

# The Relationship Between Perceived Stress Level and Healthy Nutritional Attitude and Body Weight in Adults: Descriptive and Cross-Sectional Study

## Erişkin Bireylerde Algılanan Stres Düzeyinin Sağlıklı Beslenme Tutumu ve Vücut Ağırlığı ile İlişkisi: Tanımlayıcı ve Kesitsel Çalışma

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**ABSTRACT Objective:** This study aimed to evaluate the perceived stress level and its relationship with healthy nutrition attitude and body weight in adults. **Material and Methods:** This descriptive epidemiological study was conducted with a total of 600 adult individuals who agreed to fill out the online questionnaire. Sociodemographic characteristics, stress levels and nutritional attitudes of individuals were determined with the 25-question online questionnaire applied to collect the research data. In addition, there is a 14-item Perceived Stress Scale and a 21-item Attitude Scale towards Healthy Eating. **Results:** The mean age of the individuals was 27.96±9.53 years. According to the data obtained, the mean body mass index (BMI) was 23.97±4.23 kg/m<sup>2</sup> and 7.5% of the participants were obese. Stress levels of individuals with an ideal level of healthy nutrition attitude were found to be significantly lower than that of individuals with both high and medium attitude levels (p<0.001). In addition, there was a weak negative significant correlation between BMI and stress level in all participants and individuals with BMI<30 (r=-0.193 and r=-0.213, p<0.05, respectively). **Conclusion:** According to the results of this study, ideal healthy eating attitude. It has been observed that individuals with high blood pressure have lower levels of stress compared to other individuals, perceived stress of individuals does not directly affect BMI, and there is no relationship between BMI and healthy eating attitude. However, when individuals are stressed, they may prefer unhealthy and packaged products. It should not be forgotten that changes in these food preferences made during stress may cause increases in body weight in the long term.

**Keywords:** Stress; nutritional sciences; nutrition attitude; body weight

**ÖZET Amaç:** Bu çalışma, erişkin bireylerde algılanan stres düzeyinin sağlıklı beslenme tutumu ve vücut ağırlığı ile ilişkisini değerlendirmek amacıyla planlanmıştır. **Gereç ve Yöntemler:** Bu tanımlayıcı epidemiyolojik çalışma, çevrim içi anketi doldurmayı kabul eden toplam 600 erişkin birey ile yapılmıştır. Araştırma verilerini toplamak için uygulanan 25 soruluk çevrim içi anket formu ile bireylerin sosyodemografik özellikleri, stres düzeyleri, beslenme tutumları belirlenmiştir. Ayrıca ankette 14 maddelik Algılanan Stres Ölçeği ve 21 maddelik Sağlıklı Beslenmeye Yönelik Tutum Ölçeği de bulunmaktadır. **Bulgular:** Araştırmada kişilerin yaş ortalaması 27,96±9,53 yıldır. Elde edilen verilere göre beden kitle indeksi (BKİ) ortalaması 23,97±4,23 kg/m<sup>2</sup> olup, katılımcıların %7,5'i obezdir. İdeal düzeyde sağlıklı beslenme tutumuna sahip bireylerin stres düzeyleri, hem yüksek hem de orta tutum düzeyine sahip bireylere göre anlamlı derecede daha düşük bulunmuştur (p<0,001). Ayrıca tüm katılımcılarda ve BKİ<30 kg/m<sup>2</sup> olan bireylerde BKİ ile stres düzeyi arasında zayıf negatif anlamlı bir ilişki saptanmıştır (sırasıyla r=-0,193 ve r=-0,213, p<0,05). **Sonuç:** Bu çalışmanın sonuçlarına göre ideal sağlıklı beslenme tutumuna sahip bireylerin stres düzeyleri diğer bireylere göre düşük düzeyde olduğu, bireylerin algılanan stresinin doğrudan BKİ'yi etkilemediği ve BKİ ile sağlıklı beslenme tutumu arasında ilişkili olmadığı görülmüştür. Ancak bireyler stresli olduklarında sağlıksız ve paketli ürünlere yönelebilmektedirler. Stres anında yapılan bu besin tercihlerindeki değişikliklerin uzun dönemde vücut ağırlığında artışlara neden olabileceği unutulmamalıdır.

**Anahtar Kelimeler:** Stres; beslenme bilimi; beslenme tutumu; vücut ağırlığı

Stress is expressed as a reaction that occurs in the event of physical and psychological difficulties caused by a situation or action in the individual.<sup>1</sup> In the case of stress, biochemical, physiological and behavioral changes occur and a negative mood is ob-

served and affects the majority of the population. Whether people will experience stress depends primarily on the meaning and importance attributed to such potential "stress factors".<sup>2</sup> Stressors can be classified as daily difficulties, acute stressful life situa-

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tions and chronic difficulties.<sup>3</sup> Stress, which has negative effects on human health, is also associated with nutritional behaviors and diet patterns, and it is known that the nutritional behaviors of individuals under stress change.<sup>1</sup>

Acute stressful life situations limit food intake, while chronic challenges can increase cortisol levels, food intake, weight gain, and abdominal adiposity.<sup>3</sup> Individuals who experience stress because of life events often report that their eating is out of control or that they consume excessive food. Although less common, they may be experiencing reduced eating behaviour.<sup>4</sup> As such, perceived stress can be associated with irregular eating, uncontrolled eating (excessive eating, binge eating, hunger, and disinhibition), and comfort eating.<sup>5</sup>

In the researches, it has been determined that individuals consume high-energy, high-fat, low-nutritive foods in case of stress and their emotional eating behaviors increase.<sup>6-9</sup> Emotional eating, defined as the use of food to avoid negative emotions; It can lead to obesity, eating disorders, depression and hormonal problems.<sup>10</sup> This study aimed to evaluate perceived stress levels in adults and determine the relationships between healthy nutrition attitude and body weight.

## MATERIAL AND METHODS

### STUDY POPULATION

This descriptive epidemiological study was conducted between January 15, 2021 and May 15, 2021. Ethics committee approval was obtained from the Ethics Committee of Kırklareli University Health Sciences Institute for the conduct of the study (date: December 21, 2020, no PR0276R0). Due to pandemic conditions, an online questionnaire form was created via Google Forms. The questionnaire form was delivered to the individuals via social media and they were asked to send it to the individuals who agreed to participate in the research. Those forms were applied to the participants voluntarily. Before starting the survey, this situation was stated in the introduction, and individuals were told that only individuals who wanted to participate voluntarily would fill out the online questionnaire form. The research population consisted of male and female persons

aged 18 and over who agreed to do the research throughout Türkiye, given that they could complete the online questionnaire. The research consists of Türkiye in general. Concerning power analysis, performed for 5% type I error, 0.02 standardized effect size, two estimators, and 80% power, the required minimum sample size was calculated as a total of at least 485 participants with the help of the G-Power program (v3.1.9.7) (Franz Faul, Universität Kiel, Germany). However, considering the case losses, a total of 630 people were reached. Since 30 out of 630 did not answer completely, the study data were not taken. In this way, the study was completed with 600 person. The study was completed by conducting in accordance with the principles of the Declaration of Helsinki.

### ANTHROPOMETRIC MEASUREMENTS

Body weight (kg) and height (cm) were recorded as anthropometric measurements of the individuals, and the body mass index (BMI) of each participant was calculated. The World Health Organization classification was used in the categorization of BMI. According to this classification, those with a BMI below 18.5 kg/m<sup>2</sup> were classified as underweight, those with 18.5-24.9 kg/m<sup>2</sup> as normal, those with 25.0-29.9 kg/m<sup>2</sup> as overweight, and those  $\geq 30$  kg/m<sup>2</sup> as obese.<sup>11</sup>

### DATA COLLECTION TOOLS

The individuals' sociodemographic characteristics, stress levels, nutritional attitude were determined with the 25 questions online questionnaire form applied to collect the research data. In addition, there were two scales in the questionnaire. The first measures perceived stress with 14 questions, and the second evaluates attitudes toward healthy nutrition with 21 questions.

### PERCEIVED STRESS SCALE

Created by Cohen et al., the Perceived Stress Scale (PSS) consisted of 14 items and was designed to evaluate how stressful a particular situation in one's life is perceived.<sup>12</sup> Turkish adaptation, validity, and reliability study of the PSS was carried out by Eskin et al. in 2013. In the scale, participants evaluated each item on a 5-point Likert-type scale ranging from "Never (0)" to "Very often (4)". Seven of the items with favorable statement are scored inversely (items

4, 5, 6, 7, 9, 10, 13). The scores of PSS-14 range from 0 to 56, and a superior score shows surplus of stress perception. A high score indicates an excess of one's perception of stress. A score of 28 and above is scored as high perceived stress, and values below 28 are scored as low perceived stress.<sup>13</sup>

#### ATTITUDE SCALE FOR HEALTHY NUTRITION

The validity and reliability of the Attitude Scale for Healthy Nutrition (ASHN) was studied by Tekkurşun Demir and Cicioğlu. Consequently the explanatory factor analysis, a structure including 21 items and four factors was created. The resulting factors were named Information on Nutrition, Emotion for Nutrition, Positive Nutrition, and Malnutrition. The scale includes positive and negative attitude items. The classifications of the positive items were stated as "Strongly disagree", "Disagree", "Undecided", "Agree", and "Strongly agree". Positive attitude items are scored as 1, 2, 3, 4, and 5 point(s), while negative attitude items are scored as 5, 4, 3, 2, and 1 point(s), respectively. The lowest score that can be obtained from the scale is 21, and the highest score is 105. It is explained that the participants from the ASHN have an attitude towards healthy eating with 21 points very low, 23-42 points low, 43-63 points medium, 64-84 points high, and 85-105 points ideally high.<sup>14</sup>

#### STATISTICAL ANALYSIS

Statistical analyses of the data related to the study were performed using the IBM SPSS v22.0 software (IBM Statistical Packages for the Social Sciences, USA). Mean rank, mean, and standard deviation ( $\bar{X} \pm SD$ ), along with numbers and percentages, were used to present descriptive data. Cronbach's alpha values were calculated to evaluate the reliability of the scales used in the study. The conformity of the data to the normal distribution was evaluated with the Kolmogorov-Smirnov test. The Kruskal-Wallis test was used to compare quantitative variables between more than two independent groups, and the post hoc was used to identify the group(s) that demonstrated pairwise differences. Chi-square tests were used to compare the distributions of categorical variables. Yates correction and Fisher's test were applied considering the expected values of the crosstab cells in

selecting the chi-square relationship test. Independent samples t-test was used in normal distribution to determine the difference between two independent groups, and Mann-Whitney U test was used in the absence of normal distribution. The directional relationships between continuous variables were examined by calculating Pearson and Spearman correlation coefficients. The relationship of continuous variables with each other was examined with the Pearson correlation and Spearman correlation test. The logistic regression test was applied to determine the factors affecting BMI. Logarithmic transformation was applied for the BMI variable that did not show normal distribution. We carry out the "Enter" method in the regression model. The statistical significance threshold was taken as  $p < 0.05$ .

#### RESULTS

The mean age of the individuals was  $27.96 \pm 9.53$  years. According to the data obtained, the mean BMI was  $23.97 \pm 4.23$  kg/m<sup>2</sup> and 7.5% of the participants were obese. In addition, individuals' mean PSS score was  $28.88 \pm 7.83$ , while the mean score of the ASHN was  $74.65 \pm 10.46$ . While 42.2% of obese individuals prefer unhealthy food under stress, non-obese individuals prefer happiness and stress (35.7% and 35.0%, respectively). The demographic information of the obese and non-obese people participating in the study is given in [Table 1](#).

The levels of attitudes for healthy nutrition and stress according to nutritional status are given in [Table 2](#). Stress levels of overweight individuals were found to be substantially lower than those of normal weight and underweight individuals ( $p = 0.001$ ). There was no difference between the levels of attitudes for healthy nutrition according to the body weight of the individuals ( $p = 0.730$ ).

Stress levels of individuals with an ideal level of healthy nutrition attitude were found to be significantly lower than that of individuals with both high and medium attitude levels ( $p < 0.001$ ) ([Table 3](#)). In addition, there was a weak negative significant correlation between BMI and stress level in all participants and individuals with BMI < 30 ( $r = -0.193$  and  $r = -0.213$ ,  $p < 0.05$ , respectively) ([Table 4](#)).

**TABLE 1:** Distribution of sociodemographic and individual characteristics of individuals.

	BMI<30 (n=555)	BMI≥30 (n=45)	p value
Age (mean rank)	290.69	421.54	<0.001 <sup>U</sup>
Gender, n (%)			
Male	195 (35.1)	12 (26.7)	0.250 <sup>P</sup>
Female	360 (64.9)	33 (73.3)	
BMI (kg/m <sup>2</sup> ) (mean rank)	278.00	578.00	<0.001 <sup>U</sup>
Educational status, n (%)			
Primary school	8 (1.5)	-	
High school	64 (11.5)	9 (20.0)	0.426 <sup>F</sup>
Undergraduate and postgraduate	483 (87.0)	36 (80.0)	
Working status, n (%)			
Employed	261 (47.0)	21 (46.7)	
Unemployed	89 (16.0)	15 (33.3)	0.005 <sup>P</sup>
Student	205 (37.0)	9 (20.0)	
Marital status, n (%)			
Married	145 (26.1)	26 (57.8)	<0.001 <sup>P</sup>
Single	410 (73.9)	19 (42.2)	
Chronic diseases, n (%)			
Yes	39 (7.0)	14 (31.1)	<0.001 <sup>P</sup>
No	516 (93.0)	31 (68.9)	
Mood state associated with higher food consumption, n (%)			
Stress	144 (26.0)	18 (40.0)	
Anxiety	24 (4.3)	3 (6.7)	0.101 <sup>F</sup>
Sadness	46 (8.3)	5 (11.1)	
Happiness	321 (57.8)	19 (42.2)	
Excitement	20 (3.6)	-	
Mood state increasing unhealthy and packaged food consumption, n (%)			
Stress	194 (35.0)	19 (42.2)	
Anxiety	36 (6.5)	8 (17.8)	0.047 <sup>F</sup>
Sadness	105 (18.9)	7 (15.6)	
Happiness	198 (35.7)	10 (22.2)	
Excitement	22 (4.0)	1 (2.2)	
Score of Perceived Stress Scale (mean rank)	351.63	286.57	0.575 <sup>U</sup>
Score of Attitudes Scale for Healthy Nutrition (mean rank)	298.88	320.46	0.422 <sup>U</sup>

<sup>P</sup>Chi-square test; <sup>U</sup>Mann-Whitney; <sup>F</sup>Fisher test; BMI: Body mass index.

Gender, age and chronic disease status had a significant effect on Log (BMI) and PSS total score did not have a significant effect ( $p < 0.001$ ). It was found that a 1-unit increase in age and male gender created a logarithmic increase of 0.003 and 0.045 units in Log (BMI), respectively, while having a chronic disease caused a logarithmic decrease of 0.041 units (Table 5).

## DISCUSSION

In this study, the relationship between perceived stress levels and body weight in adults was evaluated.

General data show that individuals' perceived stress levels can affect their eating habits and, thus, their body weight.

Stress is a negative emotional experience accompanied by predictable biochemical, physiological, cognitive, and behavioral changes that are directed either toward altering the stressful event or accommodating to its effects.<sup>15</sup> Individuals may eat more under stress or turn to tasty foods high in sugar, fat, and energy. Chronic life stress increases the preference for foods high in sugar and fat. Stress-related eating may be a contributing factor to the develop-

**TABLE 2:** Evaluation of individuals' attitudes towards perceived stress and healthy eating according to body mass index.

	Under weight	Normal weight	Over weight	Obese	p value
<b>Perceived Stress Scale</b>					0.059 <sup>P</sup>
Positive stress level, n (%)	10 (9.2)	72 (66.1)	22 (20.2)	5 (4.6)	
High stress level, n (%)	34 (6.9)	268 (54.6)	149 (30.3)	40 (8.1)	
Total score, (X̄±SD)	30.57±7.15 <sup>a</sup>	29.83±7.82 <sup>b</sup>	26.71±8.01 <sup>c</sup>	28.33±6.25	0.001 <sup>KW</sup>
<b>The Attitude Scale for Healthy Nutrition (X̄±SD)</b>					
Information on nutrition	20.20±4.78	19.76±5.07	19.79±4.90	20.00±4.88	0.907 <sup>KW</sup>
Emotion for nutrition	18.73±4.78	18.83±4.60	18.09±4.31	18.02±4.01	0.444 <sup>KW</sup>
Positive nutrition	17.07±5.12	16.87±4.99	17.26±4.91	17.40±4.57	0.826 <sup>KW</sup>
Malnutrition	18.45±3.93	19.48±4.09	18.85±4.49	19.89±3.60	0.168 <sup>KW</sup>
Total score	74.45±11.59	74.94±10.76	73.98±9.77	75.31±9.78	0.730 <sup>KW</sup>

<sup>P</sup>Chi-square test; <sup>KW</sup>Kruskal-Wallis test; Pairwise comparison for Perceived Stress Scale total score: a>c and b>c; SD: Standard deviation.

**TABLE 3:** Stress levels of individuals according to attitudes regarding healthy eating.

	Medium (n=82)	High (n=407)	Ideal (n=111)	p value
<b>Perceived Stress Scale</b>				
Total score, (X̄±SD)	31.15±6.14 <sup>a</sup>	29.07±7.62 <sup>b</sup>	26.48±9.06 <sup>c</sup>	<0,001 <sup>KW</sup>

<sup>KW</sup>Kruskal-Wallis test; Pairwise comparison for Perceived Stress Scale total score: a>c and b>c; SD: Standard deviation.

**TABLE 4:** The relationship between individuals' BMI, perceived stress level and their attitudes towards healthy eating.

	General		Non-Obese BMI<30		Obese BMI≥30	
	r value	p value	r value	p value	r value	p value
<b>Perceived Stress Scale</b>						
Positive stress level	<b>-0.104</b>	<b>0.021</b>	<b>-0.136</b>	<b>0.004</b>	0.285	0.074
High stress level	-0.179	0.063	-0.158	0.110	-0.205	0.741
Total score	<b>-0.193</b>	<b>&lt;0.001</b>	<b>-0.213</b>	<b>&lt;0.001<sup>a</sup></b>	0.288	0.055
<b>The Attitude Scale for Healthy Nutrition</b>						
Information on nutrition	-0.017	0.671	-0.027	0.527	-0.070	0.647
Emotion for nutrition	-0.048	0.238	-0.044	0.299	-0.096	0.530
Positive nutrition	0.073	0.073	0.074	0.083	0.041	0.789
Malnutrition	0.002	0.958	-0.017	0.693	0.064	0.676
Total score	0.008	0.839	-0.018	0.670	0.034	0.823

<sup>p</sup>: Pearson correlation test, others: Spearman correlation test; BMI: Body mass index.

**TABLE 5:** Regression analysis using BMI as the dependent variable.

Parameters	Unstandardized coefficient (β)	95% CI	t value	p value	VIF
Constant	1.350	1.298/1.402	51.137	<b>&lt;0.001</b>	-
Gender (female: 0, male: 1)	0.045	0.034/0.056	8.092	<b>&lt;0.001</b>	1.057
Age	0.003	0.002/0.004	10.027	<b>&lt;0.001</b>	1.238
Chronic disease (No/Yes)	-0.041	-0.060/-0.022	-4.225	<b>&lt;0.001</b>	1.123
Perceived Stress Scale total score	0.001	-0.001/0.001	0.111	0.912	1.152
The dependent variable: Log (BMI), n=600, R <sup>2</sup> =0.269					
Model significance: ANOVA test; F=54,671 ve p<0.001					

BMI: Body mass index; CI: Confidence Intervals; VIF: Variance inflation factor.

ment of obesity.<sup>16,17</sup> A study of the often-standard stress-eating behavior found that 39% of adults overeat or binge eat unhealthy meals in response to stress.<sup>18</sup> A study of workplace stress showed that employees report higher energy, saturated fat, and sugar intake during periods of high workload.<sup>19</sup> Difficulties were associated with increased consumption of high-fat and high-sugar snacks.<sup>20</sup> Similar to previous studies, significantly obese individuals in this study tend to prefer unhealthy and packaged products when stressed (Table 1). For this reason, it is thought that stress should be among the causes of obesity because it causes changes in food preferences.

Positive emotions can result in increased food consumption. It has been reported that eating associated with positive emotions occurs as frequently as eating associated with negative emotions and is associated with increased appetite, whereas sadness has been reported to decrease appetite.<sup>21,22</sup> Stress increases consumption in some individuals, and at the same time, they make their food choices in favor of higher-fat snack foods.<sup>7</sup> Similarly, it was observed that individuals participating in this study consumed more food when in a happy mood, while a much lower rate of participants increased their food consumption in case of sadness (Table 1). While examining the effects of emotional states on nutritional behavior and food choices in order to maintain a healthy body weight, positive mood states may also contribute to changes in nutritional behaviors. It may be useful to determine which mood state causes the increased consumption of packaged junk food when conducting a body weight assessment.

It has been reported that overweight individuals ate more food than individuals with normal weight and underweight during experiencing negative emotional states.<sup>23</sup> There is a stronger relationship between chronic stress and weight gain in individuals with high BMI compared to individuals with low BMI.<sup>24</sup> However, a negative correlation was found between generalized anxiety disorder and excessive weight.<sup>25</sup> As a result of this study, although there was no significant difference between the stress levels of non-obese and obese individuals, a weak negative correlation was observed between positive stress levels and BMI in non-obese individuals (Table 1, Table

2, Table 4). This shows us that when evaluating the nutritional status of obese individuals, the reason for eating behaviors may not be only stress. However, other factors should also be taken into consideration. In addition, the study data show that individuals with lower stress levels, within the limits of positive stress levels, have more advanced attitudes toward healthy eating (Table 4). We can say positive levels of stress contribute positively to individuals' nutritional behaviors.

At advanced levels of perceived stress, there is a higher intake of fat, higher eat of excessive-fat snacks and fast food, and a lower intake of carbohydrates. On the other hand, it has been reported that perceived stress is related fewer eating events in individuals with high perceived stress sensitivity.<sup>26</sup> Studies have shown that perceived stress is not associated with BMI or is inversely related to a feeble level.<sup>27,28</sup> Similar to other studies, it was observed that perceived stress did not affect BMI in this study (Table 5).

Although eating attitude affects the individual's diet, no significant relationship was found between BMI and healthy nutrition attitude.<sup>29</sup> According to the results of this study, the healthy eating attitudes of individuals who were normal/overweight/obese according to BMI were not different (Table 2, Table 4). However, the stress levels of individuals with an ideal healthy nutrition attitude were found to be at the lowest level compared to other individuals.

The most significant limitation of the present study was the inability to collect data face-to-face due to the pandemic. In addition to this problem, anthropometric measurements were obtained according to the participants' statements.

## CONCLUSION

In this study, up-to-date data on nutrition and dietetics were presented. The relationship between individuals' perceived stress levels and their body weight status has been examined, and a relationship was found between mood and nutrition, which is important currently.

In today's living conditions, there is a significant increase in the stress levels of individuals. Changes in the eating habits and body weights of individuals af-

fect the stress level of individuals. According to the data obtained, it was observed that the stress levels of individuals with ideal healthy eating attitudes were at the lowest level compared to other individuals. For this reason, in reducing the stress level in individuals, the development of a healthy eating attitude should also be considered. According to the results of this study, although it is seen that the perceived stress of individuals does not directly affect BMI and is not related between BMI and healthy eating attitude, individuals may turn to unhealthy and packaged products when they are stressed. It should not be forgotten that changes in these food preferences made during stress may cause increases in body weight in the long term. For this reason, it is necessary to focus more on this issue. Because studies on this subject are still insufficient. More than available data are needed to reach a general conclusion on this topic. In future studies, it may be more enlightening to evaluate individuals' food consumption records, anthropometric measurements and stress levels together. Therefore, there is a need for large-scale and long-term studies examining the relationship between

stress levels, dietary habits and body weights in individuals.

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*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:** Merve Pehlivan; **Design:** Merve Pehlivan; **Control/Supervision:** Merve Pehlivan; **Data Collection and/or Processing:** Merve Pehlivan; **Analysis and/or Interpretation:** Merve Pehlivan, Meltem Mermer; **Literature Review:** Merve Pehlivan, Meltem Mermer; **Writing the Article:** Merve Pehlivan, Meltem Mermer; **Critical Review:** Merve Pehlivan, Meltem Mermer; **References and Fundings:** Merve Pehlivan, Meltem Mermer.

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