



# Comparison of Eating Attitudes and the Susceptibility to Orthorexia Nervosa of Students in Health-Related Fields and Those in Other Fields

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## Abstract

**Background:** This study was conducted to evaluate the eating attitudes and behaviors, the susceptibility to Orthorexia nervosa and obsessive attitudes of the students who were taking undergraduate education in the field of health and the students who were not taking undergraduate education in the field of health at the time of the study.

**Methods:** This cross-sectional study was conducted at Akdeniz University with randomly selected 304 students who were studying in the Faculty of Medicine, Nursing Law and Communication, Antalya, Turkey. Data, socio-demographic features of the students were collected using the questionnaire form consisting of Eating Attitude Test (EAT-40), The Orthorexia Nervosa Evaluation Scale (ORTO-15) and Maudsley Obsessive-Compulsive Inventory (MOCI).

**Results:** 61.5% of the students were female. 51.9% of them were studying in the health field, while 48.1% of them were studying in other fields. At the beginning of the study, the use of ORTO-15 scale was planned to evaluate the students' orthorexic behaviors, but they were evaluated with the ORTO-11 scale because of the validity and resusceptibility of the ORTO-15 scale were found as too low. The incidence of orthorexic behavior was higher in students who were not studying in the field of health for both ORTO-15 and ORTO-11 scales.

**Conclusion:** It is necessary to acquire healthy eating habits for university students by practical nutrition education given informal and non-formal education institutions, thus their quality of life can be increased.

**Keywords:** Eating attitude; Orthorexia nervosa; University student; Turkey

## Introduction

Orthorexia nervosa (ON) is among the eating disorders and has some similarities with other eating disorders but cannot yet be fully classified. Orthorexia nervosa is a condition in which a healthy and nutrition dependence is excessive, the addiction is transformed into an obsession and affects normal life, and according to many

health professionals, it is an increasingly important health problem (1).

Orthorexia nervosa is not accepted as an eating disorder, therefore there is no definite data about its prevalence, but some studies can be found when the relevant literature is examined (2-8). These studies have analyzed the prevalence of

ON and eating disorder behaviors in medical faculty students, physicians, nutrition and diet students, dietitians, performing artists and professional athletes. The knowledge about nutrition possessed by individuals who are being educated or who work in health-related fields may cause obsessions (4, 6-11). The relationship between eating disorders and obsessive-compulsive disorder (OCD) has also been examined in several studies. Obsessive calorie counting, extreme physical activity, and obsessive-compulsive behaviors in eating disorders are similar to various aspects of OCD. Because of this, eating disorders and OCD should not be considered independently of each other (12-14).

Students being educated in the health-related fields come to recognize many diseases and illnesses over the course of their undergraduate education and to understand the importance of balanced and regular nutrition, as well as studying nutrition directly. In light of this knowledge, it was thought important to compare the eating attitudes, susceptibility to ON and obsessive characteristics of students studying in health-related fields with those of students in other fields. Health education may affect the development of these attitudes.

Therefore, this study was conducted to evaluate the eating attitudes, the susceptibility to ON and obsessive behaviours of undergraduate students in health-related fields and undergraduates not studying in these fields at the time of the study.

## **Materials and Methods**

### ***Sample and procedure***

This cross-sectional study was conducted at Akdeniz University with 304 randomly selected students who were studying Health Sciences in the Faculties of Medicine and of Nursing, and Social Sciences in the Faculties of Law and of Communication, Antalya, Turkey. The number of students who participated in the research from each faculty was determined by sample calculation for a defined universe and the results were obtained by the simple random sampling method. As a

result of simple random sampling, 88 students from the Medical Faculty, 70 students from the Nursing Faculty, 79 students from the Law Faculty and 67 students from the Communication Faculty were included. After the number of students to be included in the study had been determined, senior students who were 20 yr old or older, not previously had a diagnosis of an eating disorder, and who gave their written consent to participate were included in the study.

### ***Data collection***

A questionnaire was used which included questions about the students' general and demographic information, their lifestyle and other food consumption habits. In addition, the Eating Attitudes Test-40 (EAT-40) was used to determine eating attitudes, the Orthorexia Nervosa Evaluation Scale (ORTO-15) was used to evaluate orthorexic behaviors and the Maudsley Obsessive Compulsive Inventory (MOCI) was used to evaluate obsessive-compulsive symptoms.

Approval was obtained from the Clinical Research Ethics Committee of the Faculty of Medicine of Akdeniz University (decision number: 70904504/529).

### ***Instruments***

***Orthorexia Nervosa Diagnosis Questionnaire (ORTO-15):*** The Orthorexia Nervosa Evaluation Scale, developed by Steven Bratman, is a 10-item scale designed to assess the symptoms of healthy nutritional obsession in individuals (15). Donini et al. developed a 15-item ORTO-15 scale by removing some statements, adding replacements, and rearranging statements in some questions (16-18). When we analyzed the validity and reliability of ORTO-15 in our study, the Cronbach's alpha value of the scale was 0.513. The adaptation of the ORTO-15 scale into Turkish was carried out. However, the ORTO-11 scale was more appropriate to use because the validity and reliability study showed that questions 1,2,9 and 15 in the ORTO-15 could not be understood. The Cronbach's alpha value of the scale was 0.62 (5). For this reason, although all the questions on the ORTO-15 scale were asked

to determine the susceptibility of the participants in our study to ON, the Cronbach's alpha value was found to be low, and because of that, the ORTO-11 scale was used (Table 1). Fidan et al. determined the score of 27 as a threshold for ON in ORTO-11 scale according to their study and orthorexic behaviors were observed for scores of <27 (8). In our study, a score <27 was accepted as an indicator of ON.

**Eating Attitude Test (EAT-40):** The eating attitude test is conducted to measure the attitudes of eating disorder patients and possible eating disorder behaviors in normal individuals. The eating attitude test is a self-evaluation 6-point Likert type scale consisting of 40 items. It was developed by Garner and Garfinkel in 1979 to evaluate the symptoms of Anorexia and Bulimia Nervosa objectively. Scores of 30 and above are significant, and the total score is directly related to the level of psychopathology. In EAT-40 risk profiles, if the total score of EAT-40 is lower than 21 this is defined as low risk, a score of 21-30 is defined as moderate risk, and a score of 30 or above is defined as high risk (19).

**The Maudsley Obsessive Compulsive Inventory (MOCI):** The MOCI is a self-evaluation tool developed by Hodgson and Rachman to investigate the level of various obsessive symptoms (20). Obsessive-compulsive disorder is unlikely to be detected in those with scores between 0 and 12, there is a possibility of OCD for scores between 13 and 17, and there is a high possibility of OCD for scores of 18 and above (21).

### Statistical Analysis

Continuous variables are presented as mean  $\pm$  Standard deviation, while categorical variables are given as percentages. The Kolmogorov-Smirnov test was used to verify the normality of the distribution of continuous variables. Simple and cross distributions of the counted data were given as percentage tables. Differences among groups were analyzed using the "chi-square test". Statistical analysis of the data between two groups consisted of Mann Whitney U test analysis, whereas a one-way analysis of variance or Kruskal-Wallis tests was used to evaluate comparisons

more than two groups. Post-hoc analysis was carried out by Bonferroni correction test.

Analyses were performed with IBM SPSS Statistics for Windows 22 software (IBM Corp. Released 2013. Armonk, NY: IBM Corp.) and two-tailed *P*-value less than 0.05 was considered statistically significant.

## Results

61.5% of the students participating in the study were female and 38.5% of them were male. 51.9% of them were studying in health-related fields ( $n=158$ ), while 48.1% of them were studying in other fields ( $n=146$ ). The Cronbach's alpha values of the scales used in the study were ORTO-11:0.638; ORTO-15:0.513; Eat-40:0.669 and MOCI:0.865.

Socio-demographic data, anthropometric measurements and scale scores according to the fields which the students were studying at the time of the study is given in Table 1. The ratio of female students in all schools was higher than male students, there was no statistically significant difference in terms of gender distributions between the faculties ( $P=0.191$ ). The mean age of the students was  $22.94 \pm 1.65$  yr, and there was a statistically significant difference in terms of ages of the students between the faculties ( $P<0.001$ ). Nursing students is different from students of medicine and communication but not different from law students.

The majority of the students (73.4%) have a normal BMI. 42.8% of the students had orthorexic features, 7.9% had high EAT scores and 28.6% had higher possibility to have OCD. When their age, weight, height BMI, ORTO-11 and EAT 40 values were compared according to their educational fields of education, there was no statistically significant difference between the educational fields ( $P>0.001$ ). There was a statistically significant difference between the faculties when the MOCI scores were compared ( $P=0.007$ ); nursing students MOCI scores different from law students but not students of medicine and communication.

When the differences between the scores of the students studying in health-related fields and those of students studying in other fields were examined, students who were not taking courses in health-related fields were more orthorexic (<27), and both ORTO-11 and EAT-40 scores were not statistically significantly different be-

tween the groups ( $P>0.001$ ). When the MOCI scores were compared, the mean score of the students studying in other fields was higher than the mean score of the students in health-related fields. This difference was statistically significant ( $P=0.001$ ) (Table 1).

**Table 1:** The distribution of socio-demographic data, anthropometric measurements and scale scores according to the education fields

	Faculty of Nursing		Faculty of Medicine		Faculty of Communication		Faculty of Law		Total		P
	n	%	n	%	n	%	n	%	n	%	
Gender											
Female	43	61.4	62	70.5	38	56.7	44	55.7	187	61.5	
Male	27	38.6	26	29.5	29	43.3	35	44.3	117	38.5	0.191
	$\bar{X} \pm SD$		$\bar{X} \pm SD$		$\bar{X} \pm SD$		$\bar{X} \pm SD$		$\bar{X} \pm SD$		
	(min-max)		(min-max)		(min-max)		(min-max)		(min-max)		
Age (year)	21.97±1.23 <sup>a</sup> (20-27)		24.33±1.32 <sup>b</sup> (22-29)		23.13±1.42 <sup>c</sup> (20-29)		22.08±1.38 <sup>a</sup> (20-27)		22.94±1.65 (20-29)		<0.001*
Body Weight (kg)	61.96±11.81 (40 – 95.4)		62.25±11.12 (45 – 90)		63.88±11.56 (44 – 87)		64.70±14.28 (42 – 110)		63.17±12.25 (40-110)		0.454
Height (cm)	167.84±8.96 (150.0– 191.0)		169.22±8.05 (154.0 – 190.0)		171.39±8.23 (157.0 – 189.0)		168.30±9.13 (147.0 – 188.0)		169.14±8.65 (147.0-191.0)		0.076
BMI (kg/m <sup>2</sup> )	21.85±2.72 (15.9 – 30.45)		21.64±2.87 (16.53 – 31.89)		21.63±2.85 (16.61 – 29.06)		22.66±3.70 (16.26 – 34.72)		21.95±3.08 (15.92 – 34.72)		0.119
ORTO 11 score	27.34±4.42		26.98±3.80		27.09±4.80		26.11±4.41		26.86±4.34		0.329
EAT 40 score	16.16±8.10		18.97±9.75		17.85±11.41		17.91±7.47		17.80±9.27		0.309
MOCI score	11.73±6.27 <sup>a</sup>		12.89±7.23 <sup>a,b</sup>		14.31±6.71 <sup>a,b</sup>		15.29±6.44 <sup>b</sup>		13.56±6.79		0.007*
	Studying at health field				Studying at social field						
	$\bar{X} \pm SD$				$\bar{X} \pm SD$						P
ORTO 11 score	27.14±4.08				26.56±4.61						0.247
EAT 40 score	17.72±9.14				17.88±9.44						0.879
MOCI score	12.37±6.82				14.84±6.56						0.001**
	Female				Male						P
	$\bar{X} \pm SD$				$\bar{X} \pm SD$						
Body Weight (kg)	57.13±8.51				72.84±11.09						<0.001*
Height (cm)	164.39±5.79				176.74±6.84						<0.001*
BMI (kg/m <sup>2</sup> )	21.13±2.84				23.27±3.02						<0.001*
ORTO 11 score	26.35±4.17				27.68±4.50						0.01*
EAT 40 score	19.10±9.33				15.74±8.83						0.002*
MOCI score	14.42±6.81				12.19±6.58						0.005*

Note. BMI; Body Mass Index, ORTO; Orthorexia Nervosa Diagnosis Questionnaire, EAT; Eating Attitude Test, MOCI; Maudsley Obsessive Compulsive Inventory.

\*Kruskall Wallis test with Bonferonni correction,  $P<0.05$ . Statistically significant differences are shown in different letters.

\*\*Independent sample t test,  $P < 0.05$

When anthropometric measurements and scale scores were compared according to gender, the body weight, height and BMI of men and women show in Table 1. The differences between genders in terms of body weight, height and BMI were statistically significant ( $P < 0.001$ ). When ORTO-11, EAT-40 and MOCI scores were compared according to gender, the scores for all three scales were significantly different statistically ( $P < 0.001$ ) (Table 1).

At the beginning of the study, it was planned to use the ORTO-15 scale to evaluate the students'

orthorexic behaviors, but they were evaluated with the ORTO-11 scale. The incidence of orthorexic behavior was higher in students not studying in health-related fields for both the ORTO-15 and ORTO-11 scales. The incidences of orthorexic behavior in the students in health-related fields and students in other fields according to ORTO-11 and ORTO-15 were 41.8% and 43.8%, and 70.3% and 78.1%, respectively. There was no statistically significant difference ( $P > 0.001$ ) between the groups for both scales (Table 2).

**Table 2:** Distribution of ON incidence according to ORTO-15 and ORTO-11 scales of the students who study at health field and social field

<i>Education</i>	<i>ORTO 11</i>		<i>P</i>	<i>ORTO 15</i>		<i>P</i>
	<i>Orthorexic %</i>	<i>Normal %</i>		<i>Orthorexic %</i>	<i>Normal %</i>	
Studying at health field	41.8	58.2	0.716	70.3	29.7	0.077
Studying at social field	43.8	56.2		78.1	21.9	

\*Chi-square test,  $P < 0.05$ .

When nutrition and weight control behaviors of orthorexic and non-orthorexic students were compared, the susceptibility to orthorexia was higher in students who dieted frequently because of anxieties about their personal attractiveness ( $P = 0.001$ ), students who dieted under the guid-

ance of a professional ( $P = 0.003$ ), students who stated that their undergraduate education had caused a change in their nutritional habits ( $P < 0.001$ ) and students who did regular exercise ( $P = 0.001$ ) (Table 3).

**Table 3:** Comparison of attitudes of nutrition and weight control of orthorexic and non-orthorexic students

<i>Variable</i>	<i>Orthorexia n (%)</i>	<i>Normal n (%)</i>	<i>P</i>
Do you often on a diet with weight control or beauty anxieties?	39 (30.0)	24 (13.8)	0.001*
Did you get professional help on your diet?	25 (19.2)	14 (8.0)	0.003*
Do you change your eating habits when you get accurate nutrition information?	23 (76.7)	7 (23.3)	<0.001*
Did your bachelor education change your eating habits?	71 (54.6)	58 (33.3)	<0.001*
Do you have regular physical activity?	58 (44.6)	45 (25.9)	0.001*

\* Chi-square test,  $P < 0.05$ .

## Discussion

In recent years, interest in healthy nutrition and healthy living has begun to increase, especially in

developed countries. Obesity associated with a sedentary lifestyle, and diabetes that accompanies it, as well as cardiovascular diseases, hypertension, cancer and many other diseases have made

this awareness more important. Healthy nutrition plays a key role in avoiding these diseases and in living healthily. The incidence of ON has thus begun to increase among individuals who have extreme opinions about healthy nutrition. In the literature, people working in certain occupational groups are more prone to orthorexic behaviors, especially those who work in the field of health (2,6-8,22).

As a result of this study, important data were obtained about eating attitudes, the susceptibility to ON and obsessive attitudes and characteristics of students in health-related fields and students in other fields. Although ON has not yet been classified as a disease, its relationship with eating disorders has attracted the attention of researchers working in the field. 75.8% of female health professionals showed orthorexic characteristics, and that, in particular, susceptibility to ON was higher in nurses and midwives (22). In a study conducted among doctors, the prevalence of ON was found to be 45.5%, and high sensitivity towards nutrition and orthorexic behavior were more prevalent (7). In the study involved students in a department of nutrition and dietetics, the prevalence of ON was stated to be  $30.7 \pm 4.45\%$  (2). The risk of ON was 60.1% in health employees (23). The results of our study showed that 42.8% of students had orthorexic characteristics. Students who were not in health-related fields had more orthorexic characteristics, but there was no significant difference when the susceptibility to ON was evaluated in the students in health-related fields and students in other fields. Being educated and working in health-related fields increase the prevalence of orthorexic characteristics, but this condition alone is not a sufficient factor.

In this study, the mean body weight, height and BMI were higher in males and the differences between genders were statistically significant when their anthropometric measurements and scale scores were compared. Female students were more orthorexic than male students. When the literature was examined, studies supporting our findings were found, but more controversial studies stated that male students exhibit more

orthorexic behaviors were also found (8,24,25). The reason for these differences may be the socio-demographic and cultural differences between the sample groups in the studies.

Eating attitudes may be related to being educated in health-related fields. The mean score for EAT-40 was  $11.7 \pm 8.37$  in the health employees and  $12.0 \pm 8.03$  in the other employees (23). According to our findings, the mean score was  $17.7 \pm 9.14$  in the health students and  $17.8 \pm 9.03$  in the other students. The EAT-40 scores were higher in males while the results of our study showed that this score was higher in females (23). When the EAT-40 scores were compared according to the students' departments, the EAT-40 scores in all groups showed low risk but the lowest risk was found in the nursing students.

Studying/not studying health-related fields may be related to obsessive-compulsive behaviors. 28.6% of all students were found to have a high possibility of being diagnosed with OCD. While this ratio was lower in the students in health-related fields, the possibility of being diagnosed with OCD increased in the students in other fields. This difference was thought to be due to the students of the Faculty of Nursing ( $11.73 \pm 6.27$ ) and the Faculty of Law ( $15.29 \pm 6.44$ ). The possibility of being diagnosed with OCD was lower in Nursing Faculty students than in students in the Faculty of Law. This situation may be related to the content of lessons given in the field of health. The results of our study showed similarity with the results of the study of Duran (26). In terms of the relation between gender and the prevalence of obsessive-compulsive symptoms, but the results were also different in terms of the relation between gender and MOCI scores. In this study, the possibility of being diagnosed with OCD was lower in men and higher in women. These findings are in parallel with the results of the study of Duran (26). In comparing MOCI scores according to gender, no significant difference was found between genders in Duran's study, but there was a difference between the genders according to the results of our study; scores were lower in men and higher in women. The high-risk group should be evaluated

in terms of eating disorders and precautions should be taken.

A significant increase in attention to appearance and dieting increases the liability to eating disorders. Eating disorders are more diagnosed among individuals who need to be careful to stay at a particular weight and these people are especially susceptible to ON (24, 25). When the attitudes towards nutrition and weight control of the orthorexic and non-orthorexic students were compared, those who frequently dieted for weight control or to look more attractive, who dieted under the guidance of a professional, who changed their eating habits when they got the right nutritional information and who changed their eating habits as a result of their education had a higher susceptibility to ON. The susceptibility to ON of the students was found to be significantly higher while the susceptibility to ON was expected to be low in the individuals who had the help of a professional. The prevalence of ON and attention to body image are much higher in dietitians. The rules when following a specific diet are often very inflexible, and this situation may be related to this finding. A relationship was found between dieting status and EAT-40 scores in their study (27). In nursing students, the severity of obsessive-compulsive symptoms increased as a result of impaired eating behaviors (28). The results of these studies support the results of our study.

## Conclusion

There is a limited number of studies about ON, and this situation reveals the need for further studies. University students may have increased susceptibility to eating disorders because of the difficulties in their access to nutritious food and the habit of eating fast food. In this context, students should be educated about eating disorders. It is necessary that students acquire healthy eating habits through practical nutrition education given in formal and non-formal settings, thus increasing their quality of life. In addition, individuals who are using any method to gain or lose weight

are at risk of eating disorders, ON and OCD. Students are educated about nutrition and, where necessary, that individuals at risk be given expert support.

## Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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## Conflict of interest

The authors declare that there is no conflict of interest.

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