The Relationship Between Anxiety and Nutritional Habits During COVID-19 Pandemic

KOVİD-19 Sürecinde Anksiyete ve Beslenme Alışkanlıkları Arasındaki İlişki

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ABSTRACT

This study was conducted to investigate the relationship between anxiety and nutritional habits in individuals during the COVID-19 period.

The study was carried out with 800 individuals living in provinces across Turkey between February and March 2021. Data were collected using a questionnaire created on Google Forms, which included a Descriptive Information Form, the Orthorexia Nervosa Scale (ORTO-11), and the Coronavirus Anxiety Scale (CAS).

The mean anxiety score of participants whose nutritional habits changed was statistically significantly higher than the score of those whose nutritional habits did not change ($p<0.001$). It was found that the mean anxiety scores were found to be statistically significantly higher in participants whose body weight increased since the beginning of the pandemic than in those whose body weight did not change ($p=0.002$) and in those who consumed three or more snacks a day than in those who did not consume snacks at all ($p=0.002$). The mean anxiety scores were found to be statistically significantly higher also in participants who used Zinc (Zn) ($p=0.015$), Magnesium (Mg) ($p=0.019$), omega 3 ($p=0.002$), vitamin C ($p<0.001$), vitamin D ($p<0.001$), turmeric extract ($p=0.002$), black elderberry extract ($p=0.001$), and multivitamins ($p=0.001$) than in those who did not use them. A very weak, negative, and statistically significant relationship was found between the Coronavirus Anxiety Scale and ORTO-11 Scale scores (r: -0.102, $p<0.001$).

According to the findings of this study, the increase in individuals' anxiety levels during the COVID-19 pandemic caused changes in their nutritional status.

Keywords: COVID-19, Anxiety, Nutritional Habits

ÖZ

Bu çalışma, KOVİD-19 döneminde bireylerde anksiyete ve beslenme alışkanlıkları arasındaki ilişkiyi araştırmak amacıyla yapılmıştır.

Araştırma, Şubat-Mart 2021 tarihleri arasında Türkiye genelindeki illerde yaşayan 800 kişiyle gerçekleştirilmiştir. Veriler, Google Forms ile oluşturulan Tanımlayıcı Bilgi Formu, Ortoreksiya Nervoza Ölçeği (ORTO-11) ve Koronavirüs Anksiyete Ölçeği'ni (KAÖ) içeren anket kullanılarak toplanmıştır.

Beslenme alışkanlıkları değişen katılımcıların ortalama anksiyete puanı, beslenme alışkanlıkları değişmeyenlerin puanından istatistiksel olarak anlamlı derecede yüksekti ($p<0,001$). Pandemi başlangıcından itibaren vücut ağırlığı artan katılımcılarda vücut ağırlığı değişmeyenlere göre ($p=0,002$) ve günde üç veya daha fazla ara öğün tüketenlerde hiç ara öğün tüketmeyenlere göre ortalama anksiyete puanlarının istatistiksel olarak anlamlı derecede yüksek olduğu bulunmuştur ($p=0,002$). Çinko (Zn) ($p=0,015$), Magnezyum (Mg) ($p=0,019$), omega 3 ($p=0,002$), C vitamini ($p<0,001$), D vitamini ($p<0,001$), zerdeçal ekstraktı ($p=0,002$), kara mürver ekstraktı ($p=0,001$) ve multivitaminleri ($p=0,001$) kullanan katılımcılarda ortalama anksiyete puanlarının kullanmayanlara göre daha fazla olduğu bulunmuştur. Koronavirüs Anksiyete Ölçeği ile ORTO-11 Ölçeği puanları arasında çok zayıf, negatif ve istatistiksel olarak anlamlı bir ilişki bulunmuştur (r: -0,102, $p<0,001$).

Bu çalışmanın bulgularına göre, KOVİD-19 salgını sırasında bireylerin kaygı düzeylerinin artması, beslenme durumlarında da değişikliklere neden olmuştur.

Anahtar Kelimeler: KOVİD-19, Anksiyete, Beslenme Alışkanlıkları

Ethics committee approval was obtained from the Kırklareli University Health Sciences Institute Ethics Committee to conduct the research (Date: 23.02.2021, protocol number: PR0303R0, decision number: 13).

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INTRODUCTION

The global pandemic caused by Coronavirus 2 (SARS-CoV-2) led to quarantines and compulsory changes in people's lifestyles all over the world. The quarantines and concerns about getting infected forced individuals to take extra precautions, such as avoiding crowds, social distancing, and contact tracing, and individuals had to spend most of their time at home. This social isolation led to significant changes in people's lives, and the mental health of individuals was greatly affected by this situation.[1-3] In addition to deaths and hospitalizations due to the disease, COVID-19 caused anxiety and stress in individuals of all ages and genders all over the world due to moving away from their old social lives, high levels of panic atmosphere during the pandemic, and economic losses experienced by individuals.[1,4] Various changes were observed in the nutritional habits and behaviors of individuals due to this anxiety.[4] Anxiety has been reported to affect hunger, desire to eat, and food choices. As a result, impulsive nutritional habits increased due to anxiety, which led to increased consumption of high-energy foods and daily energy intake, resulting in body weight gain.[5] Some studies also indicated that body weight gain during the pandemic was associated with stress and anxiety. Stress, anxiety, fear, or depression caused by the COVID-19 pandemic was a risk factor for body weight gain and obesity.[6, 7]

In addition, in this process, anxiety related to COVID-19 brought about obsessive behaviors, that is, orthorexic tendencies, toward healthy eating, based on the belief that the transmission of the infection could be prevented or its effects could be minimized by maximizing immunity to protect against this disease.[8,9] Some studies showed that orthorexic tendencies increased during the COVID-19 pandemic.[10-12] In addition to these processes, individuals showed great interest in supplements and herbs, such as vitamin C, vitamin D, zinc, selenium, turmeric, and garlic, considering that nutrition to support the immune system might be protective against COVID-19.[1] A relationship between anxiety caused by the COVID-19 pandemic and increased supplement use was shown in the literature.[1,13,14]

It is clear that the COVID-19 pandemic has had a profound impact on dietary habits and behaviors worldwide. However, to our knowledge, the number of studies reaching a large and diverse sample group in studies conducted to examine the relationships between anxiety with nutritional habits, supplement use, and orthorexia nervosa during the COVID-19 period in Türkiye is limited. Most of the existing studies have focused on specific occupational or educational groups such as healthcare professionals, dietitians, university students, or on individuals living in a specific province, which limits generalizability. In this context, we aimed to examine the relationship between anxiety and nutritional habits in a large adult sample in Türkiye during the COVID-19 period. We hypothesized that (1) COVID-19 anxiety may be higher in individuals whose nutritional habits have changed; (2) COVID-19 anxiety may be higher in individuals using supplements; (3) COVID-19 anxiety may be positively associated with orthorexic tendencies.

MATERIALS AND METHODS

Research Type

This is a descriptive cross-sectional study.

Study Population and Sample

This study was conducted between February and March 2021 to examine the relationship between anxiety and nutritional habits in individuals during the COVID-19 pandemic. Male and female individuals aged 18 and over who agreed to participate in the study across Türkiye were competent enough to fill out the survey online, had access to the internet, and fully answered the survey and scale questions were included in the study. Individuals under the age of 18 and those who did not have the

competence to fill out the survey online were not included in the study.

The research population consisted of individuals aged ≥18 living in Türkiye, based on the 2021 data of the Turkish Statistical Institute (TURKSTAT) (N = 56.550.727).[15] The sample size was calculated on the Epilnfo 7 Software as 768 subjects, taking the any prevelance of the event as 50%, the error level as 5%, and the pattern effect as 2. Eventually, the study was completed with 800 people.

Data Collection Tools

All questions asked to the participants were converted into an online survey via Google forms. Before starting the study, an online informed consent form was provided to individuals. This form contains comprehensive information about the study and participants were questioned about their voluntary participation in the study. Those who read this form and approved to participate in the study at the end of the form were included in the study. Those who did not approve this form were definitely not included in the study and could not see the study questions. The online survey was distributed to individuals who voluntarily confirmed to participate in the study using the snowball sampling method, and the individuals filled out the survey online.

Those who agreed to participate in the study took the online questionnaire, which included a 26-question form about sociodemographic characteristics, body weight gain status, and nutritional habits, the 11-item ORTO-11 scale, and the 5-item Coronavirus Anxiety Scale.

Descriptive Information Form

This form included 26 questions, 5 about sociodemographic characteristics (age, educational status, profession, etc.) and 21 about body weight gain, nutritional habits and anthropometric measurements (body weight gain during the COVID-19 pandemic, number of main meals and snacks consumed, changes in food groups, and use of multivitamin supplements, body weight, height and body mass index (BMI).

Body mass index (BMI) is obtained by dividing body weight (kg) by height (m) squared. According to the World Health Organization recommendations; BMI < 18.5 kg/m^2 is classified as underweight, 18.5-24.9 kg/m^2 as normal weight, 25-29.9 kg/m^2 as overweight, and ≥ 30 kg/m^2 and above as obesity.[16]

The ORTO-11 Scale

This scale was first designed by Bratman as a 10-item tool.[17] Then it was developed by Donini et al. and the ORTO-15 scale was created by removing/adding some items.[18] The scale was first developed in Italy and included 15 items. It was adapted into Turkish as ORTO-l1 by Arusoğlu et al. Items are scored on a four-point Likert-type scale by using "never," "sometimes," "often," and "always." Responses that show a tendency toward normal nutritional habits are given four points, and those thought to be distinctive for orthorexia are given one point. A low score means that there is a tendency to orthorexia. The Cronbach Alpha coefficient of the Ortho 11 scale was determined as 0.62.[19] In this study, Cronbach's alpha coefficient of the ORTO-11 Scale was calculated as 0.609.

The Coronavirus Anxiety Scale (CAS)

This scale was developed by Lee (2020) using data collected online from 775 adults. It has five items and a five-point Likert-type scale. As a result of the analyses, a measurement sensitivity of 90% and a diagnostic specificity of 85% were achieved. Cronbach's alpha value of the scale was 0.93. It was recommended as a highly reliable and thematically and psychometrically consistent measurement tool.[20] The scale consisted of five questions and a single dimension. Items on the scale are scored using "0" never, "1" rarely, less than one or two days, "2" a few days, "3" more than seven days, and "4" almost every day in the past two weeks. It was adapted to Turkish and validity and reliability studies were performed by Biçer et al. (2020). Cronbach's alpha coefficient was used to determine the reliability of the scale, and as a result of the analysis, the alpha reliability coefficient of the scale with 5 questions and a single dimension was calculated as 0.832.[21]

The alpha value of the CAS was found as 0.602 in the present study.

Ethical Considerations of the Study

Ethics committee approval was obtained from the Kırklareli University Health Sciences Institute Ethics Committee to conduct the research (Date: 23.02.2021, protocol number: PR0303R0, decision number: 13). Informed consent was obtained from participants on the entry page of the online survey. Necessary permissions were obtained to use the scales.

Data Analysis

Descriptive statistics were presented using numbers (n), percentages (%), means, standard deviations (±SD), medians, and minimum (min.) and maximum (max.) values. Reliability analysis was performed for the reliability of the data and the results were evaluated with Cronbach's alpha coefficient. The normality of distribution was examined with the Kolmogorov–Smirnov test. For data showing a nonparametric distribution, the Mann–Whitney U test was employed to compare the means of two independent groups. The Kruskal–Wallis H test was applied to compare the means of three or more independent groups, and when the difference was significant, the source of the difference was investigated with the Dunnett T3 test. The relationship between two continuous variables was examined with Spearman correlation analysis. Data were analyzed on the SPSS 26.0. The significance level was accepted as $p<0.05$.

Limitations of Study

The cross-sectional nature of this study makes it difficult to make direct inferences about cause-effect relationships. Additionally, since this study includes individuals living in Türkiye, it is difficult to generalize to other countries. In addition, the inability to take into account confounding factors is among the limitations of the study. In addition, the inability to take confounding factors into account in the analyses is among the limitations of the study. In this study, the alpha value of the Coronavirus Anxiety Scale (CAS) was found to be 0.602, and this value is within the limitations of our study. These limitations can be eliminated in future more comprehensive and multicenter studies.

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RESULTS AND DISCUSSION

Table 1 shows the distribution of participants' descriptive characteristics. Accordingly, 68.3% of the participants were female, the average age was 25.48±7.21 years (median: 23, min: 18, max: 61), 71.4% had an undergraduate or graduate degree, 63.4% did not have a job, and 10.8% had at least one chronic disease. These diseases included chronic obstructive pulmonary disease (COPD) (27.9%), thyroid (25.7%), and hypertension (14.0%), respectively. It was determined that 27.6% of the group smoked and that 20.2% consumed alcohol. The rate of those who did physical activity was 55.9%, and these activities included walking (85.8%), running (20.9%), and pilates (17.7%), respectively. Of the participants, 49.2% did physical activity three to four times a week, and 48.7% did it for 30-59 minutes (Table 1).

Table 1. Distribution of Participants' Descriptive Characteristics

Variables	n	%
Gender		
Female	857	68.3
Male	398	31.7
Age (year) (Mean±sd: 25.48±7.21, median: 23, min.: 18, max.: 61)		
<25	819	65.3
25-34	296	23.5
≥35	140	11.2

Table 1. (Continued)

Variables	**n**	**%**
Education		
High school and below	179	14.3
Associate degree	180	14.3
Undergraduate or graduate degree	896	71.4
Employment status		
Working	459	36.6
Non-working	796	63.4
Presence of chronic disease		
Yes	136	10.8
No	1119	89.2
Diseases* (n=1119)		
Thyroid diseases	35	25.7
Rheumatic diseases	8	5.9
Renal diseases	6	4.4
COPD	38	27.9
Diabetes	17	12.5
Hypertension	19	14.0
Coronary artery disease	16	11.8
Musculoskeletal system diseases	11	8.1
Status of smoking		
Yes	347	27.6
No	908	72.4
Alcohol use		
Yes	254	20.2
No	1001	79.8
Status of doing physical activity		
Yes	702	55.9
No	553	44.1
Physical activities *		
Walking	602	85.8
Yoga	64	9.1
Aerobic	81	11.5
Pilates	124	17.7
Running	147	20.9
Swimming	16	2.3
Frequency of doing physical activities		
Once or twice a week	217	36.0
Three or four times a week	296	49.2
Five or six times a week	89	14.8
Duration of the activity (minutes)		
< 30	55	8.3
30-59	321	48.7
60-119	231	35.1
≥ 120	52	7.9

**Multiple choices were marked.*

Table 2 presents a comparison of the participants' anxiety levels according to their nutritional characteristics. In the research group, the mean anxiety score of those whose nutritional habits changed was determined to be statistically significantly higher than those who did not change their nutritional habits ($p<0.001$). A statistically significant difference was found between CAS scores and body weight change ($p=0.007$) and the number of snacks ($p=0.007$) consumed.

When the source of the difference was investigated, it was found that the mean anxiety scores were statistically significantly higher in participants whose body weight increased compared to those whose body weight did not change ($p=0.002$) and in those who consumed three or

more snacks compared to those who did not consume snacks at all ($p=0.002$). No statistically significant difference was determined between CAS scores and BMI, number of main meals consumed, and water consumption ($p>0.05$) (Table 2).

Table 2. Comparison of Participants' Anxiety Levels According to Their Nutritional Characteristics

Variables	n (%)	Mean±SD	Rank Avr.	Test value	p
BMI					
Underweight	96 (7.7)	0.91±1.38	618.24	7.057[2]	0.070
Normal weight	775 (62.3)	1.05±1.49	640.21		
Overweight	287 (23.1)	0.82±1.36	586.88		
Obesity	86 (6.9)	0.71±1.12	586.58		
Change in nutritional habits					
Yes	811 (64.6)	1.15±1.54	670.98	-6.386[1]	<0.001***
No	444 (35.4)	0.62±1.16	549.49		
Change in body weight					
Increased[a]	610 (48.6)	1.07±1.52	648.23	10.016[2]	0.007**
Unchanged[b]	383 (30.5)	0.76±1.28	584.62		
Decreased	262 (20.9)	1.01±1.42	644.32		
Number of main meals					
<3	622 (51.4)	0.93±1.40	601.58	2.618[2]	0.270
3	520 (43.0)	0.96±1.45	601.42		
>3	67 (5.5)	1.34±1.80	664.55		
Number of snacks					
0[c]	122 (10.5)	0.66±1.28	509.20	9.909[2]	0.007**
1-2	745 (64.4)	0.94±1.39	578.37		
≥ 3[d]	290 (25.1)	1.14±1.59	609.99		
Water consumption (ml)					
< 2000	962 (76.7)	0.99±1.47	632.70	-0.937[1]	0.349
≥ 2000	293 (23.3)	0.86±1.33	612.55		

**p<0.05, **p<0.01, ***p<0.001, [1]Mann–Whitney U test [2]Kruskal–Wallis H test, Dunnet T3 testi: a>b, d>c*

Table 3 shows the comparison of participants' anxiety levels according to their food consumption status. A statistically significant difference was found between the CAS scores and the consumption of the following foods: milk and dairy products (p=0.001), eggs (p=0.002), red meat (p=0.019), white meat (p=0.026), bread, pasta, and rice (p=0.004), legumes (p=0.010), vegetables (p=0.009), fruit (p=0.001), biscuits, crackers, and chips (p<0.001), dessert, sugar, and chocolate (p<0.001) and coffee (p=0.004). When the source of the difference was investigated, mean anxiety scores were found to be statistically significantly higher in participants with the following characteristics than in others with the differing levels of the same characteristics: increased (p=0.019) or decreased (p=0.006) consumption of milk and dairy products vs. no change in consumption; increased (p=0.027) or decreased (p=0.028) red meat consumption vs. no change in consumption; increased consumption of eggs (p=0.007), bread, pasta, and rice (p=0.007), vegetables (p=0.037), sweets, sugar, and chocolate (p=0.002) vs. no change in the consumption of these foods; decreased consumption of white meat (p=0.038) and fruit (p=0.039) vs. no change in the consumption of these foods; increased consumption of legumes vs. decreased consumption of the same food (p=0.015); increased consumption of biscuits, crackers, and chips vs. no change in consumption (p=0.002) and decreased consumption of the same foods (p=0.042); increased consumption of coffee vs. no change in consumption (p=0.041) and decreased consumption (p=0.003). No statistically significant difference could be determined between CAS scores and fish and seafood, processed meat, offal, butter, and tea consumption (p>0.05) (Table 3).

Table 3. Comparison of Participants' Anxiety Levels According to Their Food Consumption

Variables	**n (%)**	**Mean±SD**	**Rank.Avg**	**Test value[1]**	**p**
Milk and milk products					
Increased[a]	606 (48.3)	1.03±1.47	648.32	13.322	0.001**
Unchanged[b]	565 (45.0)	0.81±1.32	594.67		
Decreased[c]	84 (6.7)	1.45±1.79	705.60		
Eggs					
Increased[d]	597 (47.6)	1.07±1.48	658.24	13.004	0.002**
Unchanged[e]	515 (41.0)	0.81±1.36	589.14		
Decreased	143 (11.4)	1.04±1.50	641.71		
Red meat					
Increased[a]	509 (40.6)	1.05±1.52	640.57	7.942	0.019*
Unchanged[b]	570 (45.4)	0.82±1.29	602.53		
Decreased[c]	176 (14.0)	1.16±1.59	674.14		
White meat					
Increased	559 (44.5)	0.99±1.45	635.90	7.301	0.026*
Unchanged[f]	549 (43.7)	0.86±1.37	605.30		
Decreased[g]	147 (11.7)	1.22±1.60	682.74		
Fish and seafood					
Increased	429 (34.2)	0.96±1.38	636.18	1.197	0.550
Unchanged	565 (45.0)	0.95±1.47	617.03		
Decreased	261 (20.8)	0.98±1.45	638.29		
Processed meat					
Increased	320 (25.5)	0.95±1.43	624.67	1.505	0.471
Unchanged	504 (40.2)	0.94±1.46	617.36		
Decreased	431 (34.3)	0.99±1.42	642.91		
Offal					
Increased	141 (11.2)	1.08±1.58	640.26	3.118	0.210
Unchanged	695 (55.4)	0.91±1.43	613.71		
Decreased	419 (33.4)	1.00±1.40	647.58		
Bread, pasta, and rice					
Increased[d]	560 (44.6)	1.08±1.54	650.02	11.201	0.004**
Unchanged[e]	428 (34.1)	0.80±1.35	585.68		
Decreased	267 (21.3)	0.96±1.33	649.66		
Legumes					
Increased[h]	514 (41.0)	1.09±1.48	660.89	9.118	0.010*
Unchanged	603 (48.0)	0.90±1.45	606.45		
Decreased[i]	138 (11.0)	0.75±1.18	599.65		
Vegetables					
Increased[d]	729 (58.1)	1.02±1.46	643.19	9.390	0.009**
Unchanged[e]	377 (30.0)	0.80±1.34	586.18		
Decreased	149 (11.9)	1.09±1.51	659.50		
Fruit					
Increased	715 (57.0)	1.01±1.44	643.75	14.215	0.001**
Unchanged[f]	430 (34.3)	0.82±1.38	584.69		
Decreased[g]	110 (8.8)	1.24±1.61	694.91		
Butter					
Increased	406 (32.4)	0.95±1.43	629.26	4.179	0.124
Unchanged	582 (46.4)	0.91±1.42	612.10		
Decreased	267 (21.3)	1.08±1.48	660.74		
Biscuits, crackers and chips					
Increased[j]	611 (48.7)	1.11±1.50	663.65	17.622	<0.001***
Unchanged[k]	312 (24.9)	0.77±1.38	571.30		
Decreased[l]	332 (26.5)	0.87±1.35	615.67		
Dessert, sugar, and chocolate					
Increased[d]	640 (51.0)	1.10±1.49	661.62	17.509	<0.001***
Unchanged[e]	317 (25.3)	0.76±1.37	570.13		
Decreased	298 (23.7)	0.88±1.36	617.36		
Coffee					
Increased[j]	703 (56.0)	1.08±1.51	654.37	11.191	0.004**
Unchanged[k]	362 (28.8)	0.85±1.37	601.39		
Decreased[l]	190 (15.1)	0.73±1.23	581.14		
Tea					
Increased	784 (62.5)	1.03±1.50	642.06	4.046	0.132
Unchanged	356 (28.4)	0.85±1.35	602.35		
Decreased	115 (9.2)	0.83±1.24	611.56		

*$p<0.05$, **$p<0.01$, ***$p<0.001$; [1]*Kruskal–Wallis H test; Dunnet T3 test; a>b, c>b, d>e, g>f, h>i, j>k, j>l*

Table 4 shows the comparison of participants' anxiety levels according to their nutritional supplement use. Mean anxiety scores were statistically significantly higher in participants who used Zn (p=0.015), Mg (p=0.019), omega 3 (p=0.002), vitamin C (p<0.001), vitamin D (p<0.001), turmeric extract (p=0.002), black elderberry extract (p=0.001), and multivitamins (p=0.001) than in those who did not use them. No statistically significant difference could be determined between CAS scores and probiotic use (p>0.05) (Table 4).

Table 4. Comparison of Participants' Anxiety Levels According to Their Nutritional Supplement Use

Variables	n (%)	Mean±SD	Rank.Avg	Test value[1]	p
Zinc (Zn)					
Yes	158 (12.6)	1.19±1.53	686.02	-2.421	0.015*
No	1097 (87.4)	0.93±1.42	619.64		
Magnesium (Mg)					
Yes	140 (11.2)	1.19±1.54	688.16	-2.344	0.019*
No	1115 (88.8)	0.93±1.42	620.45		
Omega 3					
Yes	161 (12.8)	1.28±1.58	701.88	-3.116	0.002**
No	1094 (87.2)	0.91±1.41	617.13		
Vitamin C					
Yes	368 (29.3)	1.13±1.48	678.21	-3.555	<0.001***
No	887 (70.7)	0.89±1.41	607.17		
Vitamin D					
Yes	456 (36.3)	1.22±1.53	694.96	-5.561	<0.001***
No	799 (63.7)	0.81±1.36	589.78		
Turmeric extract					
Yes	87 (6.9)	1.51±1.71	732.34	-3.130	0.002**
No	1168 (93.1)	0.92±1.41	620.23		
Black elderberry extract					
Yes	70 (5.6)	1.66±1.83	756.51	-3.434	0.001**
No	1185 (94.4)	0.92±1.40	620.41		
Probiotics					
Yes	171 (13.6)	1.08±1.52	652.64	-1.076	0.282
No	1084 (86.4)	0.94±1.42	624.11		
Multivitamins					
Yes	191 (15.2)	1.28±1.60	698.97	-3.305	0.001**
No	1064 (84.8)	0.90±1.40	615.26		

*$p<0.05$, **$p<0.01$, ***$p<0.001$, [1]*Mann–Whitney U test*

Table 5 presents the relationship between the participants' ORTO-11 Scale scores and CAS scores. A very weak, negative, and statistically significant relationship was found between CAS scores and ORTO-11 scores (r: -0.102, p<0.001) (Table 5).

Table 5. Relationship between Participants' Scores on the ORTO-11 Scale and CAS

	ORTO-11 Scale		
	n	r	p
CAS	1255	-0.102	<0.001***

*$p<0.05$, **$p<0.01$, ***$p<0,001$, *Spearman's rho*

This study was conducted to examine the relationship between coronavirus-related anxiety levels and nutritional habits of adult individuals during the COVID-19 pandemic.

The COVID-19 pandemic affected psychosocial health worldwide and increased the level of anxiety.[22] It was shown in this study as well as in other studies that the anxiety caused by the COVID-19 pandemic was associated with changes in nutritional habits and food preferences.[1, 20-24] It is possible to say that the findings in studies on the examination of anxiety-related changes in the consumption of food groups are inconsistent.[23-27] This may be related to the "perceived healthiness of the food".[28] It was reported that the frequency of snacking[29] and consumption of sweet and/or salty snacks

increased in relation to anxiety during this period.[23, 24, 27] These findings are consistent with the findings of our study. Another finding obtained in some studies parallel to our study was that body weight gain during the pandemic was associated with stress and anxiety. It was reported that stress, anxiety, fear, or depression caused by the COVID-19 pandemic was a risk factor for body weight gain and obesity.[6, 7] Stress and anxiety during this process were particularly associated with an increase in the consumption of "comfort foods".[27, 30] Consumption of these high-calorie foods containing high amounts of sugar, carbohydrates, and/or fat is thought to represent a strategy for coping with negative emotions such as anxiety by increasing the production of serotonin, which positively affects mood.[26, 30] In addition, it is known that hormonal changes that occur under stressful conditions can increase the urge to eat such foods and lead to body weight gain by affecting appetite regulation and causing sensitivity in the regions of the brain associated with reward and motivation.[31, 32]

Interest in nutritional supplements and natural or herbal products increased worldwide during the COVID-19 pandemic.[33] In parallel with our study, some studies indicated a relationship between anxiety caused by the COVID-19 pandemic process and increased supplement use.[1, 13] In this study, it was shown that the anxiety levels of participants who reported using zinc, magnesium, omega 3, vitamin C, vitamin D, turmeric extract, black elderberry extract, and multivitamin supplements were higher. Some other studies showed that the interest in and use of dietary supplements such as multivitamins, zinc, omega-3, and probiotics, especially vitamin C and vitamin D, and natural or herbal products, such as ginger, turmeric, garlic, honey, and elderberry, increased.[1, 33, 34] In this process, it was observed that individuals tended to use nutritional supplements and herbal products believing that they would strengthen their immunity and provide protection against COVID-19 infection.[33, 34] However, there is currently inadequate evidence to support the use of any dietary supplements or herbal products to prevent or treat COVID-19 infection.[35] It is possible to say that an adequate and balanced diet containing fruits, vegetables, whole grains, animal proteins, and healthy fats is the best way to consume the essential nutrients necessary to maintain optimal immune function.[36]

There is qualitative and quantitative evidence that an increase in anxiety about health is associated with an orthorexic tendency.[37, 39] Therefore, with the outbreak of the COVID-19 pandemic, it was claimed that the anxiety and fear associated with coronavirus infection might bring about obsessive behaviors, that is, orthorexic tendencies, toward healthy eating and lead to the adoption of restrictive diets, based on the belief that the transmission of COVID-19 infection can be prevented or its effects can be minimized by increasing immunity to the highest level.[8, 9] The findings of this study and those of other studies support this idea.[10-12] In a systematic review and meta-analysis involving 30.476 individuals from 18 countries, it was reported that the highest prevalence of orthorexia nervosa (ON) was following the COVID-19 pandemic (2020-2023) and that the stress, anxiety, and fear associated with the COVID-19 pandemic may have caused this.[40] These findings are not surprising considering that ON is typically characterized by the belief in improving health and preventing or treating disease through the consumption of healthy food and the elimination of foods considered impure or unhealthy.[41] The excessive preoccupation with the consumption of "healthy" or "pure" foods in ON often leads to severe restriction of food intake and strict elimination of certain food groups.[41, 42] Long-term adherence to such strict and restrictive nutritional habits can lead to severe nutritional deficiencies or malnutrition, electrolyte imbalances, hormonal imbalances, and disturbances in metabolic functions, resulting in negative effects on overall health.[9, 42] Additionally, disorders in immune function due to malnutrition can increase susceptibility to infections and cause infections to be more severe or even fatal.[43] For this reason, it is

important to inform individuals accurately about nutrition, especially during processes such as pandemics, and to intervene promptly when faced with a negative situation.[8]

CONCLUSION AND RECOMMENDATIONS

The COVID-19 pandemic increased anxiety levels worldwide by affecting psychosocial health. During this period, increased anxiety levels caused changes in individuals' nutritional habits and also an increase in body weight. In addition, with increased anxiety levels, individuals' belief that they could protect themselves against infection by strengthening their immunity increased the use of nutritional supplements and/or herbal products and orthorexic tendencies. These results emphasize the importance of providing accurate information for individuals about adequate and balanced nutrition, especially during critical processes such as pandemics.

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