Progress in Nutrition 2021; Vol. 23, N. 4: e2021199 DOI 10.23751/pn.v23i4.11607 © Mattioli 1885

Original article

Eating Attitudes and Orthorexia Nervosa Tendencies in a Sample of Turkish University Students: A Cross-Sectional Study

Seyma Sünbül[1], *Ebru Bayrak*[2]

[1]Selçuk University, Institute of Social Sciences, Department of Nutrition Education, Konya, Turkey; [2]Selçuk University, Faculty of Health Sciences, Department of Nutrition and Dietetics, Konya, Turkey.

Summary: Healthy nutritional habits are a fundamental component of a healthy life. However, if these habits become an obsession, physical and mental problems may occur, which may lead to the eating disorder called orthorexia nervosa. This study aimed to determine the eating attitudes and tendencies related to orthorexia nervosa in a sample of Turkish university students.This study was conducted with 580 students, of which 250 (43.1%) were males and 330 (56.9%) were females. Study data were collected using a general information form which included questions regarding the students' demographic information and life habits, an Orthorexia-15 (ORTO-15) questionnaire to determine their healthy nutrition obsessions, and an Eating Attitudes Test-40 (EAT-40) to detect eating behavior disorders. Statistically significant relationship was found between eating disorder risk and gender, with female students having more eating disorders compared to males ($p<0.01$). It was found that 36.2% of the students included in the normal group according to BMI classification had ON tendency. Students on a diet had more orthorexic tendencies and were at moderate risk of having an eating disorder ($p<0.05$). A moderate negative correlation was found between EAT-40 and ORTO-15 scores ($r=-0.572$; $p<0.005$). According to the results of this study, university students had eating behavior disorders and a tendency to orthorexia nervosa. EAT-40 scores indicated that 15.2% had higher risks of having an eating disorder. ORTO-15 results indicated that 46.1% of the female students, 31.6% of the male students, and 40% of the overall sample had orthorexia nervosa tendencies. Awareness regarding appropriate nutrition in relation to eating disorders is needed among university students.

Key words: Orthorexia Nervosa; Healthy Nutrition Obsession; Eating Disorders; Eating Attitudes.

Introduction

University education may be considered a transition period between adolescence and adulthood, one in which students become independent from their parents and acquire new health behaviors. Given the time adolescents and young adults spend at universities and nearby areas, said sites may influence the eating habits of these students in adulthood (1, 2). The university population is an especially vulnerable group from the nutritional point of view, as they are beginning to take responsibility for their own dietary habits and they undergo a critical period in the consolidation of eating attidues and behaviors (3).

Eating disorders are complex psychiatric disorders that have serious medical consequences. They are common in adolescents and young adults and defined as severe mental health problems with adverse physical and psychological consequences (4). University students have several risk factors that increase their risk of eating disorders, such as peer pressure, academic stress, living in dormitories, close relationships,

social interaction, and high life expectation (5). The fundamental features of eating disorders include having body image disturbances in association with the perception of being overweight, eating excessively in addition to having emotional confusion, being afraid of becoming overweight, and having a strict desire to lose weight (6).

Orthorexia is derived from the Greek terms "ortho" meaning "correct" and "orexis" meaning "appetite" to indicate an obsession with eating the right foods (7). Individuals with higher tendency to orthorexic symptoms are primarily characterized by nutrition al beliefs leading to a greater importance given to the perceived healthiness and nutritional properties rather than to taste and enjoyment of the foods (8). The quality and the composition of the meals, develop rigid avoidance to food believed to be "unhealthy" (9). These situations decrease the variety of food consumed by orthorectic individuals and cause them to eat one particular type of food. Eating one particular type of food causes loss of water and muscle when adequate and balanced nutrition is not received, and this, in turn, causes the body's resistance to be lower, leading to vitamin, mineral, and nutritional deficiencies over time, eventually resulting in malnutrition (10).

Orthorexia nervosa (ON) has not yet been defined as a disorder. The Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), published by the American Psychiatry Association, does not include clear diagnostic criteria for ON as it does for anorexia nervosa and bulimia nervosa (11). However, using the ORTO-15 scale developed by Donini *et al*. based on the theories of Steven Bratman, and detector scales used for eating attitude and depression, an ON diagnosis can be made (12).

There is a huge number of studies on some disorders, like anorexia, bulimia, recently also on binge eating disorder. On the other hand, some other eating disorders (orthorexia, permarexia) were addressed in a significantly lower number of research. Therefore the authors are of the opinion that the main focus in research should be on less popular eating disorders, for which a lack of knowledge and even data is obvious (13). It is important to determine if university students, which comprise a significant age group of the society thought to be at risk, have eating disorder behavior tendencies. This can be accomplished using valid and reliable scales and tests. A correct diagnosis is important for the development of a multidisciplinary treatment approach. The focus should be on the detection of symptoms and findings of eating behavior disorders, and further research should be conducted regarding risk factors associated with this issue. Thus, this study was carried out to investigate university students' eating behaviors and ON tendencies among them, their eating attidues and ON mean scores, the factors associated with their eating attidues and ON, and the relationship between their eating attidues and ON.

Materials and Methods

Study Design

This descriptive, cross-sectional study was conducted at Selçuk University in Konya province in the Central Anatolia region of Turkey. Data were collected between January 2019 and March 2019. Data evaluation was completed in May, 2019.

Study Setting and Sample Selection

The study population included nearly 50000 students studying at the Selçuk University which is comprised of 25 Faculties/Vocational Schools. The sample size was determined using power and variance analysis (ANOVA). The G*Power 3.1.9.2 program was used for power analysis and calculations were made based on the following parameters: effect size 0.15, margin of error (α) 0.05, and power (1-β) 0.95. The appropriate sample size was determined to be 580 as a result of this calculation.

Ethical Approval

The questionnaire was anonymous, to ensure confidentiality. Study approval (numbered 2018/166 dated 31.10.2018) was obtained from the Selçuk University Faculty of Health Sciences Non-Invasive Clinical Studies Ethics Committee. No clinical intervention or blood testing was involved in this study. Students were verbally informed as to the intent of the study

beforehand and those who agreed to participate signed a voluntary consent form.

Data Collection Tools

Data were collected using a face-to-face interview technique by the researchers. Necessary permissions were obtained from Selçuk University Registrar's Office for use of the questionnaires. The questionnaire form consists of 3 parts. These are general information form developed by the researchers, EAT-40 and ORTO-15.

General Information Form: The general information section consisted of 12 questions about gender, age, height, weight, and a subjective evaluation regarding living habits. Weight (kg) and standing height (cm) anthropometric measurements were self-reported by the participants. Self-reported height and weight were used to calculate the Body Mass Index (BMI). The BMI was calculated by dividing body weight in kilograms by the square of height in meters. The following classification was used: BMI ≥ 30.00 indicates obesity, BMI ≥ 25.00 overweight, BMI = 18.50-24.99 defines the normal range, BMI lower than 18.50 is considered as underweight (14).

Eating Attitudes Test (EAT-40): The EAT-40 is a self-report scale used worldwide which was developed to determine the eating attitudes and behaviors of young individuals and adults with and without eating disorders. Garner and Garfinkel developed this scale (15). The EAT-40 is a 6-point likert-type scale including 40 questions. The total score is found by scoring the rating and the maximum score possible is 120. The breakpoint was 30. Increased points were associated with an increase in a risk of eating behavior disorder. The scale's Cronbach's alpha (α) value was 0.70 (16) and the study's Cronbach's α value was 0.88. In EAT-40 scale, the scores are classified as follows: 30 and above are high risk (abnormal eating behaviour), between 21 and 30 are moderate risk, and below 21 are low risk (15).

ORTO-15 Questionnaire: This 10-item questionnaire was first developed by Dr. Steven Bratman to determine ON tendencies (17). Following some adjustments, the latest version was developed by Donini *et al.* as a self-reporting scale including 15 items. The possible max and min scores of the ORTO-15 test are 60 and 15, respectively. Low scores indicated orthorectic tendency. Individuals who received ≤ 40 are defined as having "orthorexia" (12). The Turkish adaptation of the ORTO-15 was conducted by Arusoğlu *et al.*, whose permissions were obtained for use of this scale in our study (7). The scale's Cronbach's α value was 0.62 (18) and the study's Cronbach's α value was found to be 0.81.

Statistical Analysis

Obtained study data were evaluated using the Statistical Package for Social Sciences (SPSS) 21.0 for Windows software program. The data were assessed for suitability to normal distribution and variance equality and determining the applicability of parametric or nonparametric tests. Since the data did not show a normal distribution, a Mann-Whitney U test was used for 2 independent groups and a Kruskal-Wallis test was used for independent groups of more than 2. Spearman's correlation test was used to determine the relationship among data and cross-tabulation analysis and chi-square analysis was used for categorical values. The statistical significance level was set at 0.05 for this study.

Results

General Characteristics of Participants

The students' general characteristics are presented in Table 1. The study population included 580 participants, of which 250 (43.1%) were females and 330 (56.9%) were females. The average ages were 21.20 ± 0.10 years for males and 20.71 ± 0.93 years for females. The mean body weight of male students was 76.83 ± 0.667 kg, mean height was 179.43 ± 0.378 cm. The mean weight of female students was 60.34 ± 0.58 kg, mean height was 164.61 ± 0.33 cm. The average BMI values for male and female students were 23.88 ± 0.19 kg/m^2 and 22.28 ± 2.20 kg/m^2, respectively. According to WHO BMI classification, 64.8% of male, 68.2% of female students were classified as being in normal weight categories. Only 5.2% of the male students indicated they followed a diet compared to 17.6% of

Table 1. General Characteristics of Participants

Characteristics	Male (n: 250)	Female (n: 330)	Total (n: 580)
Age (yrs)	21.20±0.10	20.71±0.93	20.92±1.69
Weight (kg)	76.83±0.67	60.34±0.58	67.45±13.30
Height (cm)	179.4±0.38	164.61±0.33	171.00±9.36
BMI (kg/m^2)	23.88±0.19	22.28±2.20	22.97±3.51
BMI categories			
Underweight	6 (2.4)	38 (11.5)	44 (7.6)
Normal	162 (64.8)	225 (68.2)	387 (66.7)
Overweight	74 (29.6)	52 (15.8)	126 (21.7)
Obese	8 (3.2)	15 (4.5)	23 (4.0)
Being on diet			
Yes	13 (5.2)	58 (17.6)	71 (12.2)
No	237 (94.8)	272 (82.4)	509 (88.8)
Smoking			
Smoker	132 (52.8)	84 (25.5)	216 (37.2)
Non-smoker	118 (47.2)	246 (74.5)	364 (62.8)
Using nutritional supplement			
Used	43 (17.2)	59 (17.9)	102 (17.6)
Before used	53 (21.2)	99 (30.0)	152 (26.2)
Never used	154 (61.6)	172 (52.1)	326 (56.2)

Values are presented as mean±SD or number (%); n: number of the participants

the female students. More than half of the participants (62.8%) were non-smokers and never took a nutritional supplement (56.2%).

Eating Attidues and Orthorexia Nervosa Tendency across Gender

The mean EAT-40 score was 18.36 ± 0.56, and the ORTO-15 score was 39.01 ± 0.17. Females received higher scores of EAT-40 than males did (***P < 0.001). A statistically significant relationship was found between those at risk for having an eating disorder and gender (***P < 0.001). Accordingly, male students had a lower risk of eating disorders compared to female students. ORTO-15 test results found that 79 (31.6%) of the male students, 152 (46.1%) of the female students and 231 (39.8%) of all students had a score ≤ 40 which indicated orthorexic tendencies. It was also found that 68.4% male students, 53.9% female students, and 60.2% of all students had a score ≥ 41 which indicated no orthorectic tendencies. Eating disorders risks and ON tendency are more prevalent among females compared to males. A significant relationship was found between ORTO-15 and gender (***P < 0.001) with more male students having higher scores and in the group not showing ON tendencies (Table 2).

Eating Attidues and Orthorexia Nervosa Tendency According to BMI Categories

The EAT-40 and ORTO-15 scores of students who are underweight, normal weight and overweight according to BMI are provided in Table 3. The EAT-40 scores were low among the normal (17.39 ± 0.66), and higher among the underweight (26.64±2.67). BMI classifications of students in the low-risk group based on EAT-40 results were normal and overweight while

Table 2. EAT-40 and ORTO-15 scores and risk estimates according to gender

	Male (n: 250)	Female (n: 330)	Total (n: 580)	*P*-value
Scores				
EAT-40	14.11±0.17	21.58±0.83	18.36±0.56	0.000*
ORTO-15	39.49±0.25	38.65±0.23	39.01±0.17	0.031*
Risk estimates				
EAT-40[1]				
Low risk	207 (82.8)	191 (57.9)	398 (68.6)	0.000**
Moderate risk	21 (8.4)	73 (22.1)	94 (16.2)	
High risk	22 (8.8)	66 (20.0)	88 (15.2)	
ORTO-15[2]				
ON tendency	79 (31.6)	152 (46.1)	231 (39.8)	0.000**
Without ON tendency	171 (68.4)	178 (53.9)	349 (60.2)	

Values are presented as mean±SD or number (%); n: number of the participants.
[1]Low risk, EAT-40 < 21; moderate risk, EAT-40 between 21 and 30; high risk, EAT-40 > 30
[2]ON tendency, ORTO -15 ≤40; Without ON tendency, ORTO -15 >40
*Mann-Whitney U test; **Chi-square test

Table 3. EAT-40 and ORTO-15 scores and risk estimates according to BMI

	Underweight (n: 44)	Normal (n: 387)	Overweight (n: 126)	Obese (n: 23)	*P*-value
Scores					
EAT-40	26.64±2.67	17.39±0.66	18.24±1.09	19.52±2.35	0.000*
ORTO-15	37.52±0.68	39.22±0.20	39.06±0.40	38.04±0.88	0.067*
Risk estimates					
EAT-401					
Low risk	20 (45.5)	274 (70.8)	89 (70.6)	15 (65.3)	0.009**
Moderate risk	13 (29.5)	59 (15.2)	17 (13.5)	5 (21.7)	
High risk	11 (25.0)	54 (14.0)	20 (15.9)	3 (13.0)	
ORTO-15[2]					
ON tendency	29 (65.9)	140 (36.2)	52 (41.3)	10 (43.5)	0.003**
Without ON tendency	15 (34.1)	247 (63.8)	74 (58.7)	13 (56.5)	

Values are presented as mean±SD or number (%); n: number of the participants.
[1]Low risk, EAT-40 < 21; moderate risk, EAT-40 between 21 and 30; high risk, EAT-40 > 30
[2]ON tendency, ORTO -15 ≤40; Without ON tendency, ORTO -15 >40
*Kruskal-Wallis test; **Chi-square test

individuals in the moderate and high-risk groups had normal, overweight, and underweight BMIs (**P < 0.01). More than half of the students (58.7%) included in the overweight group did not show any ON tendencies while 65.9% of the students included in the underweight group according to BMI classification had ON tendencies. A significant relationship was found between BMI classification and ORTO-15 risk estimates (**P < 0.01) with underweight students having higher ON tendencies compared to others (Table 3).

Eating Attidues and Orthorexia Nervosa Tendency According to Being on a Diet

The EAT-40 test indicated that 35 (49.3%) of the students are on diet were in the high-risk group while 378 (74.3%) of the students not being on a diet were in the low-risk group. A statistically significant relationship was found between students' following or not following a diet and EAT-40 risk groups (***$P < 0.001$). When the students' ORTO-15 tendencies based on being on a diet were considered, 70.4% of the students on a diet had orthorexic tendencies while 64.4% of the students not following a diet did not, which was statistically significant (***$P < 0.001$) (Table 4).

The Relationship Between EAT-40 and ORTO-15 Scores

The Spearman correlation value of -0.572 between ORTO-15 and EAT-40 results indicated a negative, 57.2% moderate statistically significant relationship between these scores (r = 0.4-0.6; **$P < 0.01$). (Table 5).

Discussion

In this study, most of the students were in the normal body weight range (64.8% males, 68.2% females). Also, it was found that 29.6% of males were overweight, and 11.5% of females were underweight (Table 1). In a study with university students in Turkey, it was found that 69.5% of male, 77.7% of female students were classified as being in normal weight categories (19). It appears that females paid more attention to maintaining an ideal body weight than males.

The current study revealed that 39.8% had orthorectic tendencies and a significant relationship was found between these tendencies and gender, as 46.1% of the female students versus 31.6% of male students had ON tendencies (Table 2). Similarly, Arusoğlu

Table 4. EAT-40 and ORTO-15 scores and risk estimates according to being on diet

	Dieting (n: 71)	**Not Dieting (n: 509)**	***P*-value**
Scores			
EAT-40	34.10±0.53	16.17±0.47	0.000*
ORTO-15	36.68±0.53	39.33±0.17	0.000*
Risk estimates			
EAT-40[1]			
Low risk	20 (28.2)	378 (74.3)	0.000**
Moderate risk	16 (22.5)	78 (15.3)	
High risk	35 (49.3)	53 (10.4)	
ORTO-15[2]			
ON tendency	50 (70.4)	181 (35.6)	0.000**
Without ON tendency	21 (29.6)	328 (64.4)	

Values are presented as mean±SD or number (%); n: number of the participants.
[1]Low risk, EAT-40 < 21; moderate risk, EAT-40 between 21 and 30; high risk, EAT-40 > 30
[2]ON tendency, ORTO -15 ≤40 ; Without ON tendency, ORTO -15 >40
*Mann-Whitney U test; **Chi-square test

Table 5. The relationship between EAT-40 and ORTO-15 Scores (n: 580)

		EAT-40 Score
ORTO-15 Score	Correlation Value	-0.572*

*Spearman's correlation test.

et al. (7), in their study which included 994 participants, found that females tended to be more orthorectic compared to males. Several studies carried out in Turkey on eating attitudes and ON tendencies of university students found that females had more eating disorders and ON tendencies compared to males (20, 21). Previous studies, in American and Polish university students, also reported that female students had more orthorectic tendencies compared to male students (22, 23). Dell'osso *et al.* (24) performed with 2826 participants also revealed that female participants had more orthorectic tendencies compared to males. On the other hand, various other studies conducted with university students found no significant relationship between orthorexic tendencies and gender (25, 26). The importance of body image to female students has increased in recent years, so restrictive diet programs might cause an increase in orthorexic tendencies. However, gender is only one of the factors affecting ON tendencies, and the examination of other factors may explain the various results described in the literature.

According to EAT-40 scores, 15.2% of the sample had higher risks of having an eating disorder. (Table 2). In a study, conducted with medical faculty students of Inönü University, Turkey, it was found that 11.1% of the students had an eating disorder (27). Ulaş *et al.* (28) determined that this prevalence for vocational health school students to be 4.2%. These differences regarding the prevalence of eating disorders among Turkish university students are thought to be due to the region and socio-demographic characteristics of sample. A statistically significant relationship was found between gender and EAT-40 risk groups. Male students had a lower risk of eating disorder compared to female students (Table 2). Similarly, Karadaş *et al.* (29) reported that females had more eating behavior disorders compared to males. Several studies also found that female students had more eating behavior disorders compared to male students (30, 31, 32).

In the present study, a significant relationship was found between EAT-40 risk groups and BMI classification. As the students' eating behaviors deteriorated, their BMI values started to decrease. More than half of the students (65.9%) included in the underweight group according to BMI classification had orthorectic tendencies, while more than half of the students included in the normal, overweight, and overweight groups did not show any ON tendencies. As the orthorectic tendencies of the students increased, their BMI values decreased, and they were included in the underweight group (Table 3). A study conducted with medical faculty students found that the orthorectic tendencies of overweight students were significantly lower compared to students included in other BMI groups (27). Kaya (25) reported ON tendencies of students who were normal, overweight, and overweight according to BMI were twice that of those who were underweight, and BMI values and EAT-40 scores were effective on ORTO-15 results. However, some studies reported no significant relationship between BMI value and ON tendency (33, 34, 35, 36).

A significant relationship was found between being on diet and ON tendencies. Students being on a diet were mostly in the group showing orthorectic tendencies, while those not on a diet were in the group not showing orthorectic tendencies (Table 4). Similarly, Erol (27) reported that 90% of students following a diet had ON tendencies. In a study by Duran (37) it was found that mean EAT-40 and ORTO-11 scores of those following a diet were higher compared to those not being on a diet. Another study conducted with students studying in the department of nutrition and other departments to evaluate their ON tendencies found that students studying in the department of nutrition were more likely to follow a diet; however, no difference was found between their ON tendencies and dieting in this study (38). ON is an eating disorder that can be observed in individuals following strict diets associated with some disorders. Thus, orthorectic tendencies of students following a diet program are expected to be high.

The current study revealed a negative, moderate-level relationship recorded between EAT-40 and ORTO-15 scores (Table 5.). This was unsurprising, as similar findings have been reported in other studies (39, 40). This result shows that as the prevalence of eating disorders decreases in students, ON tendency increases. Accordingly, individuals with low risk of orthorexia nervosa can be predicted to have a more balanced diet.

In conclusion, EAT-40 scores indicated that 15.2% had higher risks of having an eating disorder.

According to the ORTO-15 scores, 46.1% of the female students, 31.6% of the male students and 39.8% of the overall sample had orthorexia nervosa tendencies. It is essential to increase awareness and understanding of eating disorders and its associated risk factors for university students. Awareness regarding appropriate nutrition in relation to eating disorders is needed among university students. A general university elective course in this regard might be helpful. Media, in particular, plays a significant role for young individuals regarding body image disorders and the development of eating obsessions. These types of disorders may be prevented by informational ads that raise awareness and programs offered by expert about healthy nutrition. Further studies are needed to describe the behavior of people with eating disorders (i.e. their etiology, diagnosis, treatment and the prevention of the same).

This study has several limitations that need to be mentioned. First, the fact that this study was carried out a single university could restrict the generalizability of our results to the entire Turkish university population. Second, this study strongly depended on two self-report questionnaires and this might have caused distortion due to response style bias and inaccurate reporting by the students. It is recommended that the mentioned limitations be taken into consideration and conducted with large number of students from private and govermental universities in further studies.

Acknowledgements: This article was produced from the master's thesis written by the first author under the supervision of the second author.

Conflict of interests: Authors declare no conflict of interest.

Research Funding: This research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

References

1. Nelson MC, Story M, Larson NI, Neumark-Sztainer D, Lytle LA. Emerging adulthood and college aged youth: An overlooked age for weight-related behavior change. *Obesity*. 2008; 16 (10): 2205-11.
2. Bernardo GL, Jomorı MM, Fernandes AC, Proença RP. Food intake of university students. *Revista de Nutrição.* 2017; 30(6): 847-86.
3. Sánchez Socarrás V, Aguilar Martínez A. Food habits and health-related behaviors in a university population. *Nutr Hosp*. 2014; 31: 449-457.
4. Tavolacci MP, Grigioni S, Richard L, Meyrignac G, Dechelotte P, Ladner J. Eating disorders and associated health risks among university students. *Journal of Nutrition Education and Behavior*. 2015; 47: 412-420.
5. Sanchez-Ruiz MJ, El-Jor C, Abi Kharma J, Bassil M, Zeeni N. Personality, emotion related variables, and media pressure predict eating disorders via disordered eating in Lebanese University students. *Eat Weight Disord*. 2019; 24: 313-322.
6. Baş M. Yeme bozukluklarına diyetsel yaklaşım ve ağırlık yönetimi ilişkisi. *Yetişkinlerde Ağırlık Yönetimi,* İstanbul: TDD Yayınevi, 2008.
7. Arusoğlu G, Kabakçı E, Köksal G, Merdol TK. Orthorexia nervosa and adaptation on of ORTO-11 into Turkish. *Turkish Journal of Psychiatry*. 2008; 19 (3): 283-291.
8. Marazziti D, Presta S, Baroni S, Silvestri S, Dell'Osso L. Behavioral addictions: a novel challenge for psychopharmacology. *CNS Spectr*. 2014; 19: 486-95.
9. Farchakh Y, Hallit S, Soufa M. Association between orthorexia nervosa, eating attitudes and anxiety among medical students in Lebanese Universities: results of a cross sectional study. *Eat and Weight Disord.* 2019; 24: 683-691.
10. Mathieu J. What is orthorexia? *J Am Diet Assoc.* 2005; 105 (10): 1510-1512.
11. Haman L, Barker-Ruchti N, Patriksson G, Lindgren EC. Orthorexia nervosa: An integrative literature review of a lifestyle syndrome. *Int J Qual Stud Health Well-being.* 2015; 14 (10): 1-15.
12. Donini LM, Marsili D, Graziani MP, Imbriale M, Canella C. Orthorexia nervosa: validation of a diagnosis questionnaire. *Eating and Weight Disorders.* 2005; 10 (2): 28-32.
13. Babicz-Zielińska E, Wądołowska L, Tomaszewski D. Eating Disorders: Problems of contemporary civilization-A Review. *Polish Journal of Food and Nutrition Sciences*. 2013;63(3):133-146.
14. World Health Organization. Obesity: Preventing and managing the global epidemic. Report of a WHO consultation on obesity, WHO Technical Report Series. Geneva: WHO, 2020.
15. Garner DM, Garfinkel PE. The eating attitudes test: An index of the symptoms of anorexia nervosa. *Psychological Medicine.* 1979; 9 (2), 273-279.
16. Savaşır I, Erol N. Yeme tutum testi: anoreksiya nevroza belirtileri indeksi. *Psikoloji Dergisi*. 1989; 7, 19-25.
17. Bratman S, Knight D. Health Food Junkies: Overcoming the Obsession with Healthful Eating, Newyork: Broadway Books, 2000.
18. Arusoğlu, G. The investigation of healthy eating fixation (Orthorexia) and the adaptation of the ORTO-15 scale, Master Thesis, Ankara: Hacettepe University, Institute of Health Sciences Dietetics Programme; 2006.

19. Rakıcıoğlu N, Akal YE. Energy and nutrient intake and food patterns among Turkish university students. *Nutrition Research and Practice.* 2011; 5(2):117-12
20. Okumuşoğlu S. The relationship of orthorexic tendencies with eating disorder tendencies and gender in a group of university students. *Curr Res Educ.* 2017; 3 (3), 105-115.
21. Oğur S, Aksoy A, Güngör Ş. Determination of the orthorexia nervosa tendency in university students. *BEU Journal of Science.* 2015; 4 (2), 93-102.
22. Meister SE. The occurrence of highly sensitive attitudes and behaviors toward eating among undergraduate students at a Midwestern University, Master Thesis, DeKalb County, Illinois: Northern Illinois University, 2010.
23. Brytek-Matera A, Donini LM, Krupa M, Poggiogalle E, Hay P. Orthorexia nervosa and self-attitudinal aspects of body image in female and male university students. *Journal of Eating Disorders*. 2015; 3, 2-12.
24. Dell'osso L, Abelli M, Carpita B, Massimetti G, Pini S, Rivetti L, Gorrasi F, Tognetti R, Ricca V, Carmassi C. Orthorexia nervosa in a sample of Italian University population. *Riv Psichiatr*. 2016; 51(5): 190-196.
25. Kaya Z. Consideration of healthy eating obsession (orthorexia nervosa) for students educated in nutrition and dietetics department, Master Thesis, İstanbul: Okan University 2018.
26. Bundros J, Clifford D, Silliman K, Morris NM. Prevalence of orthorexia nervosa among college students based on bratman's test and associated tendencies. *Appetite.* 2016; 1 (101), 86-94.
27. Erol Ö. Determination of Orthorexia Nervosa Symptoms and Eating Attitudes in Inonu University Faculty of Medicine Students, Master Thesis, Malatya: İnönü University, 2018.
28. Ulaş B, Uncu F, Üner S. Prevalence and affecting factors of potential eating disorders among students of health higher education. *İnönü University Journal of Health Sciences.* 2013; 2 (2), 15-22.
29. Karadağ G, Elibol E, Yıldıran H, Akbulut G, Çelik M, Değirmenci M, Söğüt M, Güneş M, Dinler M. Evaluation of the relationship between obesity with eating attitudes and orthorexic behavior in healthy adults. *Gazi Medical Journal.* 2016; 27, 107-114.
30. Batıgün AD, Utku Ç. A study on the relationship between eating attitudes and anger. *Turkish journal of physiology.* 2006; 21, 65-78.
31. Erol A, Toprak G, Yazıcı F, Erol, S. Comparison of locus of control and self-esteem as predictors of severity of anorexic symptoms. *J Clin Psy.* 2000; 3, 147-52.
32. Uskun E, abaplı A. The Relationship between Body Image and Eating Attitudes of Secondary School Students. *TAF Prev Med Bull.* 2013; 12, 519-28.
33. Bosi AT, Çamur D, Çaşatay G. Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine in Ankara, Turkey. *Appetite.* 2007; 49, 661-666.
34. Öztürk M, Ayhan N. Orthorexia in university students and determining relationship with healthy life style behaviors. *The Journal of Academic Social Science.* 2017; 5 (51), 455-465.
35. Parra-Fernández ML, Rodríguez-Cano T, Onieva-Zafra, MD, Perez-Haro MJ, Casero-Alonso V, Fernández-Martinez E, Notario-Pacheco B. Prevalence of orthorexia nervosa in university students and its relationship with psychopathological aspects of eating behaviour disorders. *BMC Psychiatry.* 2018; 18 (1), 364.
36. Reynolds R. Is the prevalence of orthorexia nervosa in an Australian University population 6.5 %?. *Eat Weight Disord.* 2018; 23 (4):453-458.
37. Duran S. The risk of orthorexia nervosa (healthy eating obsession) symptoms for health high school students and affecting factors. *Pamukkale Medical Journal.* 2016; 9 (3), 220-226.
38. Korinth A, Schiess S. Eating behaviour and eating disorders in students of nutrition sciences. *Public Health Nutrition.* 2010; 13 (01), 32-37.
39. Arslantaş H, Adana F, Öğüt S, Ayakdaş D, Korkmaz A. Relationship between eating behaviors of nursing students and orthorexia nervosa (obsession with healthy eating): a cross-sectional study. *Journal of Psychiatric Nursing*. 2017; 8(3):137-144.
40. Uzdil Z, Kayacan A, Özyıldırım C, Kaya S, Kılınç G, Asal Ulus C, Sökülmez Kaya P. Investigation of orthorexia nervosa presence and eating attitude in adolescents. Journal of *Health Science.* 2019; 4(1): 8-13.

Correspondence
Şeyma Sünbül
Selçuk University, Institute of Social Sciences, Department of Nutrition Education, Konya, Turkey.
E-mail: seyma.snbl92@gmail.com
ORCID: https://orcid.org/0000-0002-3333-7203