American Journal of Health Education

ISSN: (Print) (Online) Journal homepage: https://www.tandfonline.com/loi/ujhe20

Relationship Between Healthy Eating Fixation (Orthorexia) and Past Family Life, and Eating Attitudes in Young Adults

Gülçe Mutluer & Defne Yilmaz

To cite this article: Gülçe Mutluer & Defne Yilmaz (2023) Relationship Between Healthy Eating Fixation (Orthorexia) and Past Family Life, and Eating Attitudes in Young Adults, American Journal of Health Education, 54:2, 155-167, DOI: 10.1080/19325037.2022.2163010

To link to this article: https://doi.org/10.1080/19325037.2022.2163010

AMERICAN JOURNAL OF HEALTH EDUCATION
2023, VOL. 54, NO. 2, 155–167
https://doi.org/10.1080/19325037.2022.2163010

Routledge
Taylor & Francis Group

Relationship Between Healthy Eating Fixation (Orthorexia) and Past Family Life, and Eating Attitudes in Young Adults

Gülçe Mutluer and Defne Yilmaz

Canakkale Onsekiz Mart University

ABSTRACT

Background: In comparison to other eating problems, there is less information on healthy eating fixation (HEF) in the literature.
Purpose: Understanding the effects of previous family experiences, which have a multidimensional impact on the individual and on other eating disorders, is important to better comprehend the HEF.
Methods: The current study examined the relationships between HEF and previous family experiences as well as eating attitudes. It is a cross-sectional survey design with a convenience sample of 18–24-year-olds (n = 225) based on a quantitative analysis method.
Results: Except for "limited social activity," a sub-factor significantly related to HEF, and "health and social problems," a sub-factor significantly related to healthy orthorexia (HO), both HEF and HO did not significantly relate to past family life. The outcomes showed that the participants' eating attitudes had a significant relationship with HEF ($r = .57$, $p < .001$) and HO ($r = .23$, $p = .001$).
Discussion: The findings suggest that people with HEF have disordered eating attitudes. Furthermore, practitioners should be aware that family factors may be a risk factor for orthorexia.
Translations to Health Education Practice: These results may help to educate and increase awareness among health educators and mental health professionals regarding the identification, treatment, and recovery of eating disorders and HEF.

ARTICLE HISTORY
Received 7 October 2022
Accepted 21 November 2022

Background

Steven Bratman first identified orthorexia in 1996; the term is derived from the Greek terms "orthos," which means "right," and "orexsis," which means "hunger-appetite."[1,2] It is seen that the concept of orthorexia is also used as "orthorexia nervosa," "pathological healthy eating," "disordered healthy eating"[3] or "healthy eating fixation (HEF)" in various sources.

According to Bratman,[4] there are two levels of "orthorexia." The first level was stated as "preferring to eat healthily." It was called "healthy orthorexia (HO)," that the person's eating habits would not be problematic. Healthy orthorexia is a non-pathological interest in healthy diet and eating.[5] At the pathological level, which is known as "orthorexia nervosa (ON)," or "healthy eating fixation (HEF)," it is stated that "the search for healthy food has become an obsession."[4,6]

As a result of the pathological fixation toward more natural and healthy eating, for orthorexic individuals, the taste, variety, or enjoyment of eating food is less important, and the health, nutritional content, and quality of the food are more important factors.[3,7–9] The increase in time spent thinking about eating behavior and spending more than three hours a day procuring natural-organic materials or planning meals is considered an indicator of healthy eating fixation. This behavior, which begins as an effort to maintain a healthy diet and to achieve optimal health, can lead to malnutrition, loss of social relationships, and low quality of life.[10]

People with HEF avoid certain foods that may contain genetically modified ingredients, as well as foods that contain significant amounts of fat, sugar, salt, or other undesirable substances.[11] When purchasing the products, they spend a lot of time carefully inspecting the packages, and they avoid consuming anything they believe contains unhealthy ingredients.[12] It is also seen that they consume raw foods and prefer vegetables and fruits that they can consume raw due to their fixation with consuming pure foods without additives.[13] When choosing food, orthorexic individuals are to ensure that the food is healthy and natural. The decision to food is made for reasons other than calorie counting or weight loss.[3] The aim here is to take care of consuming healthy foods with a perfect diet. It can also be seen that they lose weight due to this strict healthy eating "diet."[10,12,14]

In relation to eating habits, orthorexic individuals may experience alienation from their family or social environment. They are alienated because they do not

CONTACT Gülçe Mutluer pskdangulcemutluer@hotmail.com Canakkale Onsekiz Mart University, Canakkale 17100, Turkey

want to eat with people who do not eat like them; this may be due to feelings of superiority and belittlement toward people who do not eat like them. It can be explained as an adjustment problem because it causes social isolation because of the deterioration of social relations.[9,10,15–17] As a result of this social isolation, a paradoxical feeling of loneliness and dissatisfaction may also occur.[15]

Spending a lot of time selecting and planning food, focusing excessively on the method of preparation and consumption, feeling distressed or disgusted when near foods they consider unhealthy, believing exaggeratedly that including or excluding certain foods can prevent or cure illnesses, and affect one's well-being, engaging in behaviors such as judging others based on their diet, experiencing deterioration in body image due to the belief of "impurity," and maintaining the diet they think is the best despite the physiological implications of rigid adherence to this diet, such as malnutrition, are examples of HEF.[3]

Individuals with a HEF tend to restrict their consumption because of a pathological desire to be as healthy as possible.[18] Patients with HEF and AN have abnormal eating attitudes and behaviors in common, and both have a limited understanding of the effects of their disorders.[18] Similarly, despite serious medical conditions and evident indications of malnutrition, persons with HEF continue to feel that their eating habits are beneficial to their health.[19] This, however, puts pressure on individuals and motivates them to seek "clean food" in the midst of enormous amounts of processed food in order to avoid being accused of being involved in the development of chronic diseases.[20] As a result, according to some studies, HEF can cause physiological effects like AN.[21] It is possible that it will result in life-long diseases or chronic diseases, since ongoing medical complications may result from malnutrition,[3] excessive weight loss, or a restrictive diet. Examples include weight loss, menstrual irregularity, testosterone deficiency, osteopenia, bradycardia, anemia, metabolic acidosis, pancytopenia, hyponatremia, and depression.[10,22] It is necessary to keep in mind, however, that having a strong orthorexic attitude toward eating might be a risk factor for developing AN.[18] So, this means that, even if it is driven by a desire for better health, orthorexia can lead to nutritional deficiencies, health complications, social consequences, and a reduced standard of living.[10,20]

According to a study conducted with American undergraduate students, those with poor affect regulation and emotional instability are more likely to experience.[23] High levels of food preoccupation and rituals are associated with a higher likelihood of ON in Italian eating disorder patients.[24] Although it was not found to be a significant predictor of total ON scores,[25] German individuals who stated a history of mental illness were also more likely to have ON than those who did not.[25,26]In comparison to people who had never experienced an eating disorder, those who had a history of eating disorders were more likely to develop ON.[24,26–30] Turkish resident doctors who ate fruit or salads for lunch or dinner were similarly more likely to report ON.[14] Likewise, those who had ON were less likely to consume animal fats or saturated fats.[31] Along these, those who purchased artisanal, locally grown, sustainably farmed, and organic goods had a higher likelihood of reporting ON.[32] Additionally, a person is more likely to develop ON if they have two or more food intolerances.[26]

Young adulthood is a period when an individual seeks out social support and desires to establish close relationships, but it is also a period when they strive to become independent and adapt to adulthood. The effort of leaving the family environment and becoming independent is also changing the way people eat.[33,34] Furthermore, it is acknowledged that if the demand for developing autonomy in adolescence is not fulfilled, individuals may feel pressured and may try to alleviate their feelings of helplessness by focusing on their bodies, weight, and eating behaviors.[35,36] Furthermore, the ages 18–24 are critical for other eating disorders such as anorexia nervosa (AN) and bulimia nervosa (BN). The most prevalent age range for AN onset is 15–25 years.[37] Similar to AN, BN is more prevalent in adolescence and young adulthood.[37] It is believed that this age range may therefore be considerable for HEF. In addition, according to the literature, HEF was high in young adults: In a study of university students aged 17 to 23, Sanlier et al.[38] reported that more than half of the participants (59.8%) showed orthorectic tendencies. Another study, carried out with 189 female students aged 18–24 studying in the nutrition and dietetics department, revealed a tendency for SBT in 76.7% of the participants.[39]

Spending too much time reading, researching, and/or preparing "pure" food, depending on the quality and component, and spending too much money are examples of HEF behaviors.[11] The purpose of gathering information regarding people's income in this study is to discover whether they display orthorexic tendencies regardless of their financial situation. On the other hand, it is seen that several psycho-social factors have a significant impact on the development of eating disorders. The prevalence of eating disorders and obsession with weight loss seems to be related, especially in some industrialized Western societies.[40] It is known that having a sports habit has a significant effect on an

individual's diet. Studies on the HEF behaviors of young adults have also reported a significant association between sports habits and HEF.[41–44] Chronic illnesses can have an impact on a person's diet just like sports habits can. For this reason, sports habits and chronic illnesses were included in the research. Their living environments are important for young adults to be independent of their families and to adjust to adult life on their own. Likewise, research has shown an association between an individual's living environment and HEF.[45,46] As a result, this variable, which may also be related to family life, was included in the study.

The Stress and Coping Model and System Theory are used to explain the research: the family is hypothesized as a dysfunctional family system, past family life is conceptualized as a stressor, and orthorexia is conceptualized as a coping mechanism. Stress is understood as a relational phenomenon; stress is seen as a "transaction" between people and their surroundings.[47] A stressor is a stimulus that an individual sees as hazardous because they believe or feel they are inadequate to respond to it. In this study, the stressor was past family life. Even if the danger is untrue, a stressor still generates stress.[48] This explains the scores on the scale for "effect." The person may not be impacted by family life problems or may still be affected even if there isn't one. The procedure has two steps. The first stage is for the person to comprehend the situation's significance and any potential repercussions. The person evaluates their own options for reacting to or handling the event in the secondary stage.[48]

Coping is the response to the stressor; the person chooses how to respond to the stimuli in a certain way.[48] Coping is described as the cognitive and behavioral attempts taken to regulate, tolerate, or lessen external and internal pressures, as well as the conflicts that arise from them.[47] A "coping strategy" is a cohesive collection of various coping activities. There are two main functions of coping strategies: problem-oriented coping, which includes direct efforts toward the source of stress, and emotion-oriented coping, which involves lessening the individual's feelings because of the stressful events. Most people have a variety of coping techniques for dealing with stressful experiences, but they tend to favor one type of coping strategy over another.[47,48] Stressful life experiences are therefore especially difficult, as their physical and psychological effects can damage self-coherence and identity long after the event has occurred. These occurrences may be seen as a "turning point" for certain people, a point linked with a substantial life transformation.[49] A turning point, in this case, could be the fixation on healthy eating.

The fundamental pillar of systems theory is that all system components are interconnected.[48] The family system's structure, organization, and transactional patterns have a big impact on each individual member because family systems theory views the family as a whole and its individuals as linked.[50] Second, the system alters as it moves through its life cycle. The system does not become permanently active at the birth of the first kid or upon the union of the mother and father; rather, the system evolves, and changes as new pieces are added. Thirdly, each modification to one system component results in modifications to all other system components. If the rules of the current pattern within the family system are disrupted, it impacts and disrupts everyone who is a member of the system, not just the specified individual.[48] According to Minuchin,[51] family systems theory works in a circular path; as a result, the impacts of the person on the family and the impacts of the family on the person have a feedback loop. Individuals who are part of a family system are not fully independent and can be understood in context. Systems have homeostatic qualities that keep their patterns stable. This means that if a family is experiencing a problem, one of the members may develop a symptom to compensate for and maintain homeostasis. In this study, the family is considered a dysfunctional system that might lead to orthorexia. But lastly, it is important to remember that every system is distinct and that no two families have the same system.

Purpose

Healthy eating fixation (orthorexia) is a recent concept.[1] Understanding the effects of family and previous experiences, which have a multidimensional impact on the individual and are known to have an impact on other eating and feeding disorders, is important to better comprehend the HEF. In addition, the young adulthood period, which is desired to establish relationships as well as independence efforts, is a common age range for eating and feeding disorders. For this reason, it is necessary to know the characteristics and risk factors of the HEF so that preventive studies can be carried out and intervention plans can be created by mental health professionals. This study was written to help health educators and mental health specialists better understand the emergence and persistence of HEF.

Methods

Participants and procedure

Data was collected between October 2021 and January 2022 after obtaining permission from the ethics

Table 1. Demographics of participants

	n	%
Age		
18 years old	21	9.3
19 years old	22	9.8
20 years old	30	13.3
21 years old	25	11.1
22 years old	43	19.1
23 years old	51	22.7
24 years old	33	14.7
Gender		
Female	208	92.4
Male	17	7.6
Education		
Secondary school	1	.4
High school	94	41.8
Associate degree	25	11.1
Undergraduate	97	43.1
Graduate	8	3.6
Chronic Illness		
Yes	31	13.8
No	194	86.2
Income		
0-3000	159	70.7
3001-6000	45	20.0
6001-9000	13	5.8
9001-12000	4	1.8
12001-15000	2	.9
15001 and more	2	.9
Source of Income		
I have my own salary and no support.	20	8.9
I have my own salary and I get support from my family/others.	41	18.2
I have no salary of my own and I get support from my family/others.	164	72.9
Living Environment		
I live alone.	18	8.0
I live with my family.	137	60.9
I live with a flatmate/friend.	20	8.9
I live in a dormitory.	48	21.3
I live with my partner.	2	.9
Growing Environment		
Village	16	7.1
Town	5	2.2
Township	44	19.6
City	37	16.4
Big city	123	54.7
Diagnosis of Eating Disorders		
Yes	25	11.1
No	200	88.9
Regular Exercise Habit		
No	180	80.0
Yes	45	20.0

committee. The ethics committee approved recruiting young adults and using social media platforms for recruitment. Regarding recruitment, there were no incentives provided for the sample to complete the survey form. The population of the study was planned to include young adults between 18 and 24 years of age without focusing on any racial/ethnic background. The sample was selected using the convenience sampling method.[52] This method was chosen to reach the participants in limitations such as time, cost, and the COVID-19 period. Data gathering was carried out with Google Form. Each e-mail address was allowed to fill out the form only once. Young adults were reached through social media platforms such as WhatsApp groups, Instagram, and Facebook. The form was sent to both genders openly. Despite being sent to groups with a high density of men, the number of men who participated remained low. Additionally, some of the male participants were excluded since they did not fully complete the form.

The IBM SPSS Statistics 22 program was used to analyze the collected data. 281 individuals participated in the study. The study was continued with a total of 225 (92.4% female, 7.6% male) participants by excluding 56 participants with extreme values, who did not meet the age range or whose forms were incomplete. Participants were questioned about their most recent degree of education. Most of them had undergraduate degrees (43.1%) and high school diplomas (41.8%), followed by associate degrees (11.1%), graduate degrees (3.6%), and secondary school diplomas (0.4%). A chronic illness affects 13.8% of participants, whereas 86.2% are illness-free. It is consistent with another study: Tóth-Király et al.[53] reported that in their study, the majority (89.3%) of participants did not have any chronic diseases, whereas 9.3% were diagnosed with an illness.

When the distribution of the participants according to their monthly income, most of the participants (70.7%) stated that they have an income of between 0–3000 Turkish Lira. For their income sources, 72.9% of the participants stated that they do not have any salary and that they receive support from their families or someone else. The majority of the participants live with their families (60.9%) and were raised in big cities (54.7%). 88.9% of the participants had never been diagnosed with any eating disorder, and 11.1% had previously been diagnosed with an eating disorder. Additionally, just 20% of them have a regular sports habit, while the other 80% do not. Sample demographics are summarized in Table 1.

Measures

The family problems of young adulthood evaluation scale (FPYAES)

The Family Problems of Young Adulthood Evaluation Scale was developed by Tugrul[54] in Turkey, based on Lazarus's Model of Stress and Coping. The scale was developed to investigate the number of family environment stressors and their effect level on young adults. It includes eight subscales: Authoritarian-oppressive attitude, insensitivity and inconsistency in relationships, disharmony between parents, limited social activity, a disorder in the house, financial problems, intrusion and abuse, health and social problems. The scale consists of 69 items.[54]

Two different scores are obtained from the scale: "stress score" and "stress affect score." First, to measure the presence of stressful situations in a family, one of the "True/False" options is ticked, and secondly, there is a self-report section showing how the individual is affected by this situation by using a 4-point Likert scale (not at all, slightly affecting, moderately affecting, highly affecting) for the items in which the "True" option is marked.[54]

They examined the scale in four separate groups (four different studies/stages) while developing it, and at each stage, the t-test, discriminant analysis, construct validity, and so on were examined for validity studies. The scale's overall Cronbach Alpha score was found to be .93. The coefficients of all sub-dimensions and the whole version of the scale ranged from .74 to .95 in the test-retest reliability. To summarize, it has been found to be a valid and reliable instrument for assessing family problems.[54]

Eating attitude test (EAT-26)

The Eating Attitude Test (EAT-26) is a self-report inventory that examines the individual's eating attitude. It can be used both clinically and non-clinically. It consists of 26 items. EAT-26 was developed by Garner, Olmstad, Bohr, and Garfinkel in 1982 and was adapted into Turkish by Erguney-Okumus and Sertel-Berk in 2020. EAT-26 scores as "3 = Always, 2 = Very often, 1 = Often, 0 = Other answers (Sometimes, rarely, never)." On the other hand, question 26′s scoring is reversed, that is, "1 = Sometimes, 2 = Rarely, and 3 = Never," while another options score 0 again. An increase in the individual's scale score indicates a deterioration of the eating attitude. If the purpose is to compare people with disordered eating attitudes to those who do not have disordered eating attitudes, the cutoff point is 20.[55]

The validity of the EAT-26 was investigated using the Eating Attitudes Test-40 (EAT-40), the Brief Symptom Inventory, and the Eating Disorders Examination Questionnaire. Concurrent and discriminant validities, as well as factor analyses, were calculated. The EAT-26 had a positive correlation with the Eating Attitudes Test-40, the Eating Disorders Examination Questionnaire, and the Brief Symptom Inventory. The Turkish version of the Eating Attitudes Test–26 had significant internal consistency that was scored by Cronbach's Alpha = .84, and test re-test reliability was .78.[55]

The Teruel Orthorexia Scale (TOS)

The Teruel Orthorexia Scale was developed by Barrada and Roncero in 2018[56] and adapted into Turkish by Asarkaya and Arcan in 2021. It has two dimensions: Healthy orthorexia (HO) and orthorexia nervosa (HEF/ON). The original scale consists of 17 items. In the Turkish version, one item was removed due to that it predicted both dimensions and continued with 16 items. The scores range from "0 = strongly disagree" to "3 = strongly agree." Two separate scores, HO and ON, are obtained. There is no reverse-scored item, and there is no cutoff point. High healthy orthorexia sub-dimension scores show that the interest in healthy eating is not pathological, whereas high orthorexia nervosa sub-dimension scores suggest that the pathological interest in healthy eating and the tendency for orthorexia nervosa increase.[57]

TOS Cronbach Alfa values for healthy orthorexia and orthorexia nervosa factors were calculated as .86 and .81 respectively. The concurrent and criterion-related validity correlation coefficients were both found to be statistically significant, providing support for the scale's validity.[57]

Personal information form

The researcher created the Personal Information Form and checked it by her supervisor before it was finalized. It was used to collect data about the participants' gender, age, education level, source of income, income status, living environment, chronic illness history, sports habits, and whether they had been diagnosed with an eating disorder.

Results

The healthy orthorexia (HO) reliability coefficient was 0.83, and the orthorexia nervosa (HEF) reliability coefficient was 0.85 for the data in this study. For this study, the EAT-26 reliability coefficient was calculated as 0.89. The reliability of the FPYAES was tested over the stress effect on the score, as in the original scale, and the general reliability coefficient was calculated as 0.95.

The relationship between demographic variables with healthy eating fixation (HEF; ON) and healthy orthorexia (HO)

In the normality examination for HEF, the kurtosis and skewness values were not found to be between ±1 (1,430 and 1,688). For this reason, the Mann Whitney U and Kruskal Wallis H tests were used to analyzing the healthy eating fixation in relation to demographic factors (Tables 2 and 3). The outcomes of these tests showed that there was no statistically significant association between HEF and participants' gender ($U = 1711.0$, $p > .05$), chronic illness ($U = 2876.5$, $p > .05$) education level (X^2 (4) = 4.30, $p > .05$),

Table 2. Examination of healthy eating fixation according to demographics (Mann-Whitney U test)

		N	Mean Rank	Sum of Ranks	U	P
HEF/ON	Gender					
	Female	208	112.7	23447.0	1711.0	.824
	Male	17	116.4	1978.0		
	Chronic Illness					
	Yes	31	108.8	3372.5	2876.5	.696
	No	194	113.7	22052.5		
	Eating Disorders					
	Yes	25	161.7	4043.0	1282.0	.000***
	No	200	106.9	21382.0		
	Exercise Habit					
	Yes	180	108.8	19580.5	3290.5	.050*
	No	45	129.9	5844.5		

*P<0.001***, P=0.05**

Table 3. Examination of healthy eating fixation according to demographics (Kruskal-Wallis H test)

		n	Mean Rank	Sd	X^2	P
HEF/ON	Education Level					
	Secondary	1	214.5	4	4.30	.295
	High	94	116.9			
	Associate	25	94.6			
	Undergraduate	97	112.4			
	Graduate	8	120.0			
	Income					
	0-3000	159	114.3	5	5.72	.335
	3001-6000	45	11.6			
	6001-9000	13	98.7			
	9001-12000	4	130.9			
	12001-15000	2	173.5			
	15001 and more.	2	35.5			
	Source of Income					
	Own salary and no support.	20	105.9	2	0.74	.690
	Own salary and support	41	107.4			
	No salary and get support	164	115.3			
	Living Environment					
	Alone	18	131.1	4	2.26	.688
	Family	137	114.1			
	Flatmate	20	104.1			
	Dormitory	48	107.5			
	Partner	2	98.8			
	Growing Environment					
	Village	16	118.9	4	0.20	.996
	Town	5	108.9			
	Township	44	111.3			
	City	37	114.0			
	Big city	123	112.7			

Table 4. Examination of healthy orthorexia according to demographics (Regression)

		95% CI					
	Variables	B	SE	LL	UL	β	P
HO	Gender	0.14	0.15	-0.16	0.43	0.06	.358
	Education	0.006	0.04	-0.07	0.08	0.01	.887
	Chronic Illness	0.14	0.11	-0.08	0.37	0.08	.208
	Eating Disorders	0.00	0.13	-0.25	0.25	0.00	.1000
	Income	-0.009	0.05	-0.10	0.08	-0.01	.841
	Source of Income	-0.03	0.06	-0.16	0.09	-0.04	.576
	Living Environment	-0.06	0.04	-0.14	0.02	-0.09	.167
	Growing Environment	-0.01	0.03	-0.08	0.05	-0.02	.745
	Exercise Habit	0.44	0.09	0.26	0.63	0.30	.000***

*P<0.001***

incomes (X^2 (5) = 5.72, p > .05), sources of income (X^2 (2) = 0.74, p > .05), living environments (X^2 (4) = 2.26, p > .05), and growing environments (X^2 (4) = 0.20; p > 0,05). Participants' eating disorders history was found substantially associated with HEF. Participants who had been diagnosed with an eating disorder before had higher HEF scores (Mdn = 161,7) than those who had never been diagnosed (Mdn = 106,9) with an eating disorder (U = 1282.0, p < .001). Additionally, people who exercise regularly had lower HEF scores (Mdn = 108.8) compared to those who do not (Mdn = 129.9) (U = 3290.5, p = .05).

The relationship between healthy orthorexia and demographic variables was analyzed with simple linear regression (Table 4). Regression results showed that there was no statistically significant relationship between HO and gender ($t_{(225)}$ = .92, R^2 = .004, p > .05), an education level ($t_{(225)}$ = .14, R^2 = .000, p > .05), chronic illness ($t_{(225)}$ = 1.26, R^2 = .007, p > .05), eating disorders history ($t_{(225)}$ = .00, R^2 = .000, p > .05), income ($t_{(225)}$ = −.20, R^2 = .000, p > .05), sources of income ($t_{(225)}$ = −.56, R^2 = .001, p > .05), living environment ($t_{(225)}$ = −1.39, R^2 = .009, p > .05), growing environment ($t_{(225)}$ = −0.33, R^2 = .000, p > .05). However, regular exercise habits and healthy orthorexia had a significant relationship ($t_{(225)}$ = 4.73, R^2 = .09, p < .001). The HO scores of individuals who have regular exercise habits are higher than those who do not have regular exercise habits.

The relationship between past family life with healthy eating fixation (HEF; ON) and healthy orthorexia (HO)

Healthy eating fixation (HEF; ON) and healthy orthorexia (HO) in young adults were examined according to the stresses of family life in youth and the level of being affected by these stresses. For the variables that had a normal distribution, simple linear regression was used; Spearman correlation coefficients were examined for the variables that did not show a normal distribution.

HEF's kurtosis and skewness values were not found to be between ±1 (1,430 and 1,688). For this reason, the Spearman correlation coefficients were used to analyze the healthy eating fixation in relation to past family life (Table 5). There was no significant relationship between both general stress scores (r = −.05, p > .05) and general stress affect scores (r = .04, p > .05) with HEF scores. Even sub-factors were not statistically substantially associated with HEF (see Table 5), except for the "limited social activity" sub-factor, neither the stress score (r = −.20, p < .01) nor the stress affect score (r = −.20, p < .01).

The relationship between healthy orthorexia score and past family life stress score was investigated using simple linear regression ($t_{(225)}$ = 1.08, R^2 = .005, p > .05) and the relationship with the stress affect score was examined with Spearman correlation coefficient (r = −.11, p > .05), and neither score showed a significant correlation with HO. Also, HO's relationships between sub-factors of past family life were investigated with regression and Spearman correlation coefficient, and there were no significant associations between HO and sub-factors (see, Tables 6 and 7) except for the "health and social problems" sub-factor's both scores, which are the stress score (r =.16, p < .05) and the stress affect score (r = −.15, p < .05).

The relationship between eating attitudes with healthy eating fixation (HEF; ON) and healthy orthorexia (HO)

In the normality examination for eating attitudes, the kurtosis and skewness values were not found to be

Table 5. Examination of HEF according to family life problems (Spearman correlation)

			Stress Score	Stress Affect Score
HEF/ON	General	r	-0.05	0.04
		p	.460	.584
	Authoritarian-oppressive attitude	r	-0.03	0.04
		p	.683	.598
	Insensitivity & inconsistency in relationships	r	-0.06	0.06
		p	.362	.376
	Disharmony between parents	r	-0.10	0.10
		p	.121	.155
	Limited social activity	r	-0.20	-0.20
		p	.004**	.003**
	Disorder in the house	r	-0.12	0.11
		p	.084	.101
	Financial problems	r	0.02	-0.03
		p	.786	.667
	Intrusion and abuse	r	-0.02	0.01
		p	.739	.860
	Health and social problems	r	-0.03	0.04
		p	.711	.575

*N=225 ; p<0.01**

Table 6. Examination of HO according to family life problems (Regression)

				95% CI			
	Variables	B	SE	LL	UL	β	P
HO	General SS	0.24	0.22	-0.20	0.69	0.7	.282
	Authoritarian-oppressive attitude SS	0.01	0.03	-0.04	0.07	0.03	.626
	Insensitivity & inconsistency in relationships SS	0.02	0.03	-0.04	0.08	0.05	.441
	Insensitivity & inconsistency in relationships SAS	-0.06	0.09	-0.24	0.12	-0.04	-.630
	Disharmony between parents SS	0.02	0.02	-0.02	0.07	0.07	.314
	Financial problems SS	0.03	0.03	-0.04	0.09	0.06	.414

Notes: SAS= Stress Affect Score, SS=Stress Score

Table 7. Examination of healthy orthorexia according to family life problems (Spearman correlation)

			Stress Score	Stress Affect Score
HO	General Score	r		-0.11
		p		.116
	Authoritarian-oppressive attitude	r		-0.07
		p		.291
	Disharmony between parents	r		-0.03
		p		.612
	Limited social activity	r	-0.04	0.05
		p	.510	.490
	Disorder in the house	r	0.06	-0.06
		p	.387	.371
	Financial problems	r		-0.08
		p		.251
	Intrusion and abuse	r	0.10	-0.12
		p	.124	.086
	Health and social problems	r	0.16	-0.15
		p	.020*	.023*

*N=225 p<0.05**

between ±1 (1,398 and 1,440). Due to this, the Spearman correlation coefficient was used to analyze the participants' eating attitudes in relation to HEF and HO (Table 8). The outcomes showed that the participants' eating attitudes had a statistically significant relationship with HEF (r = .57, p < .001) and HO (r = .23, p = .001).

Discussion

This study investigated whether past family life problems in young adults contribute to healthy eating fixation. Furthermore, healthy orthorexia's association with past family life problems, eating attitudes' impact on HEF and HO, and the relationship between orthorexia's two dimensions and demographic factors were examined. To our knowledge, this is the first study to examine the relationship between past family life problems and the person's perceived stress from these problems with HEF.

Table 8. Examination of HEF and HO according to eating attitudes (Spearman correlation)

		HEF/ON	HO
Eating Attitudes	r	0.57	0.23
	p	.000***	.001***

*N= 225, p<0.001****

Individuals in the study were not compared with or without HEF because the study's purpose was not to diagnose. This study examined the relationship between an increase in HEF scores and other variables. However, 48.8% of the study's sample had HEF scores higher than the mean (≥4). There are other outcomes in the literature that are closer to this one: In their study, Ogur, Aksoy, and Gungor[12] similarly found a cutoff score of ≥4, and they reported that 41.7% of students aged 17 to 23 displayed orthorexic tendencies in Turkish population. According to Fidan, Ertekin, Isikay, and Kirpinar's[58] study, the prevalence of orthorexia was reported to be 43.6%, which is close to the results of the current study. Furthermore, the percentage of students with orthorexia tendencies under the age of 21 was higher than the percentage of those over the age of 21. Berber's[59] study with participants over the age of 18 (68.4% were in the 18–25 age groups) found a gender distribution similar to this current study (92.2% were women), but the orthorexic tendencies were significantly greater (78.6%). In another investigation with university students, HEF was found at a rate of one-fourth of this study, and the frequency of orthorexia was determined to be 12.2% in the individuals participating in the study.[41]

It was hypothesized that HEF would not differ by gender. The finding that neither healthy eating fixation (HEF) nor healthy orthorexia showed a significant difference in the assessment of orthorexia in young adults according to the gender variable supports this. One thing that should be noted about the gender of this current study is the distribution of male and female participants. The authors did not use any statistical manipulations to correct the sample's gender imbalance, as there were more women than men in it when comparing the data. But, during the data-gathering process, the form was sent to social media platforms and groups with a high number of men. Nevertheless, it was not filled by the male participants compared to the female participants. Future studies can focus on more even gender distribution to better understand the relationship between past family life and HEF. Although the form was sent openly to both genders, the rate of woman

participants was 92.4%. Similarly, in a study with 92.2% of women, no significant difference was found between gender.[58] Awad et al.,[60] in their study where used the TOS, the same as the current study. They found that HO scores were significantly higher in females, but there was no significant relation between HEF and gender as in this study.

Previous studies in the literature mostly showed that there was no relationship between education level and HEF.[61–63] This knowledge is supported by our findings. Additionally, it was found that HEF and HO did not show a significant relation according to income status or income source. Similarly, there are studies that did not find a significant relationship between income status and orthorexic symptoms.[64–68] It was found that HEF and HO did not show a significant relation according to living or growing up environments. This finding was inconsistent with our hypothesis which we assumed that the living environment can affect people's eating habits and that this can result in healthy eating fixation. But this is consistent with previous research.[69,70] These findings show that people with HEF, no matter what their living environment, income, or education, are spending a lot of time and money to find the purest foods.

One of our hypotheses was that the presence of chronic health issues had a significant impact on the HEF in young adults. But our finding suggests that there were no noteworthy associations between HEF and chronic illness. This is consistent with previous research.[64,69] These findings may reflect that people with chronic illnesses pay attention to their diet and eating habits to maintain their health, but they do not indicate a link between HEF and chronic illnesses.

The current study also explored differences in HEF scores among those who had a diagnosis of eating disorder (ED) and those who did not. Individuals with a previous diagnosis of an ED had significantly higher HEF levels. In the study conducted by Ruiz and Quiles[71] with university students and utilizing the TOS, they also reported a positive relationship between HEF and ED. On the other hand, another finding of the current study, healthy orthorexia did not show any difference according to the diagnosis of ED. HO is preferring a healthy diet. Based on this criterion and the findings of the study, it can be inferred that a person in HO has a healthy relationship with food and therefore less ED is seen. Literature shows that orthorexia symptoms are quite prevalent in people with AN and BN, and they often increase the following therapy. HEF seems associated both with the clinical recovery of AN and BN and their transition to less severe ED types. Theoretically, an ED and a HEF might coexist and be confused as well as come before or after one another.[24] Additionally, it has been proposed that HEF might be used by anorexic people as a coping mechanism.[72] Given that HEF is a variety of eating disorders, it stands to reason that persons who have eating disorders or disordered eating attitudes will have a higher ratio of HEF. As a result, it is important to remember that HEF is an eating disorder in and of itself and that it would be beneficial to conduct an intervention, treatment, preventative research, and therapeutic interventions in future studies since it may be associated with or coexist with other eating disorders.

As a result of the examination of the HEF in young adults according to regular exercise habits, it was found that HEF and HO showed a significant difference compared to sports habits. Individuals with regular exercise habits have lower HEF scores and higher HO scores than those who do not have regular exercise habits. This means those who prefer to eat healthily are more likely to exercise frequently, which may be because they are concerned about their own health but do not place a higher priority on achieving "pure health." This finding resembles that of Berber,[59] who reported that people who do not exercise during the pandemic had a higher risk of developing HEF.

Examining the HEF in young adults according to the presence of family problems and being affected by them, there is not much research that we can compare to our results. The findings revealed that HEF and HO were not significantly linked with young adults' family problems. When examined according to the subdimensions, it was found that HEF and HO did not show a significant association with authoritarian-oppressive family attitudes and insensitivity and inconsistency in family relationships in the past. Similarly, Turhan[31] examined the relationship between parental attitudes and HEF and did not find a significant relationship. In their study, Merdin[64] and Yildiz,[68] which also addressed the abuse aspect, analyzed the association between childhood trauma experiences and HEF and did not find a significant relationship. Likewise, in the current study, it was found that HEF and HO did not show a discernible relation in terms of intrusion and abuse. Our findings also suggest that disharmony between parents and disorder in the house factors do not affect young adults' having HEF. Regarding financial problems, HEF and HO did not differ significantly. These results are also similar to the income status results of this study which showed that neither HEF nor HO is significantly correlated with income status.

The analysis of the limited social activity in the family factor revealed a substantial difference for HEF

according to the limitation in social activities and being affected by it. Contrarily, HO does not show a considerable difference in terms of limited social activities. It is seen that there is a negative correlation between limited social activities and HEF. This is an intriguing finding given that HEF might lead to social isolation. Because our finding shows that when a family's limitations on social activities increase, HEF decreases. Villa et al.,[73] in contrast to our findings, found that the association between social activities and HEF risk was not significant in their study on the impact of extracurricular activities.

The study revealed that HEF did not differ considerably depending on the family's past health and social problems. However, HO differed significantly according to the presence of past health and social problems in the family and being affected by them. As the health and social problems in the family increase, HO also increases. However, conversely, as the individual's state of being affected by health and social problems increases, it is seen that HO (preferring healthy eating) decreases. As previously noted, in the examination of chronic diseases, it is seen that the individual's own chronic illness does not cause HEF or HO, but the results of the family problems scale show that the health problems of family members may affect HO.

In the last findings of this study, eating attitude was significantly and positively correlated with both HEF and HO. This is consistent with previous research that found a positive relationship between HEF and eating attitude, showing that an increase in the deterioration of eating attitude may affect an increase in HEF symptoms or that an increase in HEF can impact an increase in eating attitude deterioration.[74–76]

Limitations

It is important to note the study's limitations. First of all, a disproportionately large number of females participated in the current study, and it wasn't done on purpose. It would be beneficial for future studies to recruit more male participants to provide a more accurate and diversified picture of HEF traits across genders. Secondly, the findings of the study are limited to the information gathered from young adults in Turkey who voluntarily participated in the study between 2021–2022 and who were aged 18–24. Lastly, there is not so much research that we can compare about the effects of family life on HEF. Therefore, the current study is important for understanding HEF.

Conclusion

Orthorexia is a new concept that does not have official diagnostic criteria and its affecting factors are still being investigated. When the relationship between HEF and young adults' former family life was investigated, it became clear that while healthy orthorexia (HO) may be affected by limited social activities, health issues, and social problems in the family, HEF may be affected by the family's limited social activities.

Finally, even though there isn't enough evidence to support this claim, the presence of family problems in young adults and the level of being affected by these stressors predict healthy eating fixation (HEF/ON) and healthy orthorexia (HO), so it can be said that they have an effect. However, certain findings, such as the effects of the family's social and health problems and the family's limitations on social activities, might be considered when considering the importance of the family, especially in the treatment of eating disorders.

Translation to Health Education Practice

The responsibilities and competencies of health educators that are important to the current study are outlined below, according to the National Commission for Health Education Credentialing, Inc. (NCHEC) (www.nchec.org).[77] Young adulthood is a critical period for eating disorders. Familial factors, on the other hand, play a significant role in an individual's life, and it is well-recognized that past family life has several psychological and health implications. Furthermore, because orthorexia is a relatively new topic, it is critical to investigate potential factors such as health conditions (chronic disease, eating disorders), socio-economic status, past family life, life skills and so forth. Mental health professionals, educators, and healthcare providers must examine the variables that influence young adults' orthorexic tendencies. Moreover, healthy eating is an important behavior, but there is a difference between healthy eating and orthorexia nervosa (HEF); therefore, nutrition and eating psychoeducation should be considered as prevention. The education and intervention need to meet the target groups and their needs (Area I). Nevertheless, when it comes to eating habits and health, gender and race issues are needed to be considered regarding the youth at risk (Area I).

For a better understanding of orthorexia nervosa (HEF), its determinants, and their underlying causes (such as limited social activities, social and health problems in past family life, and a previous eating disorder), young adults, families, mental health professionals, educators, and healthcare professionals should be informed of the study's findings (Areas IV, V, and VI). We used ethical principles throughout the design, assessment, evaluation, research, and analytic processes of our study. Educators, mental health professionals, and

other practitioners must follow ethical principles throughout the education, implementation, communication, consulting, and advocacy processes (Area VIII). In addition, media tools are useful for conducting advocacy, providing awareness, and disseminating knowledge to the youth, as populations around the world actively used the benefits of online tools during the COVID pandemic period (Areas V, and VI).

Regardless of economic status, education, or living environment, HEF behaviors can be observed. But those with diagnosed eating disorders had a higher risk of developing HEF than those without. These results may help to educate and increase awareness among mental health professionals regarding the identification, treatment, and recovery of eating disorders (ED) and HEF. Because this finding showed that HEF can be seen simultaneously with any other eating disorder or can be seen after recovery. To care for the individual's well-being, this knowledge may also help school psychological counselors to observe and intervate ED or introduce it to teachers, students, and/or families. This is important because it may help the school psychological counselor carry out primary prevention. The presence of a chronic illness does not seem to affect HEF or HO. However, social and health problems in the family may play a role in HO. Also, people who exercise regularly are more likely to show HO behaviors than HEF. These results might be because of mindful eating displayed by those with HO behaviors. Last of all, sports, family life and members, and mindful eating can be used as teaching and intervention tools by health educators and mental health professionals to create a supportive environment for mental health.

Acknowledgments

The authors thank all participants in this study. They have no financial disclosure to declare.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Gülçe Mutluer http://orcid.org/0000-0002-9270-611X
Defne Yilmaz http://orcid.org/0000-0002-9403-9218

References

1. Bratman S. What is orthorexia? www.orthorexia/what-is-orthorexia. Published 2014. Accessed May 8, 2021.
2. Donini LM, Marsili D, Graziani MP, Imbriale M, Cannella C. Orthorexia nervosa: a preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. *Eat Weight Disord*. 2004;9(2):151–157. doi:10.1007/BF03325060.
3. Dunn TM, Bratman S. On orthorexia nervosa: a review of the literature and proposed diagnostic criteria. *Eat Behav*. 2016;21:11–17. doi:10.1016/j.eatbeh.2015.12.006.
4. Bratman S. Orthorexia vs. theories of healthy eating. *Eat Weight Disord*. 2017;22(3):381–385. doi:10.1007/s40519-017-0417-6.
5. Zickgraf HF, Barrada JR. Orthorexia nervosa vs. healthy orthorexia: relationships with disordered eating, eating behavior, and healthy lifestyle choices. *Eat Weight Disord*. 2021;17:1–13. doi:10.1007/s40519-021-01263-9.
6. Altinok M. *The evaluation of eating attitudes, emotional eating, mindful eating and orthorexia with the metacognitions* [Master's thesis]. Istanbul, Turkey: Fatih Sultan Mehmet Vakif University; 2020.
7. Aksoydan E, Camci N. Prevalence of orthorexia nervosa among Turkish performance artists. *Eat Weight Disord*. 2009;14(1):33–37. doi:10.1007/BF03327792.
8. Andreas S, Schedler K, Schulz H, Nutzinger DO. Evaluation of a German version of a brief diagnosis questionnaire of symptoms of orthorexia nervosa in patients with mental disorders (Ortho-10). *Eat Weight Disord*. 2018;23(1):75–85. doi:10.1007/s40519-017-0473-y.
9. Varga M, Dukay-Szabó S, Túry F, van Furth EF. Evidence and gaps in the literature on orthorexia nervosa. *Eat Weight Disord*. 2013;18(2):103–111. doi:10.1007/s40519-013-0026-y.
10. Koven NS, Abry AW. The clinical basis of orthorexia nervosa: emerging perspectives. *Neuropsychiatr Dis Treat*. 2015;11:385–394. doi:10.2147/NDT.S61665.
11. Moroze RM, Dunn TM, Holland C, Yager J, Weintraub P. Microthinking about micronutrients: a case of transition from obsessions about healthy eating to near-fatal "orthorexia nervosa" and proposed diagnostic criteria. *Psychosomatics*. 2015;56(4):397–403. doi:10.1016/j.psym.2014.03.003.
12. Ogur S, Aksoy A, Gungor S. Determination of the orthorexia nervosa tendency in university students. *BEU Fen Bil D*. 2015;4(2):93–102. doi:10.17798/beufen.95626.
13. Evcimen H, Ayyildiz NI. Determination of the tendencies of university students to orthorexia nervosa of the relationship with obsession. *ESTUDAM Public Health J*. 2020;5(3):391–400. doi:10.35232/estudamhsd.691686.
14. Bosi ATB, Camur D, Guler C. Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine (Ankara, Turkey). *Appetite*. 2007;49(3):661–666. doi:10.1016/j.appet.2007.04.007.
15. Alvarenga MS, Scagliusi FB, Philippi ST. Changing attitudes, beliefs and feelings towards food in bulimic patients. *Arch Latinoam Nutr*. 2008;58:274–279.
16. Valente M, Syurina EV, Donini LM. Shedding light upon various tools to assess orthorexia nervosa: a critical literature review with a systematic search. *Eat Weight Disord*. 2019;24(4):671–682. doi:10.1007/s40519-019-00735-3.

17. Mathieu J. What is orthorexia? *J Am Diet Assoc*. 2005;105(10):1510–1512. doi:10.1016/j.jada.2005.08.021.
18. Dell'Osso L, Abelli M, Carpita B, et al. Historical evolution of the concept of anorexia nervosa and relationships with orthorexia nervosa, autism, and obsessive-compulsive spectrum. *Neuropsychiat Dis Treat*. 2016;12:1651–1660. doi:10.2147/NDT.S108912.
19. Cuzzolaro M, Donini LM. Orthorexia nervosa by proxy? *Eat Weight Disord*. 2016;21(4):549–551. doi:10.1007/s40519-016-0310-8.
20. Syurina EV, Bood ZM, Ryman FVM, Muftugil-Yalcin S. Orthorexia nervosa – opinion study in Dutch health professionals. *Front Psychol*. 2018;9:1419. doi:10.3389/fpsyg.2018.01419.
21. Park SW, Kim JY, Go GJ, Jeon ES, Pyo HJ, Kwon YJ. Orthorexia nervosa with hyponatremia, subcutaneous emphysema, pneumomediastimum, pneumothorax, and pancytopenia. *Electrolyte Blood Press*. 2011;9(1):32–37. doi:10.5049/EBP.2011.9.1.32.
22. Cheshire A, Berry M, Fixsen A. What are the key features of orthorexia nervosa and influences on its development? A qualitative investigation. *Appetite*. 2020;155(1):104798. doi:10.1016/j.appet.2020.104798.
23. Oberle CD, Samaghabadi RO, Hughes EM. Orthorexia nervosa: assessment and correlates with gender, BMI, and personality. *Appetite*. 2017;108:303–310. doi:10.1016/j.appet.2016.10.021.
24. Segura-Garcia C, Ramacciotti C, Rania M, et al. The prevalence of orthorexia nervosa among eating disorder after treatment. *Eat Weight Disord*. 2015;20(2):161–166. doi:10.1007/s40519-014-0171-y.
25. Strahler J, Herman A, Walter B, Stark R. Orthorexia nervosa: a behavioral complex or psychological condition? *J Behav Addict*. 2018;7(4):1143–1156. doi:10.1556/2006.7.2018.129.
26. Missbach B, Hinterbuchinger B, Dreiseitl V, Zellhofer S, Kur C, Konig J. When eating right, is measured wrong! A validation and critical examination of the ORTO-15 questionnaire in German. *PLoS One*. 2015;10(8):1–15. doi:10.1371/journal.pone.0135772.
27. Barnes MA, Caltabiano ML. The interrelationship between orthorexia nervosa, perfectionism, body image and attachment style. *Eat Weight Disord*. 2017;22(1):177–184. doi:10.1007/s40519-016-0280-x.
28. Brytek-Matera A, Rogoza R, Gramaglia C, Zeppegno P. Predictors of orthorexic behaviours in patients with eating disorders: a preliminary study. *BMC Psychiatry*. 2015a;15(1):1–8. doi:10.1186/s12888-015-0628-1.
29. 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. *J Eat Disord*. 2015b;3(1):1–8. doi:10.1186/s40337-015-0038-2.
30. Gramaglia C, Brytek-Matera A, Rogoza R, Zeppegno P. Orthorexia and anorexia nervosa: two distinct phenomena? A cross-cultural comparison of orthorexic behaviours in clinical and non-clinical samples. *Bio Med Central Psychia*. 2017;17(1):1–5. doi:10.1186/s12888-017-1241-2.
31. Grammatikopoulou MG, Gkiouras K, Markaki A, et al. Food addiction, orthorexia, and food-related stress among dietetics students. *Eat Weight Disord*. 2018;23(4):459–467. doi:10.1007/s40519-018-0514-1.
32. Barnett MJ, Dripps WR, Blomquist KK. Organivore or organorexic? Examining the relationship between alternative food network engagement, disordered eating, and special diets. *Appetite*. 2016;105:713–720. doi:10.1016/j.appet.2016.07.008.
33. Ercim RE, Pekcan G. Assessment of nutritional status of young adults with Healthy Eating Index-2005. *J Nutr Dietet*. 2014;42:91–98.
34. Cok F. Gelişim psikolojisi, kuramlar, yöntemler ve yaşamın ilk yılları. *Jfes*. 1993;26(22):641–670. doi:10.1501/Egifak_0000000479.
35. Erol A, Toprak G, Yazıcı F. Predicting factors of eating disorders and general psychological symptoms in female college students. *Türk Psikiyatri Derg*. 2002;13:48–57.
36. Erbas S. *Examining eating attitudes from an object relational perspective* [Ph.D. Dissertation]. Ankara, Turkey: Hacettepe University; 2015.
37. Smink FRE, van Hoeken D, Hoek HW. Epidemiology of eating disorders: incidence, prevalence and mortality rates. *Curr Psychiatry Rep*. 2012;14(4):406–414. doi:10.1007/s11920-012-0282-y.
38. Sanlier N, Yassibas E, Bilici S, Sahin G, Celik B. Does the rise in eating disorders lead to increasing risk of orthorexia nervosa? Correlations with gender, education, and body mass index. *Ecol Food Nutr*. 2016;55(3):266–278. doi:10.1080/03670244.2016.1150276.
39. Garipoglu G, Arslan M, Andaç-Ozturk S. Beslenme ve Diyetetik Bölümü'nde okuyan kız öğrencilerin ortoreksiya nervoza eğilimlerinin belirlenmesi. *Jizuist*. 2019;1:23.27.
40. Westen D. *Psychology: Mind, Brain, & Culture*. New York: John Wiley & Sons; 1996.
41. Pehlivan E, Mete B, Firinci B, Dogan E. Prevalence of orthorexia nervosa and its relations with health literacy in university students. *ESTUDAM Public Health J*. 2019;4(2):166–175. doi:10.35232/estudamhsd.500538.
42. Baysal I. *The determination of the relationship between food neophobia and orthorexia nervosa tendencies with nutritional status of individuals who engage in sports* [Master's Thesis]. Ankara, Turkey: Baskent University; 2020.
43. Dalmaz M, Tekdemir-Yurtdas G. Investigation of the orthorexia nervosa symptoms among those who sport in gym. *Int R J Orthopaed Traumatol Sport Med*. 2015;4(4):23–39. doi:10.17372/OTSHD.2015412556.
44. Oner B. *Investigation of exercise addiction and orthorexia nervosa (healthy eating obsession) symptoms among sports center members* [Master's thesis]. Elazig, Turkey: Firat University; 2021.
45. Hamurcu TGO. *The Effect of social media use on orthorexia nervosa in nursing students* [Master's thesis] İstanbul, Turkey: İstanbul University; 2019.
46. Karakus B, Hidiroglu S, Keskin N, Karavus M. Orthorexia nervosa tendency among students of the department of nutrition and dietetics at a university in Istanbul. *North Clin Istanb*. 2017;4(2):117–123. doi:10.14744/nci.2017.20082.

47. Krohne HW. Stress and coping theories. *Int Encycl Social Behav Sci*. 2001;22:15163–15170. doi:10.1016/B0-08-043076-7/03817-1.
48. Verhaeghe S, Defloor T, Grydonck M. Stress and coping among families of patients with traumatic brain injury: a review of the literature. *J Clin Nurs*. 2005;14(8):1004–1012. doi:10.1111/j.1365-2702.2055.01126.x.
49. Sutin AS, Costa JPT, Wethington E, Eaton W. Perceptions of stressful life events as turning points are associated with self-rated health and psychological distress. *Anxiety Stress Coping*. 2010;23(5):479–492. doi:10.1080/10615800903552015.
50. Miller IW, Ryan CE, Keitner GI, Bishop DS, Epstein NB. The McMaster approach to families: theory, assessment, treatment, and research. *J Fam Therapy*. 2008;22(2):168–189. doi:10.1111/1467-6427-00145.
51. Minuchin P. Families and individual development: provocations from the field of family therapy. *Child Dev*. 1985;56(2):289–302. doi:10.2307/1129270.
52. Ozen Y, Gul A. Population-sampling issue on social and educational research studies. *Educ Acad Res*. 2007;15:394–422.
53. Tóth-Király I, Gajdos P, Román N, Vass N, Rigó A. The associations between orthorexia nervosa and the sociocultural attitudes: the mediating role of basic psychological needs and health anxiety. *Eat Weight Disord*. 2021;26(1):125–134. doi:10.1007/s40519-019-00826-1.
54. Tugrul C. Gençlik dönemindeki aile sorunlarını değerlendirme ölçeği: faktör yapısı, geçerlik ve güvenirlik çalışması. *Türk Psk D*. 1996;11:25–43.
55. Erguney-Okumus FE, Sertel-Berk HO. The psychometric properties of the eating attitudes test short form (EAT-26) in a college sample. *Stud Psychol*. 2020;40(1):57–78. doi:10.26650/SP2019-0039.
56. Barrada JR, Roncero M. Bidimensional structure of the orthorexia: development and initial validation of a new instrument. *Anales de Psicología*. 2018;34(2):283–291. doi:10.6018/analesps.34.2.299671.
57. Asarkaya B, Arcan K. Adaptation, validity and reliability study of Teruel Orthorexia Scale (TOS): the Turkish adaptation of the Teruel Orthorexia Scale. *Klinik Psk D*. 2021. doi:10.5455/kpd.26024438m000039.
58. Fidan T, Ertekin V, Isikay S, Kirpinar I. Prevalence of orthorexia among medical students in Erzurum, Turkey. *Compr Psychiatry*. 2010;51(1):49–54. doi:10.1016/j.comppsych.2009.03.001.
59. Berber R. *Investigation of the relationship between orthorexia tendencies and nutritional status of individuals in the Covid-19 pandemic* [Master's thesis]. Aydin, Turkey: Adnan Menderes University; 2021.
60. Awad E, Salameh P, Sacre H, Malaeb D, Hallit S, Obeid S. Association between impulsivity and healthy orthorexia: any moderating role of personality traits? *Psychol Health Med*. 2021;27(8):1832–1841. doi:10.1080/13548506.2021.1954673.
61. Cok G. *Examination of Orthorexia Nervosa Frequency and Nutritional Status in Individuals Applying to A Family Health Center*. [Master's thesis]. Istanbul, Turkey: Istanbul University; 2020.
62. Guvenc F. *The effect of healthy nutrition obsession (Orthorexia nervosa) on the quality of life and happiness* [Master's thesis]. Isparta, Turkey: Suleyman Demirel University; 2020.
63. Ozkahya KD. *Identification of orthorexia nervosa in adults applying for online diet and the correlation with other parameters* [Master's thesis]. Istanbul, Turkey: Okan University; 2015
64. Merdin E. *The role of childhood trauma and psychopathological symptoms on orthorexia nervosa* [Master's thesis]. Istanbul, Turkey: Maltepe University; 2018.
65. Ugurlu EB. *The relationship between orthorexia nervosa levels and social appearance anxiety in Uskudar University students* [Master's thesis]. Istanbul, Turkey: Uskudar University: 2020.
66. Cakir RD. *The evaluation of the effects of social media use on orthorexia nervosa and body image* [Master's thesis]. Istanbul, Turkey: Istanbul Aydin University; 2021.
67. Turhan S. *The examination of the relationship between orthorexia nervosa, perfectionism, body image and perceived parenting attitudes* [Master's Thesis]. Istanbul, Turkey: Istanbul Arel University: 2021.
68. Yildiz K. *The relationship between childhood trauma and perfectionism, orthorectic symptoms and eating attitudes* [Master's thesis]. Istanbul, Turkey: Isik University: 2020.
69. Erol O. *Determination of orthorexia nervosa symptoms and eating attitudes in Inonu University Faculty of Medicine Students* [Master's thesis]. Malatya, Turkey: Inonu University; 2018.
70. Ozdenoglu A, Dege G. As a predictor of eating disorders at university students the effect of self-esteem and nutrition education on the frequency of orthorexia nervosa. *Bozok Med J*. 2015;5:5–14.
71. Ruiz A, Quiles Y. Prevalence of orthorexia nervosa in Spanish university students: relationship with body image and eating disorders. *Ann Psychol*. 2021;7(3):493–499. doi:10.6018/analesps.449041.
72. Barthels F, Meyer F, Huber T, Pietrwosky R. Orthorexic eating behaviour as a coping strategy in patients with anorexia nervosa. *Eat Weight Disord*. 2017;22(2):269–276. doi:10.1007/s40519-016-0329-x.
73. Villa M, Opawsky N, Manriquez S, Ananias N, Vergara-Barra P, Leonario-Rodriquez M. Orthorexia nervosa risk and associated factors among Chilean nutrition students: a pilot study. *J Eat Disord*. 2022;10(1):6. doi:10.1186/s40337-022-00529-6.
74. Cicekoglu-Ozturk P. Determining nursing students' orthorexia nervosa tendencies and associated factors. *Eurasian JHS*. 2021;4:99–105.
75. Duran S. The risk of orthorexia nervosa (healthy eating obsession) symptoms for health high school students and affecting factors. *Pam Med J*. 2016;9(3):220–226. doi:10.5505/ptd.206.03880.
76. Sumengen M. *Eating behavior in students and relationship between orthorexia nervosa* [Master's tehsis]. Istanbul, Turkey: Bahcesehir University; 2020.
77. National Commission for Health Education Credentialing. Areas of responsibilities, competencies and sub-competencies for health education specialists 2020. https://www.nchec.org/responsibilities-andcompetencies. Published 2020. Accessed November 05, 2022.