overweight or obese (\geq 25)	173 (86.5)	76.5 \pm 14.9		99.3 \pm 21.0		172.2 \pm 32.2	

*p<0.05; ^aIndependent samples t-test; ^bMann-Whitney U test; ^cAnalysis of variance; ^dKruskal-Wallis test. CS: Cooking skills; FS: Food skills; SD: Standard deviation; BMI: Body mass index

TABLE 2: Evaluation of women's cooking and food knowledge levels

Characteristics	n (%)	CS and FS score					
		CS		FS		CS and FS (total)	
		$\bar{X} \pm SD$	p value	$\bar{X} \pm SD$	p value	$\bar{X} \pm SD$	p value
Love to cook							
Yes	167 (83.5)	77.0 \pm 14.7	0.006 ^b	99.9 \pm 20.9	0.001 ^a	173.9 \pm 31.8	<0.001 ^a
No	33 (16.5)	69.8 \pm 13.9		86.0 \pm 25.1		151.3 \pm 34.8	
Frequency of home cooking (n/week)							
\geq 5/week	168 (84)	77.9 \pm 13.4	<0.001 ^c	101.3 \pm 19.6	<0.001 ^d	175.4 \pm 29.5	<0.001 ^c
3-4/week	21 (10.5)	63.9 \pm 16.9		74.7 \pm 26.6		137.7 \pm 41.1	
1-2/week	11 (5.5)	69.4 \pm 17.6		86.0 \pm 22.3		153.2 \pm 35.3	
Menu planning							
Yes	158 (79)	77.3 \pm 12.1	0.005 ^b	101.1 \pm 20.7	<0.001 ^b	175.0 \pm 29.9	<0.001 ^a
No	42 (21)	70.5 \pm 21.5		84.7 \pm 23.1		151.9 \pm 39.3	
Making a shopping List							
Yes	142 (71)	76.5 \pm 15.0	0.304 ^a	100.9 \pm 19.9	0.004 ^a	174.5 \pm 31.2	0.004 ^a
No	58 (29)	74.1 \pm 14.1		89.8 \pm 25.5		159.7 \pm 36.2	
Reading labels							
Yes	153 (76.5)	76.5 \pm 15.0	0.379 ^b	100.9 \pm 19.9	<0.001 ^a	174.5 \pm 31.2	0.002 ^a
No	47 (23.5)	74.1 \pm 14.2		89.8 \pm 25.5		159.7 \pm 36.2	
Meal prep time							
\geq 1 h	90 (45)	74.9 \pm 15.0	0.092 ^b	95.3 \pm 19.6	0.022 ^b	167.6 \pm 29.3	0.235 ^a
<1 h	110 (55)	76.9 \pm 14.5		100.5 \pm 24.8		173.4 \pm 37.6	

*p<0.05; ^aIndependent samples t-test; ^bMann-Whitney U test; ^cAnalysis of variance; ^dKruskal-Wallis test. CS: Cooking skills; FS: Food skills; SD: Standard deviation

($p=0.031$). When those who are normal according to the neck circumference classification are taken as reference, a 1-unit increase in the FS score increases the risk of being overweight and obese 1,017 times ($p=0.018$), while a 1-unit increase in the total scale score increases the risk of being overweight and obese 1,011 times ($p=0.029$). When those who are normal according to waist/height ratio classification are taken as reference, a 1-unit increase in FS score increases the risk of being overweight and obese 1,019 times ($p=0.035$) (Table 3).

1-unit increase in body fat percentage increases the total scale score by 0.646 units ($p=0.039$). 1-unit increase in body weight increases the total scale score

by 0.043 units ($p=0.043$). 1-unit increase in hip circumference increased the total scale score by 0.419 units ($p=0.041$). The total scale score of those at risk for obesity was 11,666 units higher than those with normal neck circumference classification ($p=0.027$). 1-unit increase in age increased the total scale score by 0.419 units ($p=0.017$). When the effect of education status on the total scale score is examined, the total scale score of those who are high school graduates and above is 12,002 units less than those who are less than high school graduates ($p=0.011$). The total scale score of those who did not like to cook is 7,194 units less than those who love to cook ($p<0.001$). The total scale score of those who do not plan a menu is 6,801 less ($p=0.008$) (Table 4).

TABLE 3: Relationship between the obesity and cooking and FS scores

Variables	According to the BMI classification overweight and obese		According to neck circumference classification overweight and obese		According to waist/height ratio classification overweight and obese	
	OR (95% CI)		OR (95% CI)		OR (95% CI)	
	lower-upper	p value	lower-upper	p value	lower-upper	p value
Cooking skills	1,022 (0.995-1.051)	0.115	1,011 (0.989-1.033)	0.323	1,025 (0.997-1.054)	0.079
Food skills	1,024 (1.006-1.042)	0.009*	1,017 (1.003-1.032)	0.018*	1,019 (1.001-1.038)	0.035*
Total scale score	1,013 (1.001-1.025)	0.031*	1,011 (1.011-1.020)	0,029*	1,012 (1.000-1.024)	0.055

* $p<0.05$. BMI: Body mass index; OR: Odds ratio; CI: Confidence interval

TABLE 4: The relationship between anthropometric measurements and sociodemographic characteristics with cooking and food skills

Variables	Total scale score			
	B (95% CI) Lower-upper	SE	Beta	p value
BFP (%)	0.646 (0.032-1.261)	0.312	0.146	0.039*
BW (kg)	0.326 (0.010-0.642)	0.160	0.143	0.043*
WC (cm)	0.281 (-0.059-0.620)	0.172	0.115	0.104
HC (cm)	0.419 (0.018-0.821)	0.204	0.145	0.041*
Waist/hip	0.928 (-4.459-6.315)	2.732	0.024	0.734
Waist/height	6.400 (-0.258-13.058)	3.376	0.134	0.059
NC (cm)	11.666 (1.359-21.973)	5.227	0.157	0.027*
Age (year)	0.521(0.093-0.948)	0.217	0.168	0.017*
Educational status	-12.002 (-21.180--2.823)	4.654	-0.180	0.011*
Love to cook	-22.618 (-34.760--10.466)	6.160	-0.252	<0.001*
Menu planning	-23.079 (-34.053--12.106)	5.565	-0.283	<0.001*

* $p<0.05$. B: Non-standardized coefficient; CI: Confidence interval; SE: Standard error; Beta: Standardized coefficient; BFP: Percentage of body fat; BW: Body weight; WC: Waist circumference; HC: Hip circumference; NC: Neck circumference

DISCUSSION

People's tendencies to ready-made foods, the increase of fast food restaurants; makes it difficult to maintain a healthy body weight while living in an obesogenic environment.^{16,17} Because to time constraints and convenience, the consumption of foods prepared outside the home has become increasingly common around the world.¹⁸ It is stated that especially working individuals buy ready-packaged and processed meals due to lack of time, low cooking self-efficacy and reduced meal planning skills.¹⁹ Researches have determined that there is a positive connection between the consumption of ultra-processed foods and high BMI, obesity and metabolic syndrome.^{5,20,21} In this sense, cooking and food skills are critical for a healthy diet of the individual. However, it is critical to use these skills correctly and to support these skills in aspects such as portion control, choosing healthy menu plans, and reading food labels.

In a study in Türkiye Turkey that included 150 men and 150 women individuals, it was determined that the food skills sub-dimension score was higher than the cooking skills sub-dimension.¹⁵ In a study conducted in Switzerland, cooking and food skills were examined separately for students, adults and dietitians, and similarly, it was determined that the adult food skills sub-dimension score was higher than the cooking skills sub-dimension score.²² The results of this research showed that the food skills sub-dimension score was higher than the cooking skills sub-dimension score, consistent with literature. Additionally, in this study, the scale scores were slightly higher than in other studies. This may be because only women were evaluated in this study. In a study evaluating the CS and FS scale scores according to age groups, the median values of CS and FS total scale scores for 18-25, 26-35, 36-45 and 46-64 age groups were determined as 147.5, 171, 174, 165. Statistically significant differences were found between CS and FS total scale scores according to age groups, and it was stated that the groups that created this difference were between the ages of 18-25 and 26-35.¹⁵ In a study examining the cooking habits of Hispanic men and women, the

cooking skills scale was evaluated and no difference was found between age groups.²³

In a study, it is stated that the total scale score increases as the education level increases.²² Similarly, in this study, cooking skills scores, food skills scores and total scale scores were observed higher in women who were under high school graduates. There are studies showing an association relate excitement, cooking abilities, and choosing healthier foods.^{2,24} But some research have not found direct relationship for body weight, cooking frequency, and cooking skills.^{3,23,25} Although cooking and food skills are important on obesity, it is obvious that many factors should not be ignored.²⁶⁻²⁸ A study examining the relationship between socioeconomic status and obesity found that low-income individuals had a higher risk of obesity adjusted for age and gender, and that uncontrolled eating and nighttime eating habits mediated this relationship.²⁹ It is emphasized that genetic studies continue to play a strong role in shaping the understanding of weight-regulating pathways and their perturbations in obesity.^{30,31} In another study, obesity and portion control were emphasized and the importance of portion control in weight loss was stated.³² In addition, many factors such as physical activity, smoking, presence of accompanying chronic diseases, etc. have been emphasized on obesity.^{33,34} The cuisines of different cultures are also very important in food selection, and in a study evaluating excerpts on obesity and populations from the Mediterranean and Middle Eastern regions, it was emphasized that although the Middle Eastern cuisine has similarities when compared to the Mediterranean Diet, body weight decreases and cardiometabolic risk factors improve, especially with the addition of calorie restriction and physical activity intervention to the Mediterranean Diet.³⁵

In our study, it was determined that the risk of obesity increases as cooking and food skills increase. First of all, it was determined that a large portion of female individuals are unemployed and housewives. Moreover, it was determined in our study that 77.5% of women have a low income level. It is known that low-income individuals tend to consume carbohydrate-heavy foods, which are

generally seen as more economical and satisfying. In our study, it was determined that individuals generally prefer foods prepared with traditional methods. In addition, studies in the literature are generally conducted in Western societies or in different socioeconomic groups. In addition, individuals with high cooking skills focus more on the taste and appearance of the food, which can make portion control difficult. Our study supports the fact that cooking and food preparation skills alone are not sufficient for weight control, and that food preferences, physical activity, economic status, genetic factors associated with obesity, accompanying chronic diseases and cultural factors are also of great importance.

LIMITATIONS

This study's cross-sectional nature, limited sample size and scope, the fact that the data were collected through self-report, and the fact that it was conducted only with women are among its limitations. However, the study also has its strengths. The strength of the study is that it is one of the few studies examining women's cooking and food preparation skills together with obesity. It is important that future studies evaluating the relationship between CS and FS and obesity be conducted with a broader scope and in which many factors can be addressed together.

CONCLUSION

This study highlights that cooking and food preparation skills are important for public health but are in-

sufficient alone to ensure healthy nutrition. Factors such as food preferences, portion control, physical activity, and socioeconomic status also play critical roles in preventing diseases like obesity and diabetes. Nutrition education should therefore include practical skills like shopping, label reading, and menu planning alongside cooking techniques. Adapting traditional cuisines to healthier methods and promoting intergenerational transfer of cooking skills can support sustainable healthy eating habits. Finally, a holistic public health approach combining education on cooking, diet, and physical activity is essential to improve population health outcomes.

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: Gül Eda Kılınç; **Design:** Gül Eda Kılınç; **Control/Supervision:** Gül Eda Kılınç, Alev Keser; **Data Collection and/or Processing:** Gül Eda Kılınç; **Analysis and/or Interpretation:** Gül Eda Kılınç; **Literature Review:** Gül Eda Kılınç; **Writing the Article:** Gül Eda Kılınç; **Critical Review:** Alev Keser.

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