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# Assessment of Healthy Eating Obsession (Orthorexia Nervosa) and Eating Attitudes of Individuals Age 65 and Older

## 65 Yaş Üstü Bireylerin Sağlıklı Beslenme Takıntısı (Ortoreksiya Nervoza) ve Yeme Tutumlarının Değerlendirilmesi

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## ABSTRACT

**Objective:** The current study was cross-sectional and aimed to determine the eating behaviors and orthorexia nervosa related factors, the relationship between eating behaviors and orthorexia nervosa (ON), and the frequency of eating behaviors and orthorexia nervosa during the pandemic period in individuals aged 65 and older.

**Materials and Methods:** The sample of the research is a large group of individuals age 65 and older in Turkey. A total of 895 elderly individuals were included in the study. Data were collected with Personal Information Form, Eating Attitude Test (EAT-40) and Orthorexia-15 Scale (ORTO-15). Data were evaluated in SPSS statistical package program 18.0 and frequency, percentage, student-t test, chi-square, Pearson correlation analysis were used as statistical analysis, and type 1 error level was accepted as $p<0.05$.

**Results:** The risk of orthorexia was found in 45.8% of the elderly individuals and the mean ORTO-15 score was found 34.35±4.428. In addition, it was determined that 99.1% of the elderly had eating attitude and behavior disorders, and the mean EAT-40 score of the elderly individuals was found 68.81±13,873. A negative correlation ($r=-.476$; $p=0.001$) was found between EAT-40 and ORTO-15. Therefore, 45.7% of elderly individuals had both orthorexia nervosa risk and eating attitude disorder.

**Conclusion:** This study showed that elderly individuals are at risk of orthorexia and have eating disorders. According results, it would be appropriate to raise awareness of elderly individuals against orthorexia nervosa and also eating attitude and behavior disorder tendencies with a multidisciplinary approach.

**Keywords:** Orthorexia, Elderly, Eating attitude, Covid-19, Nutrition

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## ÖZET

**Amaç:** Çalışma 65 yaş ve üzeri bireylerde pandemi döneminde yeme davranışları ve ortoreksiya nevroza(ON) sıklığını, yeme davranışları ve ON ile ilişkili faktörleri, yeme davranışları ve ON ilişkisini belirlemek amacıyla kesitsel olarak yapılmıştır.

**Gereç ve Yöntem:** Araştırmada evreni Tükiye'deki 65 yaş üstü bireylerin oluşturduğu büyük bir yığındır. Çalışmaya toplam 895 yaşlı birey dahil edilmiştir. Veriler Kişisel Bilgi Formu, Yeme Tutum Testi (YTT-40) ve Ortoreksiya-15 Ölçeği (ORTO-15 ile toplanmıştır. Elde edilen veriler SPSS istatistik paketprogramı 18.0'de değerlendirilmiş ve istatistiksel analiz olarak sıklık, yüzde, student-t test, ki kare, Pearson korelasyon analizi kullanılmış olup, tip 1 hata düzeyi $p<0.05$ olarak kabul edilmiştir.

**Bulgular:** Yaşlı bireylerin %45.8'inde ortoreksiya riski saptanmıştır ve ORTO-15 puan ortalamaları 34,35±4,428 olarak bulunmuştur. Buna ek olarak yaşlıların %99,1'inde yeme tutum ve davranış bozukluğu olduğu belirlenmiştir ve yaşlı bireylerin EAT-40 puan ortalamaları 68,81±13,873 olarak bulunmuştur. YTT-40 ve ORTO-15 arasında negatif yönlü ilişki ($r=-.476$; $p=0.001$) bulunmuştur. Yaşlı bireylerin %45.7'si hem ortoreksiya nevroza riskine hem de yeme tutum bozukluğuna sahiptir.

**Sonuç:** Bu çalışma, yaşlı bireylerin ortoreksiya riskine ve yeme bozukluğuna sahip olduğunu göstermiştir. Çalışma verilerine göre yaşlı bireylerin ortoreksiya nevroza ile yeme tutum ve davranış bozukluğu eğilimlerine karşı multidisipliner bir yaklaşımla bilinçlendirilmesinin uygun olacağı kanatindeyiz.



**Anahtar Kelimeler:** Ortoreksiya, yaşlı,yeme tutum ve davranış bozukluğu, covid-19, beslenme


## 1. Introduction

The population of the elder is increasing worldwide. Aging with its physiological dimension; while expressing the changes seen with chronological age; aging with its psychological dimension it refers to the change in the adaptive capacity of a person in terms of learning, psychomotor, problem solving and personality traits as the chronological age progresses. It has been accepted by the World Health Organization that the early old age is between the ages 65 and 75, the middle age stage is 75 and 65 and the advanced age is the stage after 85 years old [1]. In old age, problems related to "inadequate (malnutrition)" and "unbalanced (obesity)" nutrition may be experienced. Nutrition plays a very important role in the prevention, delay and treatment of aging-related diseases. Nutrition is very important for ensuring adequate cognitive and physical functions while reducing the risk of chronic diseases in the elderly population [2-3].

Orthorexia nervosa (ON), one of the eating disorders, has been the subject of many researches in recent years. The term was coined by Steven Bratman in 1997. The term orthorexia nervosa is defined as an obsession with healthy eating and is characterized by excessive concentration on strict food quality, food preparation and nutritional norms [4].

People under the influence of orthorexia categorize foods as "correct and healthy" and "wrong and unhealthy". Besides they exclude color additives, food flavoring, pesticides, excess fat, sugar, salt or genetically modified foods from their diet [5,6].

People with this eating behavior focus on an excellent, pure and healthy diet in order to impact their health positively [7]. Food choices, conflicting information about proper nutrition, and hypersensitivity to physical appearance have reached a pathological statein orthorexia nervosa [8]. In the study of Donni et al., who developed the ORTO -15 scale, they reported the frequency of orthorexia as 6.9% of the general population [9]. Orthorexia nervosa (ON) high-risk groups are women, adolescents, health education students, athletes, men (practitioners and medical students), dietitians, fitness professionals, and performance artists. Different sociodemographic characteristics are reported in many studies [10-15].

Orthorexia nervosa is not listed in the ICD-11 and DSM-V classifications. There is still no officially accepted definition of ON or standardized criteria for diagnose. Although many diagnostic criteria have been proposed, they have all been also criticized. In 2016,developed new diagnostic criteria based on analysis of published studies, data from experts in eating disorders (from the USA, Norway, Poland, Sweden, Australia, Italy, and Germany), and questionnaires [16]. The criteria are divided into A and B types. The first describes the behavioral characteristic of ON, namely obsessive eating habits, a feeling of anxiety when dietary restrictions are not followed. The body mass index descrase was observed in those with ON; however, this is not a necessary or sufficient condition for ON. Criterion B indicates a wide range of ON-related outcomes such as malnutrition, social isolation, distorted image of one's body, low self-esteems yet, it should be emphasized that these criteria still need to be validated and may be subject to further changes [16-19].

The prevalence of ON in young participants made the prevalence of ON in older individuals unpredictable. Understanding ON in the elderly in this context is particularly important in light of the uniqueness of the late stage of life, where health becomes a more central issue in daily life during this vulnerable period and personal time becomes more abundant as retirement provides. Almost all studies on ON have been conducted in Western countries, especially in Europe. In our country, the studies are limited with this studies and are aimed at university students and adults. In the international literature, only one study was found regarding ON on elderly individuals [20]. No research was found in Turkey. Therefore, in this study, it is aimed to determine for the first time the level of obsession with healthy eating, eating attitudes and behaviors in individuals over 65 and so as to contribute to the literature.

## 2. Material and Method

### Participants

This cross-sectional study was conducted in June 2021 by individuals 65 age and older across Turkey via google form. The universe of the research is a large group of individuals age 65 and older in Turkey. The number of samples was determined by the study data of He et al (2021) through the G power program. Power analysis was performed with 80% power, 0.2875989 effect size and 0.05 margin of error, and it was planned to include at least “382” individuals age 65 and older in the study. Considering the 20% loss, the minimum sample size was determined as 458. A total of 896 individuals agreed to participate in the survey without falling below the number determined by the power analysis, and one of them did not answer the questions; therefore, 895 individuals over the age of 65 were included in the study.

### Tools

The questionnaire form was prepared by examining the literature. The questionnaire form was prepared according to literature. The questionnaire consists of 3 parts.
*Personal Information Form:* Form contains a total of 23 questions, including sociodemographic characteristics, disease diagnosis, drug use status, and nutritional information, which are thought to affect the eating attitudes and obsessions of elderly individuals.
*Eating Attitude Test (EAT-40):* Test is used as a screening tool for the early diagnosis and anorexia nervosaidentification. EAT-40; determines the attitudes and behaviors related to eating in patients with eating disorders, and the disorders in eating behavior in normal individuals. EAT-40 scale will be a six-digit Likert type scale and the scale consists of 40 items. The validity and reliability study of the EAT-40 scale in Turkey was conducted by Erol and Savasir in 1989. For each item, one of the options “always”, “very often”, “often”, “sometimes”, “rarely” and “never” is ticked. The "never" option in items 1, 18, 19, 23 and 39 and the "always" option in other items are calculated as 3 points, while the

options next to them are calculated as 2 points and 1 point, respectively. Scoring is calculated and the total score is obtained. A score of 30 and above is significant and is related to the level of psychopathology. A maximum score of 120 is obtained from the scale. The Cronbach Alpha of the scale is 0.70 and the Cronbach Alpha was found to be 0.88 in this study [10].

*Orthorexia-15 Scale (ORTO 15):* The diagnostic evaluation scale developed for orthorexia nervosa is the ORTO-15 scale developed by Donini et al. in 2005. This test includes 15 questions about healthy eating habits and efforts to reach healthy food.A minimum of 15 and a maximum of 60 points can be obtained from the scale. Orthorexic individuals (who have a healthy eating obsession) get the lowest score on the scale. Answers, which are the distinguishing criteria for orthorexia, were given a score of "1", and answers showing a tendency to normal eating behavior were given a score of "4" .Turkish validity and reliability of the ORTO-15 scale was made by Arusoglu in 2006. The factor and consistency analysis of the ORTO-15 scale was performed by ORTO-15 and as a result of the factor analysis, the eigen value of the test was determined as 3 factors above 1.0 and the factor loadings of the items in the scale were found to vary between -0.44 and 0.69.In Arusoglu's study, the cut-off point was determined as "33" by looking at the 25% and 75% percentile values, and it is expected that orthorexic symptoms can be seen in individuals with a score below this. The Cronbach Alpha of the scale was 0.62 and in this study, the Cronbach Alpha was found to be 0.74 [10].

**Statistical Evaluation of Data**

Normal distribution analyzes were performed at the beginning of the study. In this context, the Gaussian curve was evaluated and the mean score and the Kolmogorov-Smirnov test significance level were calculated; It was determined that the distribution is within the normal distribution curve. The T-Test was used to compare quantitative data and to compare two groups; The Anova Test was used to compare more than two groups. Pearson correlation analysis tests were used and type 1 error level was accepted as $p<0.05$.

## 3. Results

**Introductory Characteristics of Elderly Individuals**

**Table 1:** Introductory characteristics of elderly ındividuals

| GENERAL FEATURES | n | % |
|---|---|---|
| **Gender** | | |
| Female | 520 | 58.1 |
| Male | 375 | 41.9 |
| **Living Place** | | |
| Bay | 228 | 25.5 |
| Town | 94 | 10.5 |
| City center | 573 | 64.0 |
| **Marital Status** | | |
| Married | 609 | 68.0 |
| Single | 42 | 4.7 |
| Widow | 244 | 27.3 |
| **Educational Status** | | |
| Primary school | 476 | 53.2 |
| Midschool | 140 | 15.6 |
| High school | 148 | 16.5 |
| University | 119 | 13.3 |
| Postgraduate | 12 | 1.3 |
| **Income Status (Turkish Lira)** | | |
| 750 | 105 | 11.7 |
| 751-1500 | 157 | 17.5 |
| 1501-3000 | 374 | 41.8 |
| 3001-5000 | 191 | 21.3 |
| 5001-10000 | 52 | 5.8 |
| Over 10001 | 16 | 1.8 |

| | | |
|---|---|---|
| **Do you use medicationregularly?** | | |
| Yes | 466 | 52.1 |
| No | 429 | 47.9 |
| **Do you use vitamins and minerals?** | | |
| Yes | 237 | 26.5 |
| No | 451 | 50.4 |
| Bazen | 207 | 23.1 |
| **Do you smoke?** | | |
| Yes | 132 | 14.7 |
| No | 763 | 85.3 |
| **Do you drink alcohol?** | | |
| Yes | 85 | 9.5 |
| No | 810 | 90.5 |
| **How many meals a day do you eat?** | | |
| 1-2 | 91 | 10.2 |
| 2-3 | 504 | 56.3 |
| 3-4 | 222 | 24,8 |
| 4-5 | 57 | 6.4 |
| 5-6 | 17 | 1.9 |
| More than 6 | 4 | 0.4 |
| **Do you skip meals?** | | |
| Yes | 353 | 39.4 |
| No | 542 | 60.6 |
| **How often do you eat out?** | | |
| 1 in 2-3 days | 37 | 4.1 |
| 1 in a week | 85 | 9.5 |
| 1 in 2 weeks | 71 | 7.9 |
| 1 in a month | 195 | 21.8 |
| Rarely | 507 | 56.6 |
| **Do you cook your own meals at home?** | | |
| Yes | 547 | 61.1 |
| No | 348 | 38.9 |
| **How fast do you eat your meals?** | | |
| Slow | 197 | 22.0 |
| Medium | 488 | 54.5 |
| Fast | 177 | 19.8 |
| Too fast | 33 | 3.7 |
| **What is your daily water consumption?** | | |
| Less than 1 liter | 186 | 20.8 |
| 1-2 liter | 489 | 54.6 |
| 2-3 liter | 181 | 20.2 |
| More than 3 liter | 39 | 4.4 |
| **Do you have a disease diagnosed by a doctor?** | | |
| Yes | 512 | 57.2 |
| No | 383 | 42.8 |
| **Have you experienced a change in your diet after the Covid19 pandemic?** | | |
| Yes | 273 | 30.5 |
| No | 622 | 69.5 |
| **Do your behaviors change when you access the right nutritional information?** | | |
| Always | 88 | 9.8 |
| Often | 222 | 24.8 |
| Rarely | 465 | 52.0 |
| Never | 120 | 13.4 |
| **Do you exercise regularly?** | | |
| Yes | 202 | 22.6 |
| No | 693 | 77.4 |
| **Do you wake up at night and eat something?** | | |
| Yes | 124 | 13.9 |
| No | 771 | 86.1 |

58.1% (n=520) of 895 individuals 65 years and older participated in the study were female and 41.9% (n=375) were male. 64% (n=573) of the individuals live in the city center and 68% (n=609) are married. Individuals aged age 65 and older who participated in the research stated that they mostly live in İzmir, Aydın, Antalya, İstanbul and Bursa provience. 53.2% of the individuals (n=476) have primary school education. The income status of 41.8% (n=374) is in the range of 1501-3000. 52.1% (n=466) of elderly individuals use medicationregularly. 50.4% (n=451) did not use vitamins and minerals. 85.3% (n=763) stated that they did not smoke, and 90.5% (n=810) did not use alcohol. 56.3% (n=504) of the elderly individuals eat 2-3 meals a day and 60.6% (n=542) do not skip meals. 56.6% (n=507) rarely eat out, 61.1% (n=547) cook meals at home. 54.5% (n=488) stated their eating rate as moderate, 54.6% (n=489) stated their daily water consumption as 1-2 L. 57.2% (n=512) of the elderly individuals stated that they have a disease diagnosed by a physician, and these diseases are generally diabetes, hypertension, high cholesterol and cardiovascular diseases. 69.5% (n=622) of them did not change their nutritional preferences in the post-Covid19 pandemic period, 52% (n=465) rarely changed their behavior when they accessed the right nutrition information, 77.4% (n=693) did not do regular exercise, 86.1% (n=771) stated that they did not wake up to eat at night (Table 1).

**Table 2:** Average values of features related to elderly individuals

| GENERAL FEATURES | ELDERLY INDIVIDUALS(n:895) | $\bar{X}$ ± SD |
|---|---|---|
| AGE | 70.03 | 5.815 |
| WEIGHT(kg) | 75.05 | 13.031 |
| HEIGHT(cm) | 164.39 | 9.327 |
| BMI (kg) / (m²) | 27.81 | 4.675 |

In Table 2. the mean age of the elderly individuals was 70.03±5.815, mean body weight was 75.05±13.031 kg, mean height was 164.39±9.327 cm, and mean BMI was 27.81±4.675 (kg) / (m²) .

**Table 3:** The distribution of elderly individuals according to their ORTO-15 scores and their mean-standard deviation values

| ORTO-15 | S | % |
|---|---|---|
| **≤ 33** | 410 | 45.8 |
| **>33** | 485 | 54.2 |
| **$\bar{X}$ ± SD** | 34.35±4.428 | |

The distribution of elderly individuals according to their ORTO-15 scores and their mean-standard deviation values are given at Table 3. Elderly individuals who score 33 or less on the scale are considered orthorexic. The risk of orthorexia was found in 45.8% of the elderly individuals, and the mean ORTO-15 score was found to be 34.35±4.428.

**Table 4:** Distribution of elderly individuals according to their EAT-40 scores and mean-standard deviation values

| EAT-40 | S | % |
|---|---|---|
| **≤ 30** | 8 | 0.9 |
| **>30** | 887 | 99.1 |
| **$\bar{X}$ ± SD** | 68.81±13.873 | |

Table 4 shows the distribution of elderly individuals according to their EAT-40 scores and their mean-standard deviation values. It is known that those who score above 30 on the scale may have eating attitude and behavioral disorders. It was determined that 99.1% of them had eating attitude and behavior disorders. The mean EAT-40 score of the elderly individuals was found to be 68.81±13,873.

**Table 5:** Distribution of elderly individuals according to their ORTO-15 and EAT-40 scores

| ORTO-15 | ≤ 30(n=8) | EAT-40 >30(n=887) | TOTAL | p |
|---|---|---|---|---|
| ≤33(n=410) | 0.1 | 45.7 | 45.8 | |
| >33(n=485) | 0.8 | 53.4 | 54.2 | 0.001* |
| **TOTAL** | 0.9 | 99.1 | 100 | |

*: $p<0.05$

In Table 5, the ORTO-15 scale score status and the EAT-40 scale score situation are examined together. It was determined that 45.7% of the elderly individuals who scored 33 or less on the ORTO-15 scale and 30 points on the EAT-40 scale. These elderly individuals have eating behavior and attitude disorders as well as their obsession with healthy eating.

**Table 6.** Relationship between Eating Attitude Test-40 and Orthorexia-15 scores of elderly individuals

| SCALE | ORTO-15 | |
|---|---|---|
| | R | P |
| **EAT-40** | | |
| | **-476**** | **001*** |

**. Correlation is significant at the 0.01 level (2-tailed).
*: $p<0.05$

In Table 6, a negative and statistically significant relationship was found between the EAT-40 and ORTO-15 score averages of the elderly individuals ($p<0.05$). As the eating attitude score increases, the orthorexia nervosa score decreases.

**Table 7:** The relationship between the general characteristics of elderly individuals and their ORTO-15 scores

| | ORTO-15 SCORES | | | | |
|---|---|---|---|---|---|
| | ≤ 33 | | > 33 | | |
| | n | % | n | % | P |
| **GENDER** | | | | | |
| FEMALE | 219 | 42.1 | 301 | 57.9 | |
| MALE | 191 | 50.9 | 184 | 49.1 | 0.028*[a] |
| **Educational Status** | | | | | |
| Primary school | 246 | 51.7 | 230 | 48.3 | |
| Midschool | 60 | 42.9 | 80 | 57.1 | |
| High school | 67 | 45.3 | 81 | 54.7 | |
| University | 34 | 28.6 | 85 | 71.4 | |
| Postgraduated | 3 | 25 | 9 | 75 | 0.001*[b] |
| **Do you use medicationregularly?** | | | | | |
| Yes | 210 | 45.1 | 256 | 54.9 | |
| No | 200 | 46.6 | 229 | 53.4 | 0.571[a] |
| **How often do you eat out?** | | | | | |
| once in 2-3 days | 9 | 24.3 | 28 | 75.7 | |
| 1 in a week | 32 | 37.6 | 53 | 63.4 | |

| | | | | | |
|---|---|---|---|---|---|
| 1 in 2 weeks | 23 | 32.4 | 48 | 67.6 | |
| 1 in a month | 82 | 42.1 | 113 | 57.9 | |
| Rarely | 264 | 52.1 | 243 | 47.9 | 0.001*[b] |
| **Do you have a disease diagnosed by a doctor?** | | | | | |
| Yes | 236 | 46.1 | 276 | 53.9 | |
| No | 174 | 45.4 | 209 | 54.6 | 0.518[a] |
| **Have you experienced a change in your diet after the Covid19 pandemic?** | | | | | |
| Yes | 88 | 32.2 | 185 | 67.8 | |
| No | 322 | 51.8 | 300 | 48.2 | 0.001*[a] |
| **Do your behaviors change when you access the right nutritional information?** | | | | | |
| Always | 19 | 21.6 | 69 | 78.4 | |
| Often | 71 | 32.0 | 151 | 68.0 | |
| Rarely | 239 | 51.4 | 226 | 48.6 | |
| Never | 81 | 67.5 | 39 | 32.5 | 0.001*[b] |
| **Do you exercise regularly?** | | | | | |
| Yes | 55 | 27.2 | 147 | 72.8 | |
| No | 355 | 51.2 | 338 | 48.8 | 0.001*[a] |

*: $p<0.05$
a=t test
b=one-wayAnova

Table 7 shows the distribution of the ORTO-15 scores of the elderly according to their general characteristics. The risk of orthorexia nervosa was found in 42.1% of women and 50.9% of men. A significant correlation was found between gender and ORTO-15 score ($p<0.05$). The risk of orthorexia nervosa was determined in 51.7% of primary school graduates, 42.9% of secondary school graduates, 45.3% of high school graduates, 28.6% of university graduates, and 25% of postgraduate elderly individuals. A statistically significant correlation was found between the ORTO-15 score and the ORTO-15 score ($p<0.05$).

According to the frequency of eating out, the risk of orthorexia nervosa was determined in 24.3% of the elderly individuals who eat out every 2-3 days, 37.6% of the elderly individuals who eat out once a week, 32.4% of the elderly individuals who eat out once in two weeks, 42.1% of the elderly individuals who eat out once a month and in 52.1% of the elderly individuals who rarely eat out. A statistically significant correlation was found between the frequency of eating out and the ORTO-15 score ($p<0.05$).

Orthorexia nervosa risk was determined in 32.2% of the elderly individuals who stated that their nutrition changed in the post-Covid19 period, and in 51.8% of the elderly individuals who stated that their nutrition did not change in the post-Covid19 period. A statistically significant relationship was found between the nutritional change and the ORTO-15 score in the post-Covid 19 period. The risk of orthorexia nervosa was detected in 21.6% of the elderly individuals who stated that their behavior always changes when they accessed the right nutrition information, 32 % of the elderly individuals who stated that they changed frequently, 51.4% of the elderly individuals who stated that they rarely changed, and 67.5% of the elderly individuals who stated that they never changed. A statistically significant correlation was found between behavioral change and ORTO-15 score when accessing the right nutritional information ($p<0.05$).The risk of orthorexia nervosa was found in 27.2% of the elderly individuals who stated that they exercised regularly and 51.2% of the elderly individuals who stated that they did not exercise regularly. A statistically significant correlation was found between regular exercise and ORTO-15 score ($p<0.05$).

## 4. Discussion and Conclusion

Today, people tend to buy organic food and have a balanced diet in order to be healthier. These tendencies can sometimes lead to problems such as the obsession with healthy eating. Preventing

diseases or being protected from food allergies are other factors that affect orthorexia nervosa. As in other age groups, organic and healthy nutrition are indispensable concepts for a healthy life in elderly people [21]. The changes with aging, various diseases affect nutrition and health status. In recent years, the elderly have been more careful about healthy eating. This may increase the tendency for orthorexia nervosa in this age group.

One of the important factors affecting the aging process and health status in old age is nutrition. Nutrition both affects healthy aging and is effective in maintaining health in old age. Adequate and balanced nutrition of elderly individuals will increase their life expectancy and improve their lifequality. Nutritional status in old age is affected by changes in the body during the aging process, chronic diseases, drug use, physical, psychological, social and economic conditions [22]. The fact that nutrition in old age is associated with these conditions may encourage elderly individuals to become more conscious about nutrition in recent years. Therefore, the issue of orthorexia nervosa in the elderly becomes remarkable. There have been no studies investigating the frequency of orthorexia nervosa in elderly individuals. In this context, this research has a unique quality. This study was conducted only on the elderly (65 years and older) population. According to the results of the study, it was determined that 45.8% of the elderly showed orthorexic tendency.
In a study conducted with nursing students, it was found that 45.3 % of the students were at risk for orthorexia nervosa [10]. In a study conducted on healthcare personnel, the frequency of ON was found to be as high as 60.1% [23]. In McInerney-Ernst's study, 83% of university students had an ON tendency [24]. In Shah's study, 69% of students showed orthorexic tendency [25]. In their study on ON, Varga et al. reported the prevalence of orthorexia to be 6.9% for the general population and between 35% and 57.8% for high-risk groups (health care professionals, artists) [26]. In a study conducted on pregnant women, it was determined that 21.4% of pregnant women may have orthorexia risk [27]. In our current study, contrary to the literature, 42.1% of women and 50.9% of men showed orthorexic tendency, and it was observed that the orthorexia tendency of elderly individuals with increasing education level decreased ($p<0.05$).In the study conducted by Yesil et al. on adult individuals, 71.4% of women and 28.6% of men showed orthorexic tendency, and it was determined that the tendency of orthorexia increases as the education level of adult individuals increases [28]. To the question of " Do your behaviors change when you access the right nutritional information?" of the elderly who participated in our research; 88 of them (9.8%) answered always and 222 of them (24.8%) answered often. Orthorexia nervosa may be revealed by misinterpreting the information about proper nutrition in the elderly or by giving too much importance to it. According to the results of the research, when their BMIs are evaluated, it has been determined that the rate of the elderly with a BMI value above 25 and having eating behavior and attitude disorders is quite high (73.4%).These results showed that elderly pre-obese and obese individuals have eating behavior and attitude disorders. BMI is a simple technique in the evaluation of nutritional status, but it should not be forgotten that the intersection points used in the elderly are different [29].
When the literature was reviewed, it was determined that the studies examining the relationship between elderly individuals and orthorexia nervosa were quite limited. In the study of He et al., the relationship between life satisfaction and positive body image in orthorexia nervosa in the elderly living in China was investigated. According to the results of the research, a negative relationship was determined between life satisfaction and positive body image in the elderly. On the contrary, it was determined that the elderly with orthorexia nervosa scored higher on positive psychological/lifestyle measures [20].

According to the results of the research, they stated that the elderly have many diseases that are closely related to nutrition (diabetes, hypertension, cardiovascular diseases). 46.1% of elderly individuals who have at least one of these diseases are orthorexic. The increase in the incidence of disease with aging is also caused by the simultaneous use of a large number and variety of drugs by the elderly. In our study, 46.6% of the elderly individuals who did not use regular medication were orthorexic In the study of Barthels et al.it was stated that the interest in healthy eating, whether at an advanced age or at a young age, can be positive and this result is not surprising In this context, a similar conclusion can be drawn in this study [30]. In our study, 67.5% of the elderly individuals who answered 'Never' to the question ‘Do your behaviors change when you access the right nutritional information?' were orthorexic ($p<0.05$).In a study, a significant relationship was found between excessive focus on healthy nutrition and psychosocial disorders [26]. On the contrary, the opposite result was found in our study. This research was conducted on the elderly during the pandemic period. Changing dietary habits in some elderly people during the pandemic period has made the concept of orthorexia nervosa more popular. In this study, it was determined that 273 elderly people (30.5%)

changed their eating habits during the pandemic period. Considering the nutrition of the elderly, it is noteworthy that this rate is significant. The Covid 19 pandemic process has affected the living conditions and eating habits of many people. Due to the curfew during the pandemic period, individuals age 65 and older had to prepare and consume their meals at home. According to our research data, 52.1% of elderly individuals who rarely eat outside are orthorexic ($p<0.05$). In this study, according to the EAT-40 test, eating attitude and behavior disorders were determined in 99.1 of the elderly by getting 30 points or more. This rate is quite high and remarkable. When the EAT-40 test and ORTO-15 test scores were compared, statistically significant results were found $p<0.05$).In a study conducted with students, it is seen that 84.5% of students are at risk for EAT-40 (10).In a study conducted with health school students, it was determined that 10.9% of the students were at risk for eating disorders according to their EAT-40 score [31].

The frequency of people obsessed with healthy eating in society is increasing. Adolescents, women, athletes, health professionals, dietitians are risky groups for orthorexia [23]. This is the first study in which the prevalence of ON in the elderly population and eating attitude and behavior disorders were determined in elderly individuals. The results will contribute to future research. The most important conclusion from this study is that individuals age 65 and older tend to have ON at a remarkable rate (45.8%) during the pandemic period. In addition, when it was evaluated in terms of eating attitude and behavior disorders, it was determined that elderly individuals were at high risk (99%). Furthermore it has been determined that elderly individuals have eating behavior and attitude disorders as well as their obsession with healthy eating. It seems that to raise awareness of elderly individuals about nutrition and to address them in terms of eating disorders and to take precautions for this is important. When eating behavior disorder is detected in individuals; with a multidisciplinary approach (with doctors, dietitians, nurses and psychologists) should be helped to turn to healthy nutrition. Due to the limited number of studies investigating orthorexia nervosa in old age, comprehensive studies on this subject should be planned and performed.

## Declaration of Ethical Code

*In this study, we undertake that all the rules required to be followed within the scope of the "Higher Education Institutions Scientific Research and Publication Ethics Directive" are complied with, and that none of the actions stated under the heading "Actions Against Scientific Research and Publication Ethics" are not carried out.*

## References


[1] Fettahoglu R, Erdem R.The Effect of Individuals' Perception of Aging on Healthcare Use. Manisa Celal Bayar University Journal of Social Sciences 2020;18(4):12-32.

[2] Sarac ZF, Yilmaz M. Aging and healthy eating. Ege Journal of Medicine 2015: 54.

[3] Filion AJ,Haines J. Whyprevention? The caseforupstreamstrategies. In L. Smolak& M. P. Levine (Eds.), The Wiley handbook of eating disorders .West Sussex,UK: Wiley 2015: 557– 568.

[4] Zickgraf HF, Barrada JR. Orthorexia nervosa vs. healthy orthorexia: relationships with disordered eating, eating behavior, and healthy lifestyle choices. Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity 2021 ;1-13.

[5] Brytek-Matera A. Orthorexia nervosa—An eating disorder, obsessive-compulsive disorder or disturbed eating habit? Arch. Psychiatry Psychother 2012;14:55–60

[6]Sellin J.Dietary dilemmas, delusions, and decisions.Clin. Gastroenterol. Hepatol 2013;12,:1601–1604.

[7] Branley-Bell D, Talbot CV. Exploring the impact of the COVID-19 pandemic and UK lockdown on individuals with experience of eating disorders. Journal of Eating Disorders 2020;8(1), 1-12.

[8] Cheshire A,Berry M,Fixsen A. Whatare the keyfeatures of orthorexianervosa and influences on itsdevelopment? A qualitativeinvestigation. Appetite 2020;155:104798.

[9] Donini LM, Marsilli D, Graziani MP, Imbriale M, Canella C.Orthorexia Nervosa: Validation of a diagnosis questionnaire.Eating and Weight Disorders2005;10(2):28-32.

[10] Arslantas H, Adana F, Ögüt S, Ayakdas 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).

[11] Kinzl JF, Hauer K,Traweger C, Kiefer I.Orthorexia nervosa: eine häufige essstörung bei diätassistentinnen. Ernahrungs-Umschau 2005;11:436-439.

[12] Bagci Bosi AT, Camur D, Güler C.Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine .Appetite 2007;49:661–6.

[13] Fidan T, Ertekin V, Isikay S, Kirpinar I.Prevalence of orthorexia among medical students in Erzurum, Turkey. Comprehensive psychiatry 2010;51(1):49-54.

[14] Asil E, Surucuoglu M. S.Orthorexia nervosa in Turkish dietitians. Ecology of food and nutrition 2015;54(4): 303-313.

[15]Aksoydan E,Camci N.Prevalence of orthorexia nervosa among Turkish performance artists. Eating and Weight Disorders-Studies on Anorexia, Bulimia and Obesity 2009;14(1):33-37.

[16] Dunn T.M, Bratman S.On orthorexia nervosa: A review of the literature and proposed diagnostic criteria. Eat. Behav 2016:11–17.

[17] Kummer A, Dias F M, Teixeira A.L. On the concept of orthorexia nervosa. Scand. J. Med. Sci. Sports 2008;18:395–396.

[18] Aragon A. Introduction This article is inspired by the peculiarly obsessive and perfection isticview that many fitness enthusiasts have of food. I firstheard the term “orthorexia” mentioned many years ago, but. 2009.

[19] McComb, Sarah E, Jennifer S Mills."Orthorexia nervosa: A review of psychosocial risk factors." Appetite 2019;140:50-75.

[20] He J,Zhao Y, Zhang H, Lin Z. Orthorexi anervosa is associated withpositive body imageand life satisfaction in Chinese elderly: Evidencefor a positive psychology perspective. International Journal of Eating Disorders 2021;54(2): 212-221.

[21] Mathieu J.What is orthorexia? Journal of the American Dietetic Association 2005;105(10):1510-1512.

[22] Kuk J.L,Saunders T J, Davidson L E, Ross R. Age-relatedchanges in total and regional fat distribution.Ageing research reviews 2009;8(4):339-348.

[23] Ergin G.*Orthorexia Nervosa Prevalence Study in Health-Care and NonHealth Care Individuals*.Baskent University, Faculty of Health Sciences, Master Thesis, Nutrition and Dietetics, 2014. Ankara.

[24] McInerney-Ernst E M.*Orthorexianervosa: Real constructorne west social trend*? Doctoral dissertation, University of Missouri Kansas City. 2011.

[25] Shah SM. *Orthorexi anervosa:Healthy eating oreating disorder*?Student Thesis: Eastern Illinois University.2012.

[26] Varga M,Dukay-Szabó S, Túry F. Evidenceandgaps in theliterature on orthorexia nervosa. Eat Weight Disord 2013;18:103–111.

[27] Ipkirmaz I.B, Saka M. The Evaluation of Healthy Nutrition Obsession (Orthorexia Nervosa) and Eating Attitudes of Pregnant Women. *Baskent University Journal of Faculty of HealthSciences*, 5(1). 2020.

[28] Yeşil E, Turhan B, Tatan D, Sarahman C,Mendane S. a. k. a. The Effect of Gender to Orthorexia Nervosa Tendency in Adults.Ankara Journal of Health Sciences 2018; 7(1):1-9.

[29] Pekcan G.Determination of nutritional status. In: Baysal A, Aksoy M, Bozkurt N, Merdol TK, Pekcan G, Besler HT, Kececioğlu S, Mercanligil SM, Yildiz E, editors. *Diet Handbook.* 5thEdition, Ankara: Hatiboglu Publishing House; 2008:69-77

[30] Barthels F,Barrada J. R, Roncero M. Orthorexia nervosa and healthy orthorexia as new eating styles.PLoSOne 2019;14(7):e0219609.

[31] Duran S.The risk of orthorexia nervosa (healthy eating obsession) symptoms for health high school students and affecting factors. Pamukkale Medical Journal 2016;(3):220-226.