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Time Spent on Social Media During The COVID-19 Pandemic is Associated with A Healthy Eating Obsession and Anxiety Symptoms: A Cross-Sectional Study of 525 Adults in Semi-Quarantine

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ABSTRACT

Purpose: The increase in social media exposure during the COVID-19 pandemic may cause an increase in the obsession of healthy eating and anxiety symptoms. The interaction between social media, obsessive healthy eating and anxiety symptoms was evaluated.

Methods: An online questionnaire was applied to individuals in COVID-19 semi-quarantine (n=525) using Google forms. Orthorexia and anxiety symptoms were evaluated using the ORTO-11 and Generalised Anxiety Disorder questionnaires, respectively.

Results: The time spent on social media to follow the COVID-19, health, and nutrition news was closely associated with higher orthorexic symptoms in both sexes, and higher anxiety symptoms in women (r=-0.638 in men; r=-0.560 in women, p<0.001). High rates of anxiety (62.4% in men; 95.4% in women) and an unhealthy obsession with healthy eating (67% in men, 83.2% in women) were detected in individuals in the COVID-19 pandemic.

Conclusion: While the COVID-19 pandemic causes negative effects on both eating behaviour and anxiety disorders, the use of social media to follow healthy nutrition news can also exacerbate these problems. Therefore, it is important to increase awareness about the use of social media during the pandemic, to detect healthy eating obsessions and anxiety symptoms earlier, and to prevent the harmful consequences of these problems in the long term.

Keywords: healthy eating obsession, COVID-19, social media, supplements and functional foods, anxiety disorders

COVID-19 Salgını Sırasında Sosyal Medyada Geçirilen Süre, Sağlıklı Beslenme Takıntısı Ve Kaygı Belirtileriyle İlişkilidir: Yarı Karantinadaki 525 Yetişkin Üzerinde Yapılan Kesitsel Bir Çalışma

ÖZET

Amaç: COVID-19 pandemisinde sosyal medya maruziyetinin artması, bireylerde sağlıklı beslenme takıntısının artmasına ve kaygı belirtilerine neden olabilmektedir. Bu çalışmada, sosyal medya, sağlıklı beslenme ve anksiyete belirtileri arasındaki etkileşimi değerlendirilmiştir.

Yöntemler: Google forms kullanılarak COVID-19 sürecinde yarı karantinadaki bireylere (n=525) çevrimiçi anket uygulandı. Ortoreksiya ve anksiyete belirtileri sırasıyla ORTO-11 ve Yaygın Anksiyete Bozukluğu anketleri kullanılarak değerlendirildi.

Bulgular: COVID-19, sağlık ve beslenme haberlerini takip etmek için sosyal medyada geçirilen süre, her iki cinsiyette daha yüksek ortoreksik semptomlar ve kadınlarda daha yüksek anksiyete semptomları ile yakından ilişkiliydi (erkek: r=-0.638; kadın: r=-0.560, p<0.001). COVID-19 pandemisinde bireylerde yüksek oranda kaygı (erkeklerde %62,4; kadınlarda %95,4) ve sağlıklı beslenme konusunda takıntı (erkeklerde %67, kadınlarda %83,2) tespit edildi.

Sonuç: COVID-19 pandemisi hem yeme davranışı hem de kaygı bozuklukları üzerinde olumsuz etkilere neden olurken, sosyal medyanın sağlıklı beslenme haberlerini takip etmek için kullanılması da bu sorunları şiddetlendirebilmektedir. Bu nedenle pandemi sürecinde sosyal medya kullanımına yönelik farkındalığın artırılması, sağlıklı beslenme takıntılarının ve kaygı belirtilerinin daha erken saptanması ve bu sorunların uzun vadede zararlı sonuçlarının önlenmesi açısından oldukça önemlidir.

Anahtar Kelimeler: sağlıklı beslenme takıntısı, COVID-19, sosyal media, supleman ve fonksiyonel gıdalar, kaygı

The whole world has been faced with the COVID-19 pandemic, which has caused the death of approximately 5 million people, affected more than 200 million people, and has long-lasting detrimental consequences (1). In order to prevent the spread of the coronavirus, people in Turkey had to stay in semi-quarantine after the government and the Ministry of Health called for "stay at home to stay safe" (2). However, prolonged stay at home, combined with the fear of contracting the virus, can affect the psychological well-being of people in quarantine and increase symptoms of anxiety (3).

As nutrition may have positive effects on supporting the immune system and reducing the risk of infection, there has been increased interest in a healthy and balanced diet rich in antioxidants and vitamins in the fight against COVID-19 to strengthen immune functions (4). Although dietary guidelines in COVID-19 direct individuals to strengthen immunity naturally (5), there has been a lot of misleading news on social media about the use of nutritional supplements as immune boosters during the COVID-19 pandemic (6). To our knowledge, the effect of nutritional advice stated on social media on individuals in semi-quarantine and the tendency of individuals to use nutritional supplements has not been investigated.

With the COVID-19 pandemic, social media has become a fundamental communication tool to provide all types of information about COVID-19 can be delivered very quickly(7). In addition, it is possible that the time spent on social media may increase during the COVID-19 pandemic, due to the increased time spent at home with semi or full quarantine administrations. Constant exposure to COVID-19 news on social media and increased virus spread can affect both mood and eating behaviors (4). In a cross-sectional study, it was suggested that the symptoms of Orthorexia Nervosa (ON), known as healthy eating obsession, increased significantly with following healthy nutrition news on social media (8). However, to date, no research has been conducted on how the time individuals spend on social media affects their eating behavior during the COVID-19 pandemic.

In this study, we aimed to evaluate the presence of obsessive eating behaviours and general anxiety disorders, and the interaction between time spent on social media and healthy eating obsession and anxiety symptoms in individuals in semi-quarantine during the COVID-19 pandemic. In addition, we also investigated the effect of orthorexic behaviours on nutritional supplement use during the pandemic. We hypothesised that (1) general anxiety symptoms may be related to healthy eating obsession; (2) time spent on social media may be positively related to orthorexic behaviours and anxiety; and (3) there may be a potential positive correlation between orthorexic behaviours and the nutritional supplement use during semi-quarantine of the COVID-19 pandemic. We tested our hypotheses by classifying them according to sex to detect differences between sexes.

METHODS

Study Design

This study was a cross-sectional study conducted during the first wave of COVID-19 (between 01-21 April 2020) during the government-imposed lockdown due to the COVID-19 outbreak.

Data Collection

This lockdown included weekend curfews, everyone except cargo and food workers worked from home, and the obligation to wear masks everywhere. Data was collected using a digital platform (Google forms) due to the eliminate the risk of face-to-face interviews. Participants were recruited through both personal and faculty social networks (Facebook, Instagram, Twitter, WhatsApp), of the researchers. The researchers created an invitation post including the research details, inclusion/exclusion criteria and a link to the research questionnaire form. Participants who want to participate in the research fill out the research questionnaire online. The use of an online survey enabled data to be collected from all over the country. No incentives were used in this cross-sectional study. All individuals over the age of 18 were allowed to participate in this study. Participation ended when the first 525 people ((1-β): 85%) who met the inclusion criteria were reached. Body mass index (BMI) was calculated using the following formula; [weight (kg).(height)$^{-2}$ (m^2)]. BMI that less than 18.5 is classified as underweight range, between 18.5 to < 25, as healthy range, between 25 to < 30, as overweight range, higher than 30 as obese range (9).

Questionnaire

The questionnaire consisted of 41 questions and three parts detailed below. The first part included the sociodemographic characteristics: age, sex, education level, smoking status, presence of any chronic disease, marital status, dietary practice. The second part included questions about the use of social media and supplements during semi-quarantine. Questions aimed to collect self-reported information about the use of nutritional supplements

before and after COVID-19, whose recommendation and why they need to use them. There were also questions regarding the time spent using social media, the applications they use, and how long they follow the news on COVID-19, health and nutrition on a daily basis. The last part dealt with the determination of orthorexia and general anxiety disorders using the following scales described in detail.

ORTO-11 Scale

ORTO-11 scale was used to detect healthy eating obsession in individuals. The ORTO-11 scale consists of 11 multiple-choice questions that are rated using a four-point Likert scale. The scale, which was originally created with 15 items by Donini et al.(10), which has been adapted in Turkish as 11-item by Arusoğlu et al (11). The ORTO-11 scale cut-off value is 27, and individuals with lower scores are thought to have more orthorexic symptoms (10,11). We calculated Cronbach's α internal consistency coefficient of the scale as 0.81.

Generalized Anxiety Disorder-7 Scale

The scale consists of seven questions rated using a four-point Likert scale. With a maximum score of 21, cut-off points of 5, 10 and 15 were interpreted as representing mild, moderate and severe anxiety levels in GAD-7 (12,13). Cronbach's α internal consistency coefficient of the scale was computed as 0.87 in this study.

Statistical Analyses

Sample Size Calculation

The power analysis was calculated based on the study conducted by Turner et al. (8), which was stated the rate of orthorexia nervosa in individuals using social media was 49%, and the estimation of this ratio for our study as 55%. At least 435 adults were needed to be included into the study according to the G power software (14), based on a power of 80% and a reliability of 95%. At the end of the data collection, a total of 525 participants were enrolled to the study (achieved power (1-β): 85%).

Statistical analyses were performed using the SPSS Software version 21. The variables were tested using visual (histogram, probability plot) and analytic (Kolmogorov-Smirnov/ Shapiro-Wilk's test) methods to determine if they are normally distributed. Descriptive results were presented as mean and standard deviation. In order to compare the differences between the sexes, the independent two sample t-test or the Mann-Whitney test was used, where appropriate. The Chi-square test or Fisher's exact test (when chi-square test assumptions do not hold due to low expected cell counts), where appropriate, was used to compare the proportions of education, occupation, presence of chronic diseases, and diet applied between sexes. The Wilcoxon test was used to verify differences in supplement use between before and the current pandemic period. As both ORTO-11 and time spent on per day using social media to read information related to the COVID-19, health and nutrition were normally distributed, the correlation coefficients and their significance were calculated using Pearson test. However, Spearman test was applied to calculate the correlation between GAD-7 scores and time spent on social media to read information related to the COVID-19, health and nutrition as GAD-7 scores were not normally distributed. A multiple linear regression model was used to identify the impact of orthorexic behaviors on starting the supplement use during the COVID-19. A 5% type-1 error level was applied to infer statistical significance.

Results

Demographics

Descriptive characteristics of the participants were presented in Table 1. No differences were observed in age between sexes. Most of the participants were omnivorous (98.9% of men; 98.0% of women), highly educated, actively working and had no known chronic diseases.

Healthy Eating Obsession Risk

With significant differences across sex, 67.0% (n = 120) of men and 83.2% (n = 288) of women were at risk for healthy eating obsession (Table 1).

Presence of General Anxiety Disorder

Higher general anxiety symptoms ranging from mild to severe were detected in both sexes (62.4% of men; 95.4% of women) (Table 1). Women had higher general anxiety symptoms compared to men, with predominantly moderate levels (40.5%) ($p<0.001$).

Association between healthy eating obsession and general anxiety disorder

Lower ORTO-11 scores were significantly associated with higher GAD-7 scores in both sexes ($r=-0.4$ in men; $r=-0.2$ in women; $p<0.05$) (data not shown).

Social Media Use

Table 1 represents the information about social media use according to sexes. With an average time of 53.9 $min.day^{-1}$ for men and 51.2 $min.day^{-1}$ for women, participants spent time on social media apps to seek for information related to COVID-19, health and nutrition.

Table 1. General characteristics of the subjects (n= 525)			
[a] Mean ± SD (Min-Max) [b] Median (IQR) [c] n (%)			
	Men (n=179)	**Women (n=346)**	***p***
Age	31.0 ± 11.4 [a] (19-67)	30.8 ± 9.8 [a] (20-63)	0.416①
Weight (kg)	77.8 ± 12.2 [a] (70-120)	61.7 ± 10.7 [a] (53-98)	0.001①
Height (cm)	176.0 ± 14.5 [a] (163-193)	164.2 ± 5.9 [a] (150-181)	0.001①
BMI (kg/m^2)	24.9 ± 3.6 [a] (16-40.5)	22.9 ± 3.8 [a] (16.1-36.7)	0.001①
ORTO-11	26.0 ± 4.9 [a] (14-41)	23.6 ± 4.1 [a] (14-37)	0.002*①
Orthorexia presence			
Yes	120 (67.0 %) [c]	288 (83.2 %) [c]	0.001*①
No	59 (33.0 %) [c]	58 (16.8 %) [c]	
GAD-7	7.0 (4.0- 11.0) [b]	8.0 (3.0- 13.0) [b]	0.001*①②
No	67 (37.4 %) [c]	16 (4.6 %) [c]	
Mild	47 (26.3 %) [c]	140 (40.5 %) [c]	
Moderate	37 (20.7 %) [c]	119 (34.4 %) [c]	
Severe	28 (15.6 %) [c]	71 (20.5 %) [c]	
Education			
< High school	16 (9.0 %) [c]	33 (5.0 %) [c]	0.635①②③
≥ High school	163 (91.0 %) [c]	313 (95.0 %) [c]	
Occupation			
Not working	0 (0.0 %) [c]	27 (7.8 %) [c]	0.001*①②③
Student	18 (10.1 %) [c]	83 (24.0 %) [c]	
Working	150 (89.0 %) [c]	235 (67.9 %) [c]	
Retired	11 (6.1 %) [c]	1 (0.3 %) [c]	
Presence of any chronic diseases			
Yes	12 (6.7 %) [c]	35 (10.0 %) [c]	0.008①②③
No	167 (93.3 %) [c]	311 (89.0 %) [c]	
Diet			
Omnivore	177 (98.9 %) [c]	339 (98.0 %) [c]	0.725①②③④
Vegetarian	2 (1.1 %) [c]	7 (2.0 %) [c]	
Number of social media apps	3.0 (2.0- 3.0) [b]	3.0 (2.0- 4.0) [b]	0.795①②
Time subjects spent on social media apps to track information about COVID-19, health and nutrition (min)	53.9 ± 10.9 [a]	51.2 ± 13.4 [a]	0.725①
< 15	48 (26.8 %) [c]	72 (20.8 %) [c]	0.423①②③
15-30	64 (35.8 %) [c]	112 (32.4 %)[c]	
30-60	31 (17.3 %) [c]	93 (26.9 %) [c]	
> 60	36 (20.1 %) [c]	69 (19.9 %) [c]	
Percentage of using the apps daily[¶]			
Instagram	131 (73.2 %) [c]	311 (89.9 %) [c]	0.001①②③*
Facebook	101 (56.4 %) [c]	131 (37.9 %) [a]	0.001①②③*
Twitter	92 (51.4 %) [c]	179 (51.7 %) [c]	0.942①②③
LinkedIn	37 (20.7 %) [c]	52 (15.0 %) [c]	0.123①②③
①*Independent two-sample t-test.* ①②*Mann–Whitney U test.* ①②③*Pearson chi-squared test.* ①②③④*Fisher's exact test.*			
**p<0.001. **p<0.05. [¶] multiple answers allowed.*			

Effect of social media use on healthy eating obsession and general anxiety disorder

The potential effects of social media on orthorexia and general anxiety symptoms were shown in Table 2. The average time participants spent on social media apps to track information about COVID-19, health and nutrition were negatively correlated with ORTO-11 scores in both sexes. On the other hand, GAD-7 scores of women were found to be positively linked with the time spent on social media to check for health and nutrition solutions for COVID-19.

Determination of nutritional supplement use after COVID-19: Figure 1 represents the data regarding nutritional supplement use before and after COVID-19 according to sex. The use of vitamin C, Beta-glucan (ß-glucan), and *Pelargonium sidoides* were increased after the COVID-19 outbreak in both sexes ($p<0.05$). The utilisation rate of multivitamins, zinc, black elderberry and propolis in women, and the use of Vitamin D in men were elevated after COVID-19 ($p<0.05$).

Most of the participants started using nutritional supplements with a "belief effect" (52.6 % of men; 50.3 % of women) (Figure 2). Participants predominantly preferred to use nutritional supplements to improve their immunity (24.0 % of men; 32.9 % of women) (Figure 3).

Tendency to supplement use according to the presence of healthy eating obsession

Table 3 shows the multiple linear regression analysis of supplement utilisation and orthorexia symptoms taking the ORTO-11 score as the dependent variable. The regression analysis showed that as the ORTO-11 scores decreased, multivitamin (R^2=0.377 in men; 0.055 in women) and ß-glucan (R^2=0.379 in men; 0.199 in women) utilisation rates were slightly increased in participants regardless of sex. However, since the R^2 values were observed below 40%, the findings can be interpreted as a low level of correlation.

Table 2. Correlation between time spending social media, and orthorexia and general anxiety disorders status

	Average time subjects spent on social media apps to track information about COVID-19, health and nutrition			
	Men (n=179)		Women (n=346)	
	r	*p*	r	*p*
ORTO-11	-0.638	0.001[a]*	-0.560	0.001*
GAD-7	0.746	0.909[b]	0.444	0.001*

*[a] Pearson correlation. [b] Spearman' rho correlation. *p<0.001.*

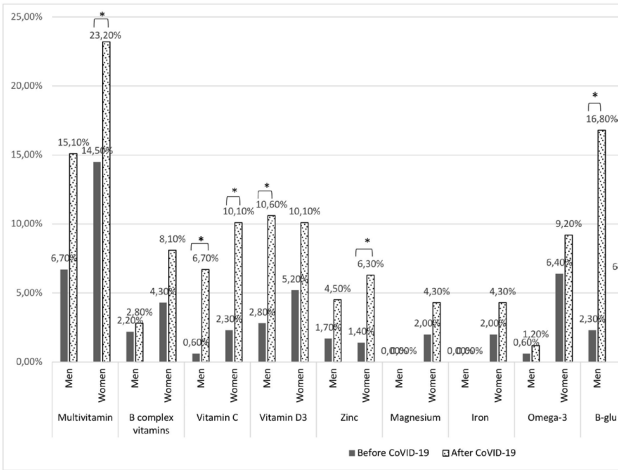

Figure 1. *Data regarding nutritional supplement use before and during COVID-19 semi-quarantine*

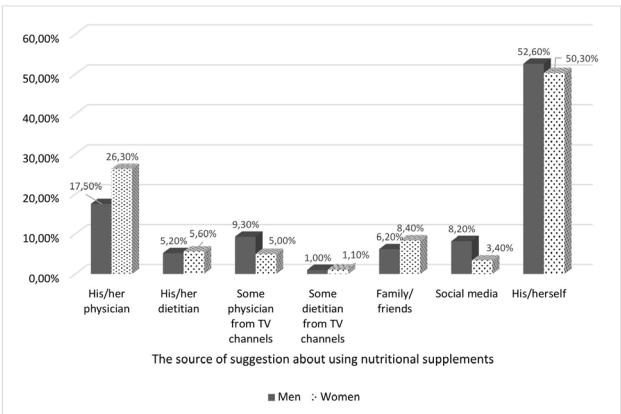

Figure 2. *The source of suggestion about using nutritional supplements before and after COVID-19 semi-quarantine*

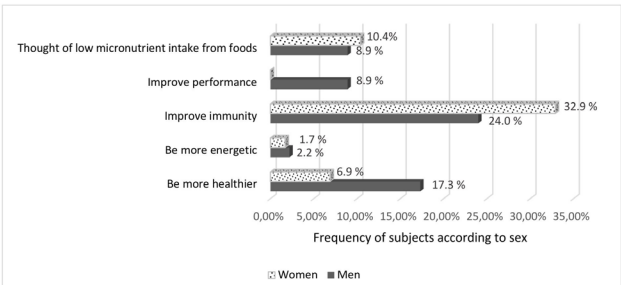

Figure 3. *Main reason for the use of nutritional supplements in subjects according to sex p<0.05*

Table 3. Linear regression analysis taking the ORTO-11 score as the dependent variable					
Food Supplement (Pre COVID-19/ during COVID-19)	**Sex**	**B**	**SE**	**Confidence Interval (95%)**	**R^2**
Multivitamin					
No/Yes	Men	**-0.557***	0.201	(-1.005)- (-0.109)	**0.377**
No/Yes	Women	**-0.243***	0.135	(-0.518)- (0.031)	0.055
B group vitamins					
No/Yes	Men	-	-	-	-
No/Yes	Women	-0.200	0.216	(-0.698)- (0.298)	-0.016
Vitamin C					
No/Yes	Men	-0.432	0.313	(-1.154)- (0.289)	0.092
No/Yes	Women	**-0.435***	0.189	(-0.823)- (-0.047)	0.142
Vitamin D					
No/Yes	Men	-0.320	0.298	(-0.976)- (0.337)	0.012
No/Yes	Women	**-0.319***	0.147	(-0.633)- (-0.005)	0.199
Zn					
No/Yes	Men	-0.380	0.232	(-1.117)- (0.357)	0.297
No/Yes	Women	-0.164	0.192	(-0.573)- (0.245)	-0.017
Mg					
No/Yes	Men	-	-	-	-
No/Yes	Women	-0.398	0.251	(-1.042)- (0.247)	0.202
Fe					
No/Yes	Men	-	-	-	-
No/Yes	Women	-0.372	0.223	(-0.919)- (0.174)	0.203
Omega-3					
No/Yes	Men	-	-	-	-
No/Yes	Women	-0.347	0.214	(-0.890)- (-0.214)	0.152
ß-glucan					
No/Yes	Men	**-0.405****	0.127	(-0.678)- (-0.132)	**0.379**
No/Yes	Women	**-0.508****	0.183	(-0.883)- (-0.132)	0.199
Black Elderberry					
No/Yes	Men	-0.384	0.230	(-0.929)- (0.160)	0.182
No/Yes	Women	-0.265	0.154	(-0.586)- (0.056)	0.081
Pelargonium Sidoides					
No/Yes	Men	-0.333	0.253	(-0.983)- (0.317)	0.110
No/Yes	Women	**-0.347***	0.147	(-0.653)- (-0.041)	0.172
Propolis					
No/Yes	Men	-0.324	0.640	(-3.076)- (2.428)	-0.329
No/Yes	Women	-0.437	0.197	(-0.844)- (-0.030)	0.130
p<0.05.p<0.001.*					

DISCUSSION

The main purpose of the study is to investigate the interaction between time spent social media, and orthorexia and general anxiety symptoms during the semi-quarantine period due to the COVID-19 pandemic. We achieved five main conclusions: (1) A positive association was found between orthorexia and anxiety disorder symptoms; (2) Individuals in semi-quarantine spent an average of 52 minutes on social media seeking information about COVID-19, health and nutrition; (3) A significant positive link was observed between social media use and unhealthy eating obsession in both sexes; (4) A positive interaction was obtained between general anxiety disorder symptoms and social media use in women; (5) Most people in semi-quarantine (an average of 51.6 %) decided to take supplements believing they support their immunity, and a low level of positive interaction was observed between the increase in healthy eating obsessions and the use of multivitamins and ß-glucans in both sexes.

Our results show that there is a high risk of healthy eating obsession (67.0% in men and 83.2% in women) and general anxiety disorder (62.6% in men and 95.4% in women) for individuals in the COVID-19 pandemic. The unexpected coronavirus pandemic has made considerable changes in physical and psychological health by being isolated from almost everyone and creating fear of contracting the disease (15). Although the COVID-19 lockdown provides better protection to prevent catching the virus, its impact on mental health has been reported to drive individuals into depression, anxiety, stress, and even suicide (16,17). Our study revealed a higher percentage of anxiety compared to the world anxiety prevalence (3.6%) (18), and previous studies using the same GAD-7 questionnaire in China (22.6%) (17), Brazil (23.3%) (19), Ireland (20.0%) (20) and Turkey (52% (21) - 71.4% (22)). Higher anxiety may also be due to economic instability, as noted by Puccinelli et al (19). As higher anxiety levels have highly compromised mental health and closely related to eating disorders (17), early detection and underlying problems need to be deeply considered.

As it is claimed that mental distress such as loneliness and boredom trigger eating problems and the COVID-19 pandemic also prompts this mood (23), a series of studies have been conducted to investigate the potential effect of COVID-19 on eating disorders (23-25). Previous research has indicated that individuals with psychological distress tend to eat more, leading to emotional and binge eating symptoms (24,25). A recent review by Rodgers et al. (26) noted that orthorexic symptoms may increase due to the rise in concerns about healthy eating during the COVID-19 outbreak. The current study indicated a high risk of healthy eating obsession (67.0% in men and 83.2% in women). In accordance with the present study, another study investigating the efficacy of the early onset of the COVID-19 pandemic on eating behaviors in 3533 Italians indicated that 15% of subjects started to buy their foods from farmers or organic fruits and vegetables (27). Thus, although orthorexia is not classified as an eating disorder, the increased risk of healthy eating obsession may trigger other eating-related disorders. We conducted the survey at the beginning of the COVID-19 pandemic (i.e., approximately one month after the semi-quarantine announcement by the Ministry of Health), when the fear of getting the disease and the unknowns about the disease are most intense, revealing that people had experienced orthorexia symptoms even at the beginning of the COVID-19 pandemic.

Constant exposure to social media during the COVID-19 may have paramount effects on psychological state (17). Turner and Lefevre (8) reported that a significant interaction between orthorexia and social media use, and Instagram is the most commonly used application to follow a healthy eating environment. Similar results were obtained from our study indicating that Instagram was the most frequently used application for both sexes (73.2% in men, 89.9% in women). In this study, the significant interaction between social media use and orthorexia symptoms may be due to the higher exposure time to Instagram. Following or interacting with like-minded individuals using social media can lead to an echo chamber effect, which reinforces the correctness of their point of view regarding eating behaviors by constantly underlining common views (28). In addition, the restrictions of nearly all outdoor activities and daily schedules during the pandemic led to intense exposure to news about COVID-19 and healthy eating on social media (23), thus increasing fears of contracting COVID-19, and rising the obsession about healthy eating.

We revealed that the main reason why individuals in COVID-19 pandemic chose to take nutritional supplements was to support their immunity. Rising concerns about healthy eating during the pandemic (29) may drive individuals to take these supplements to improve adaptive immunity to minimize the risk of contracting COVID-19. In addition, one of the major reasons why individuals increase their use of nutritional supplements without consulting any healthcare professional during the COVID-19 pandemic may also be the echo effect of social media.

Studies of orthorexia and dietary supplement use have revealed conflicting results (30,31). Although the general belief is that dietary supplement use is significantly higher in people with orthorexia symptoms (30),most of the studies have indicated no significant interaction between dietary supplement use and orthorexia symptomatology (10,30,31). In contrast to most studies (10,30,31), we found a low level of positive association between multivitamin and ß-glucan use and orthorexia symptoms in both sexes, indicating that individuals with orthorexia symptoms may tend to use multivitamins (R2=0.377 in men; 0.055 in women) and ß-glucan (R2=0.379 in men; 0.199 in women) to support their immunity and become healthier during the COVID-19 pandemic. Although the main purpose of supplement use is to support immunity, it should be kept in mind that it may affect the body in the opposite direction, especially in the case of COVID-19 (32). Although there is no evidence-based consensus regarding recommendation of nutritional supplements during COVID-19, social media and the supplement industry are strongly recommending various dietary supplements to improve immunity, and, thereby, prevent COVID-19 infection (32). Therefore, randomize-controlled clinical trials are needed to better understand the impact of nutritional supplements on the body defense. In addition, checking the national dietary guidelines before recommending any nutritional supplements during the COVID-19 pandemic is also a great strategy to eliminate misutilization of these supplements.

Our study has several strengths and limitations to consider. To our knowledge, this is the first study to compare healthy eating obsession and anxiety in relation with the use of social media and nutritional supplements. We implemented the ORTO-11, the valid and reliable version of ORTO-15 in our country as it eliminates the false prediction of the disorder. It is crucial to apply a valid questionnaire since we are aware that one of the main reasons why orthorexia is not included in DSM-V is the several limitations of the ORTO-15 questionnaire including lack of cultural adaptation, internal validity, and reliability.

Since there are no specific diagnostic criteria for orthorexia in DSM-5 (33) and we cannot independently be confirmed the presence of eating disorders, we did not ask if they had been diagnosed with orthorexia or any eating disorders before. However, previous eating disorder history may elevate the exaggerated obsession about food and orthorexic behaviors during the COVID-19 pandemic.

In summary, social media use is positively associated with healthy eating obsession in both sexes. A meaningful interaction was observed between healthy eating obsession and anxiety. We found a low level of positive correlation between orthorexia and the use of multivitamins and ß-glucans in both sexes. More than half of the participants applied nutritional supplements to improve the immune response. Overall, these findings suggest that orthorexia and anxiety symptoms could be closely related to each other, and health, nutrition and COVID-19-related news on social media may trigger these symptoms. Therefore, individuals who are concerned or obsessed with healthy eating should be encouraged to consult a healthcare professional so that any potential psychological problems can be detected early before they cause long-term detrimental consequences.

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Conflict of Interest

The authors declare no conflict of interest.

Ethics Approval

The study protocol was approved by the Istanbul Medeniyet University Institutional Review Board Human Subjects Committee (0806/2020; date: 27.03.2020) and all participants consented to participating in the study.

Authors' Contributions

ADL was the main writer of the paper, assisted with data interpretation, and gave final approval of this version to be published. HKBG conducted the data analysis, critically reviewed the paper, and gave final approval of this version to be published.

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