



## OBSESSIVE-COMPULSIVE SYMPTOMS AND ORTHOREXIA NERVOSA IN MEDICAL STUDENTS: A WEB-BASED, CROSS-SECTIONAL STUDY

### TIP ÖĞRENCİLERİNDE OBSESİF-KOMPULSİF BELİRTİLER VE ORTOREKSİYA NERVOZA: WEB TABANLI, KESİTSEL BİR ÇALIŞMA

#### Abstract / Özet

**Aim:** The aim of this study was to investigate medical students' tendencies towards orthorexia nervosa (ON) and its relationship with obsessive-compulsive symptoms. **Materials and methods:** This descriptive study was conducted with 822 medical students. The data were collected via an online survey. A sociodemographic information form, the ORTO-11 scale, and the Maudsley Obsessive Compulsive Symptom Inventory (MOCI) were used as data collection forms. **Results:** The mean age of the students was 20.5±2.1 years, and 50.7% (n=417) were female. Orthorexia tendency was detected as 19% (n=156). A significant negative relationship was found between the students' ORTO-11 and MOCI scores (p<0.001). There was no significant difference between ORTO-11 and MOCI scores according to sex and years of training. Participants who did not eat at night, did not consume packaged food, checked the expiration date and content of the food, and had regular meals had significantly lower ORTO-11 scores. There was no significant relationship between students' mean body mass index and their ORTO-11 and MOCI scores (p>0.05 for all). **Conclusion:** The study results show that the tendency to ON is high among medical students. ON is more common in students with obsessive-compulsive symptoms. Interventions to eliminate obsessive-compulsive symptoms should be added to the fight against ON. **Keywords:** Medical students, orthorexia, obsessive-compulsive symptoms

**Amaç:** Bu çalışmanın amacı tıp öğrencilerinin ortoreksiya nervoza (ON) eğilimlerini ve obsesif-kompulsif belirtiler ile ilişkisini araştırmaktır. **Materyal ve Metot:** Bu tanımlayıcı çalışma 822 tıp öğrencisi ile yürütülmüştür. Veriler çevrimiçi bir anket aracılığıyla toplanmıştır. Veri toplama formu olarak sosyodemografik bilgi formu, ORTO-11 ölçeği ve Maudsley Obsesif Kompulsif Belirti Envanteri (MOCI) kullanılmıştır. **Bulgular:** Öğrencilerin yaş ortalaması 20.5±2.1 yıl olup, %50.7'si (n=417) kadındır. Ortoreksiya eğilimi %19 (n=156) olarak tespit edilmiştir. Öğrencilerin ORTO-11 ve MOCI puanları arasında negatif yönde anlamlı bir ilişki bulunmuştur (p<0.001). Cinsiyet ve eğitim yılına göre ORTO-11 ve MOCI puanları arasında anlamlı bir fark bulunmamıştır (p>0.05). Gece yemek yemeyen, paketlenmiş gıda tüketmeyen, gıdaların son kullanma tarihini ve içeriğini kontrol eden ve düzenli öğün yapan katılımcıların ORTO-11 puanları anlamlı derecede düşüktü. Öğrencilerin ortalama vücut kitle indeksi ile ORTO-11 ve MOCI puanları arasında anlamlı bir ilişki bulunmamıştır (tümü için p>0.05). **Sonuç:** Çalışma sonuçları, tıp öğrencileri arasında ON eğiliminin yüksek olduğunu göstermektedir. Obsesif-kompulsif semptomları olan öğrencilerde ON daha yaygındır. ON ile mücadelede obsesif-kompulsif belirtileri ortadan kaldırmaya yönelik müdahaleler de eklenmelidir. **Anahtar kelimeler:** Tıp öğrencisi, ortoreksiya, obsesif kompulsif belirtiler

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## 1. INTRODUCTION

Orthorexia nervosa (ON) is a pathological obsession with consuming healthy foods (1). Although it is quite natural for an individual to eat healthily, the behavior toward healthy eating has become obsessive in ON. This situation adversely affects the individuals' health and quality of life (2, 3). Orthorexia nervosa is not a diagnostic criterion in the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition, but is considered an unidentified eating disorder (1).

Although ON has similar aspects to eating disorders such as anorexia nervosa and bulimia nervosa, orthorexic individuals are mainly concerned with the healthiness of food, not its calories (1, 2). Therefore, it is crucial for orthorexic individuals that the food is pure and has no additives. They control food exaggeratedly and are very strict about ingredients and expiration dates (3). They examine food packaging at length and check whether there are any hormones, additives, carcinogenic substances, or dyes. They spend most of their time researching the properties of the foods they will consume and preparing pure foods. This obsessive approach to healthy eating negatively affects the health of individuals with ON and may cause them to lose weight even though they do not calculate calories (3-6).

Orthorexic individuals often lead a life away from society because they do not eat food prepared by others. This situation limits their lives over time, negatively affects their social relationships, and reduces their quality of life (6). Sometimes efforts starting as just a healthy diet can turn into ON over time (7). The prevalence of ON in the population is between 6.9% and 57.6% (8-13).

The etiology of ON is complex, multidimensional, and their psychological factors are crucial. Although there are aspects similar to known eating disorders, the desire to consume pure and healthy food is more critical in ON than the desire to lose weight. This desire, which initially started as a healthy eating behavior, turns into an excessive mental and behavioral struggle over time. Thus, the desire to eat healthy food becomes obsessive and challenging. In these respects, it is similar to obsessive-compulsive disorder (OCD) (1, 8).

OCD is a disease that progresses with obsessions and compulsions and affects the individual's daily life. Obsessions are impulses, thoughts, or images that occur involuntarily, cause the individual to be agitated, alien to the self (ego-dystonic), and show repetitive features, whereas compulsions are actions that occur with these thoughts, and the person feels compelled to engage in these behaviors (9, 10).

Orthorexia nervosa has a pathological obsession, similar to obsessive-compulsive disorder, leading to strict rules for dietary practices and intense anxiety.

When the adopted diet is violated, guilt and shame are seen (11). Therefore, obsessive-compulsive tendencies and perfectionism may be risk factors for orthorexia (8, 12).

It is predicted that people with ON disorder will gradually increase, and orthorexia will be a global public health problem. The university life is a period in which the eating habits of young individuals are reshaped. Orientation to fast-food, unbalanced eating or malnutrition can be seen in the adaptation to the new environment especially in students who move to another city (5). Therefore, determining the eating habits acquired during university that will likely last a lifetime is vital in preventing future problems (13).

Health and disease information may also affect orthorexic tendencies. Therefore, health professionals are a risk group for ON due to their increasing emphasis on healthy eating and the pressure to be role models in healthy living (14).

Medical students are also among the risk groups regarding ON (15). Hence, knowing the frequency of ON and the influential factors in students is essential to intervene early.

Understanding the relationship between orthorexic attitudes and obsessive-compulsive symptoms requires searching for and treating obsessive symptoms, especially in treatment-resistant ON cases. Studies evaluating the orthorexic attitudes of medical students are limited in Turkey (16). To the best of our knowledge, there has not been a study investigating the orthorexic attitudes of medical students in Turkey for the last 15 years. This study aimed to evaluate the orthorexia attitudes of medical students and the relationship of obsessive-compulsive symptoms.

## 2 MATERIALS AND METHODS

### 2.1 Ethical Approval

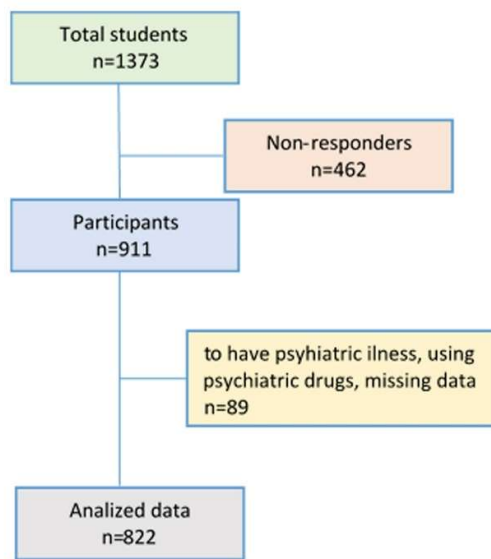
The ethical approval required for the study was obtained from the Atatürk University Faculty of Medicine Clinical Research Ethics Committee (IRB Number: B.30.2.ATA.0.01.00/633, Number: 7/44, Date: 29.09.2022). The study was conducted following the principles of the Helsinki Declaration, and informed consent was obtained from the participants.

### 2.2 Study Setting and Participants

This cross-sectional study was carried out with students of Atatürk University Faculty of Medicine between October and November 2022. The data were collected through an online survey. First, students were informed about the purpose and scope of the study through class WhatsApp groups and emails. The survey was administered online through Google Forms. Information about the purpose of the study was included at the beginning of the survey. Participation in the study was voluntary. The

survey's first question was "I voluntarily agree to participate in the study," and the participants were asked to consent to this statement. Second question was about having a psychiatric illness and/or using psychiatric medications. Students who did not give their consent or having a psychiatric illness and/or using psychiatric medications could not answer the survey questions. The questionnaire was left open for answers for three weeks. During this time, three reminder messages were sent, once every week. At the end of the specified period, the survey was terminated. All students in grades 1-5 were invited to the study (n=1373). Nine hundred-eleven students responded to the survey, making a participation rate of 66%. Eighty-nine questionnaires excluded for various reasons. Data from a total of 822 students were analyzed (Figure 1).

**Figure 1:** Participant flowchart



## 2.3 Measures

The study questionnaire consisted of three sections: 1) sociodemographic characteristics and nutritional habits, 2) the ORTO-11 scale, and 3) the Maudsley Obsessive Compulsive Symptom Inventory (MOCI).

### 2.3.1 The sociodemographic information form

Items in this section were age, education year, height, weight, smoking and alcohol use, exercising status, weight perception, night eating (eating after 9 pm), regular eating, place of having lunch, number of meals a day, place of accommodation, regular eating behavior, fast food consumption, packaged food consumption, and eating at night. Body mass index (BMI) was calculated according to the self-reported height and weight values by dividing weight by height squared (weight (kg)/ height (m<sup>2</sup>) (17).

### 2.3.2 The ORTO-11 Scale

The ORTO-15 scale was first developed by Donnini et al. (3). During the adaptation of the scale to Turkish, four items with low internal reliability were removed from. When the items' statistical characteristics were considered, the scale was brought to the best possible operability level with its 11-item form, and it was named ORTO-11 (5). The items on the scale consist of expressions that investigate the obsessive behaviors of individuals in selecting, purchasing, preparing, and consuming foods that they consider healthy. Scale items are answered according to the Likert system of 4 and are scored as always (1 point), often (2 points), sometimes (3 points), and never (4 points). For each item, 1 point reflects orthorexic tendency, and 4 points reflect normal eating behavior tendency. The total score is obtained by summing the points of all items. The score that can be obtained from the scale ranges between 11 and 44. Low scores on the scale indicate orthorexic tendency. There is no recommended cut-off value. We pragmatically chose the cut-off 24 (25th percentile) and below as orthorexic tendency. The Cronbach's alpha value of the scale is reported as 0.62 (5). In our study, Cronbach's alpha was 0.61.

### 2.4 The Maudsley Obsessive Compulsive Symptom Inventory

MOCI is a self-assessment tool developed by Hodgson and Rachman (1977) to measure the type and prevalence of obsessive-compulsive symptoms. The original scale was developed with 30 items (18). The scale was adapted to Turkish by Erol and Savaşır (1988). Seven more items related to obsessional thinking were added to the Turkish version, and a scale of 37 items was obtained. The scale's Cronbach's alpha value is reported as 0.86 (19). Every item on the scale is answered as 'yes' or 'no.' Each 'yes' answer is given one point, and 'no' is scored zero points. High scores on the scale indicate the severity of obsessive-compulsive symptoms (OCS) (19). In our study, the scales Cronbach's alpha value was 0.87.

### 2.5 Statistical Analysis

Statistical analysis was performed with the SPSS 20 statistical package program (SPSS Inc., Chicago, IL, USA). Suitability of the data to normal distribution was assessed with the Kolmogorov-Smirnov test. Numerical variables were expressed as the mean and standard deviation, and categorical variables as numbers and percentages. The t-test for independent groups was used to evaluate two independent groups. The Mann-Whitney U test was used for skewed data. Depending on data distribution, the one-way ANOVA test or the Kruskal-Wallis test was used to compare more than two groups. Backward stepwise model logistic regression analysis was used to evaluate the factors affecting orthorexia nervosa and OCS. When looking at the relationship between two

quantitative variables, Pearson correlation analysis was used in those with normal distributions, and Spearman correlation analysis for skewed data. The reliability of the scales was tested with the Cronbach's alpha coefficient. The statistical significance level was accepted as  $p < 0.05$ .

### 3. RESULTS

The mean age of the students was  $20.5 \pm 2.1$  (range 18-32) years, and 50.7% ( $n=417$ ) were female. Four hundred ninety-seven students (60.5%) described their body perception as normal. Of the students,

69.8% ( $n=574$ ) stated that they ate at night (after 9 pm), and 92.6% ( $n=761$ ) consumed packaged foods. Two hundred forty-one (29.3%) were engaged in regular sports, and 51.7% ( $n=425$ ) consumed fast food more than once a week. Four hundred and fifty-seven 55.6% ( $n= 457$ ) ate lunch in the school cafeteria. The students' sociodemographic characteristics, nutrition, and lifestyle habits are shown in Table 1. The mean ORTO-11 score of the participants was  $27.2 \pm 4.2$  (range 14-41), and the average MOCI score was  $14.7 \pm 7.2$  (range 1-36).

**Table 1:** Sociodemographic characteristics of students.

Variables	Count (n)	Percent (%)	
Sex	Female	417	50.7
	Male	405	49.3
Education year	1	156	19.0
	2	165	20.1
	3	202	24.6
	4	185	22.5
	5	114	13.9
In your opinion, what is your body's perception?	Normal	497	60.5
	Slim	145	17.6
	Overweight	134	16.3
	Obese	46	5.6
Do you eat anything at night? (after 9 pm)	No	248	30.2
	Yes	574	69.8
Do you consume packaged foods?	No	61	7.4
	Yes	761	92.6
Do you usually look at the expiration date of food?	No	195	23.7
	Yes	627	76.3
Do you usually look at the content of food?	No	371	45.1
	Yes	451	54.9
Are your meals regular?	No	435	52.9
	Yes	387	47.1
Do you do sports regularly?	No	581	70.7
	Yes	241	29.3
Do you consume alcohol?	No	694	84.4
	Yes	128	15.6
Do you smoke?	No	651	79.2
	Yes	171	20.8
Do you think you are eating healthily?	No	462	56.2
	Yes	360	43.8
Where are you staying?	Dormitory	408	49.6
	Alone at home	52	6.3
	At home with my friends	70	8.5
	At home with my family	292	35.5
How many meals do you eat per day?	One	17	2.1
	Two	339	41.2
	Three	377	45.9
	More than three meals per day	89	10.8
Where do you eat your lunch?	I don't eat lunch	90	10.9
	In the school cafeteria	457	55.6
	Restaurant	49	6.0
	In the canteen	104	12.7
	At home	122	14.8
How often do you consume fast food?	Once a week	194	23.6
	Less than once a week	203	24.7
	More than once a week	425	51.7

### 3.1 Relationship between ORTO-11 and MOCI scores

There was a significant negative relationship between students' scores on ORTO-11 and MOCI ( $p < 0.001$ ) (Spearman's  $r = -0.253$ ,  $p < 0.001$ ).

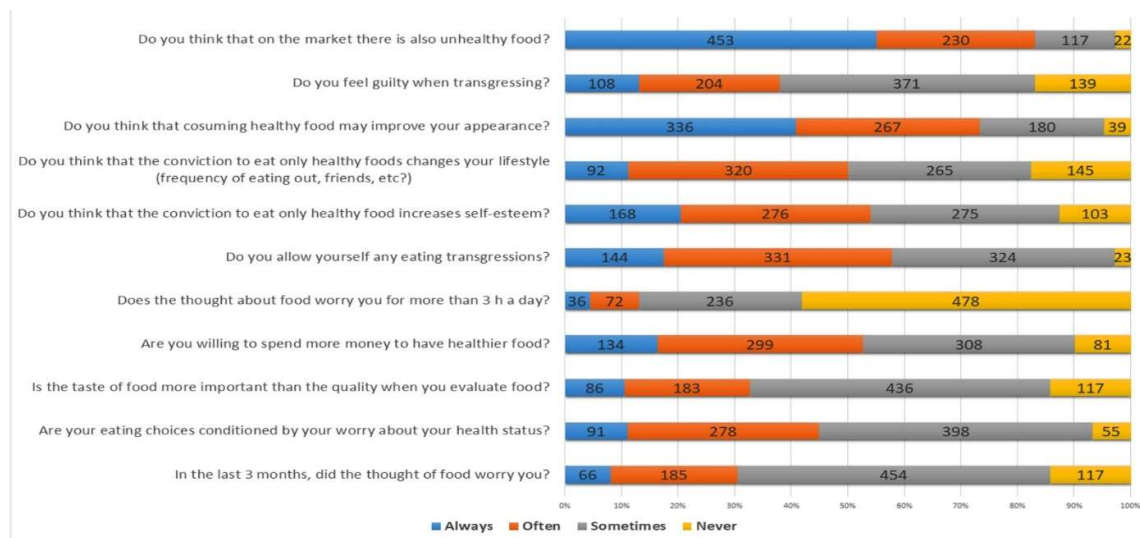
### 3.2 The relationship of ORTO-11 and MOCI scores with sociodemographic variables

There was no significant difference between the students' ORTO-11 and MOCI scores according to sex and school year ( $p > 0.05$  for both, Table 2). Participants who did not eat at night (after 9 pm), did not consume packaged food, looked at the expiration date and content of the food, and had regular meals had significantly lower ORTO-11 scores ( $p = 0.02$ ,  $0.02$ ,  $0.01$ ,  $< 0.001$ ,  $< 0.001$ , respectively). There was

no significant difference between the ORTO-11 scores of students who smoked or consumed alcohol and those who did not ( $p > 0.05$ ). The ORTO-11 scores of the students who thought they were eating healthy were significantly lower than those of the students who did not think they were eating healthy ( $p = 0.02$ ).

The students' grade point average was  $71.0 \pm 11.4$  (range 25-98), their mean weight was  $66.3 \pm 13.4$  (range 42-124), and their mean BMI was  $22.9 \pm 4.5$  kg/m<sup>2</sup>. No significant correlation was found between grade point average and BMI, ORTO-11, or MOCI scores ( $p > 0.05$  for all). While there was no significant relationship between the students' perceptions of their bodies (slim, overweight, fat) and ORTO-11 scores, there was a significant relationship between them and their MOCI scores.

**Figure 2:** Students' responses to ORTO-11 scale items



According to logistic regression analysis, ORTO-11 scores were 2.4 times higher in those who did not consume packaged food than in those who did consume it, 0.5 times higher in those who controlled the content of the food than in those who did not, and 0.4 times higher in those who did regular exercise (Table 3).

## 4. DISCUSSION

Orthorexia nervosa (ON) is a new concept in the field of eating disorders. Studies to determine the prevalence of ON among medical students are limited (16). In this study, obsessive-compulsive symptoms and the role of gender on the tendency to ON in medical students were investigated. While gender did not significantly influence the tendency to ON, obsessive-compulsive symptoms had a significant predictive effect. Accordingly, as the OCS scores of the students increases, their tendency to ON also increases.

In the current study, 19% of medical students had a tendency to ON. Different study results are reported regarding the frequency of ON. The prevalence of orthorexia in the study conducted with medical students in Turkey was reported as 43.6% (16) and 45.5% in the study with assistant doctors (14). In the study by Donini et al. in Italy, the ON frequency was 6.9% (8). In two studies conducted in Italy, the prevalence of ON in athletes was 28% (20) and 12,6% in university students (21). In a study conducted in an athlete sample, the prevalence of ON was reported as 81%. These differences may depend on the characteristics of the group studied, the cultural characteristics, the measurement tools used, or the difference in accepted cut-off points.

In our study, the mean ORTO-11 score of the students was  $27.2 \pm 4.2$ , and the mean MOCI score was  $14.7 \pm 7.2$ . Students' ORTO-11 scores were similar to the results of a study with medical students in the same region in 2018 (16). Fidan et al. found a significant relationship between the age of the

students and their ORTO-11 scores (16). However, other studies did not find a significant relationship between age and orthorexia scores (5, 22-25). In a study conducted in an Italian sample, Donini et al. reported the average age of the orthorexic group

being higher (8). In our study, there was no significant relationship between the students' ages and ON attitudes. The close age of the students who made up the study group may have impacted the results.

**Table 2.** The relationship of ORTO-11 and MOCI scores with sociodemographic variables

	ORTO-11 Score				MOCI Score				
	Mean±SD	Me	Min-max	<i>p</i>	Mean±SD	Me	Min-max	<i>p</i>	
<b>Education year</b>	1	27.25±4.55	28	14-41	0.149	14.39±7.23	13	1-36	0.756
	2	27.73±4.01	28	14-38		14.76±6.96	15	1-35	
	3	26.97±4.21	27	14-38		14.80±6.79	15	1-36	
	4	26.68±4.21	27	15-38		15.15±7.63	14	2-36	
	5	27.71±4.39	28	16-41		14.23±7.99	13	1-36	
<b>Sex</b>	Female	27.36±4.05	28	14-41	0.573	14.73±7.30	14	1-36	0.963
	Male	27.06±4.49	28	14-41		14.70±7.23	14	1-36	
<b>Do you eat something at night? (after 9 pm)</b>	No	26.74±4.20	27	15-41	0.021	14.90±7.01	13	1-36	0.130
	Yes	27.41±4.29	28	14-41		15.00±7.35	15	1-36	
<b>Do you consume packaged foods?</b>	No	25.90±4.85	26	17-35	0.023	14.39±7.21	15	1-31	0.946
	Yes	27.32±4.21	28	14-41		14.74±7.27	14	1-36	
<b>Do you usually look at the expiration date of food?</b>	No	27.86±4.10	28	15-41	0.014	14.33±7.31	14	1-36	0.491
	Yes	27.01±4.31	27	14-41		14.83±7.25	14	1-36	
<b>Do you usually look at the content of food?</b>	No	28.16±3.88	29	15-41	0.000	14.45±6.73	14	1-35	0.656
	Yes	26.44±4.42	26	14-41		14.94±7.67	14	1-36	
<b>Are your meals regular?</b>	No	27.65±4.27	28	15-41	0.004	14.74±7.45	14	1-36	0.876
	Yes	27.42±4.22	27	14-36		14.69±7.05	14	1-36	
<b>Do you exercise regularly?</b>	No	27.66±4.06	28	15-41	0.000	14.66±7.20	14	1-36	0.957
	Yes	26.13±4.58	26	14-38		14.84±7.42	14	2-36	
<b>Do you consume alcohol?</b>	No	27.72±4.17	28	14-41	0.770	14.53±7.02	14	1-36	0.324
	Yes	26.87±4.78	28	14-36		15.70±8.41	14	2-36	
<b>Do you smoke?</b>	No	27.26±4.14	28	14-41	0.821	14.29±7.09	14	1-36	0.001
	Yes	27.01±4.76	28	14-41		16.33±7.70	17	2-36	
<b>Do you think you are eating healthily?</b>	No	27.55±4.16	28	15-41	0.025	14.84±7.22	15	1-36	0.412
	Yes	26.78±4.38	27	14-38		14.56±7.33	14	1-36	

**Table 3.** The probability of orthorexia nervosa according to different variables

	<b>B</b>	<b>S.E.</b>	<b><i>p</i></b>	<b>OR</b>	<b>95% C.I. for OR</b>	
					<b>Lower</b>	<b>Upper</b>
<b>Sex</b>	-0.17	0.19	0.36	0.83	0.57	1.23
<b>Do you eat something at night? (after 9 pm)</b>	-0.08	0.20	0.66	0.91	0.60	1.37
<b>Do you consume packaged foods?</b>	0.88	0.30	0.003	2.42	1.33	4.38
<b>Do you usually look at the expiration date of food?</b>	-0.16	0.24	0.50	0.85	0.53	1.36
<b>Do you usually look at the content of food?</b>	-0.56	0.21	0.008	0.56	0.37	0.86
<b>Are your meals regular?</b>	-0.29	0.22	0.19	0.74	0.47	1.16
<b>Do you do sports regularly?</b>	-0.71	0.20	0.001	0.48	0.32	0.73
<b>Do you eat breakfast regularly?</b>	-0.08	0.22	0.71	0.92	0.59	1.42
<b>Do you think you are eating healthily?</b>	0.05	0.23	0.80	1.05	0.67	1.66

Regarding the effects of sex on ON, different results are reported in the literature. In Fidan's study, the ON frequency in males was higher than in female students (16). In the studies of Sanlier et al. and Arusoğlu et al., higher rates were found in women. It was reported that gender had a strong predictive effect on orthorexic attitudes (5, 26). In another study conducted in Turkey, the frequency of diabetic patients and orthorexia was significantly higher in men (27). Also, in a study by Donini et al. in Italy, the tendency to ON was higher in men. This result was explained by men possibly entering the influence of "body culture" earlier in some societies (8). In addition to cultural and social differences, the different measurement tools used may have been effective in these variations. Our study did not find a significant difference between the sexes regarding ON attitudes.

Conflicting results regarding the relationship between education level and ON are observed. Some studies have observed a higher tendency to ON in individuals with lower education levels. In a study conducted by Korinth et al., the tendency to orthorexia decreased toward the last years of university education. In the studies of Aksoydan and Bosi, no significant relationship was found between orthorexic tendency and education level. In a recent study by Yeşilçayır et al. with individuals who exercised, the relationship between ON and education level was not determined. Our study did not find a relationship between education level and orthorexic attitudes. Additional studies are needed to reach definitive conclusions. The current study did not find a relationship between how students perceive their bodies and ON tendencies. However, students who felt fat and overweight were significantly more likely to have obsessive-compulsive symptoms than other students.

Body mass index is an important variable related to eating disorders. BMI did not have a significant effect on orthorexic tendencies. The information on this subject is contradictory. In addition to the studies reporting that BMI does not affect ON (5, 24, 27), there are also studies claiming that orthorexic tendency is higher in those with higher BMI (28, 29). This may be related to the need for healthy nutrition or weight control of individuals who are overweight. Another study determined that participants who frequently controlled their weight had high ON tendencies (14). In two studies conducted with medical doctors and medical students in Turkey, those with low BMI had a higher tendency to ON (14, 16). Similarly, in another study, orthorexic tendencies decreased as BMI increased (23).

There are many benefits of healthy eating for physical and mental health. However, this has become a very advanced obsession in individuals with ON. When this obsession exceeds a certain duration, it can become a disorder that concerns the dimensions of personality and behavior (6). In this

respect, the relationship between ON and OCD is interesting. In the study of Arusoğlu et al. in Turkey, obsessive-compulsive symptoms were associated with the tendency to ON. It was understood that the group with high obsessive-compulsive symptoms showed more orthorexic tendencies. This finding was confirmed in our study. In the current study, we determined that students' tendency to ON had a significant association with obsessive-compulsive symptoms. As the students who participated in the study had obsessive-compulsive symptoms, the tendency to ON also increased.

Contrary to our findings, in the study conducted by Donini et al. in Italy, no relationship was found between orthorexic attitudes and OCS, which was explained by the difference in the measurement tools used (3). In addition to the deterioration of health in eating disorders, it has been reported that problems such as difficulty in learning and decreased intelligence averages occur due to unbalanced nutrition (30). Our study did not confirm this. We did not find a significant relationship between the average school grades of the students participating in our research and their ORTO-11 scores. More comprehensive and long-term follow-up studies may be helpful in this regard. In our study, there was no difference in the tendency toward orthorexia between the students who smoked or drank alcohol and those who did not. Similar results were obtained in a study of performance artists (31). Only one-third of the students who participated in our study exercised regularly. Strategies should be developed to encourage medical students to eat healthily and participate in sports. More than half of the students consumed fast food more than once a week, two-thirds perceived body weight as normal, and nine out of ten students consumed packaged food.

Students who did not eat at night (after 9 pm), did not consume packaged food, looked at the expiration date and content of food, had regular meals, thought they were eating healthily, and played sports had significantly more orthorexic attitudes than other students. In the study of Bossi et al., people examined label information when purchasing products (14). According to regression analysis, the tendency to ON was 2.4 times higher in those who did not consume packaged food, 0.5 times more in those who controlled the content of the food than in those who did not, and 0.4 times more in those who exercised regularly. These findings are consistent with orthorexic behaviors. The limited number of studies on orthorexia nervosa, a new concept, reveals the need for further investigation in high-risk groups. Medical students are at risk for eating disorders due to their age and health education. Considering medical students' public information and social roles, increasing their knowledge and awareness of the subject is crucial. Medical students who are physician candidates in the future should be aware of ON. Understanding the relationship between ON attitudes and obsessive-compulsive symptoms is

vital for prevention and intervention approaches. For this, more large-scale and diverse sampling studies on ON are needed.

Considering the peer education roles of medical students, it should also be seen as an opportunity for them to educate those around them with the right information. For this reason, it may be helpful to include courses on nutrition in the medical education curricula and motivate students to take responsibility in social sensitivity projects and to inform society. Cultural differences should be considered when planning individual and community training, and measures should be taken to prevent medical students from becoming obsessive while improving healthy nutrition awareness.

#### 4.1 Strengths and limitations

There are some limitations of our study. First, it is a cross-sectional study with participants from a single medical school. This makes it difficult to generalize the results for medical students. Second, the obsessive-compulsive symptoms and orthorexic attitudes of the students were evaluated through scales. There were no face-to-face interviews or examinations. All data, including weight/height measurements and co-morbidities, were collected by self-reports. Third, the influence of time and training on the ON tendency was not assessed. Finally, medical students' attitudes could not be compared with those of students in different departments. Despite these limitations, the fact that it is one of the limited numbers of studies conducted in a large sample in the field and that there has been no other study evaluating orthorexic attitudes of medical students in our region for more than a decade makes our study strong.

#### 5. CONCLUSION

In this study, the relationship between orthorexia nervosa and gender and obsessive-compulsive symptoms was investigated in a large sample, and obsessive-compulsive symptoms had a substantial predictive effect on orthorexic attitudes. Gender did not affect orthorexic attitudes. As tomorrow's doctors, students should be provided with knowledge and awareness about ON from the early stages, and obsessive-compulsive symptoms should be sought and treated in students with ON. Future studies should compare different groups of students.

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