



Trabajo Original

Epidemiología y dietética

The effect of social media use on orthorexia nervosa: a sample from Turkey *El efecto del uso de las redes sociales en la ortorexia nerviosa: una muestra de Turquía*

Esma Asil¹, Mustafa Volkan Yılmaz¹, Feride Ayyıldız², Tuba Yalçın³¹Department of Nutrition and Dietetics. Faculty of Health Sciences. Ankara University. Ankara, Turkey. ²Department of Nutrition and Dietetics. Faculty of Health Sciences. Gazi University. Ankara, Turkey. ³Department of Nutrition and Dietetics. Faculty of Health Sciences. İzmir Kâtip Çelebi University (İKÇÜ). Izmir, Turkey

Abstract

Objectives: the current study evaluated the orthorexic tendencies of social media users and the factors affecting these tendencies.**Methods:** a total of 2526 adult participants (696 male and 1830 female, 28.4 ± 10.3 years) completed a questionnaire that includes personal information, the Orthorexia Nervosa Scale (ORTO-11), the Social Media and Eating Behavior Scale (SMEB), and the International Physical Activity Questionnaire Short Form (IPAQ). Body mass index (BMI) was calculated from the reported weight and height of the participants. Independent-sample t-tests or chi-square tests were computed to evaluate various information of the participants according to the ON tendency. A binary logistic regression analysis was used to identify risk factors.**Results:** according to ORTO-11, 56.1 % of the participants had a tendency to ON, and the trend to ON increased with age and BMI ($p < 0.05$). People without ON tendency spent more time (172.2 ± 119.9 min/day) on social media. Participants who followed webpages with healthy nutrition and sport-exercise recommendations had an increased ON risk when compared to those who did not follow those pages ($p < 0.05$). In addition, although there was a significant difference between participants in physical activity level according to the ON tendency, this relationship was not significant in the regression model ($p > 0.05$).**Conclusion:** this study indicates that increasing social media usage, especially web pages that include health and nutrition recommendations, may boost the tendency to ON. Thus, raising awareness of social media may be beneficial to people who have a tendency to ON.**Keywords:**

Orthorexia nervosa. Social media. Eating behavior. Eating disorders.

Received: 15/05/2022 • Accepted: 02/02/2023

Acknowledgements: the authors thank the participants who shared their valuable time with them, and Hanife Avci for helping check the statistics of the study.**Ethics approval:** this study was performed in line with the principles of the Declaration of Helsinki. Approval was granted by the Ethics Committee of Ankara University (14.06.2021/No:09/113). All participants were informed about the study before enrollment, and an online informed consent was obtained from all individuals included in the study.**Data statement:** the datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.**Financing:** this research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.**Conflicts of interest:** all of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version. Additionally, there are no conflicts of interest in connection with this paper, and the material described is not under publication or consideration for publication elsewhere. The authors have full control of all primary data and agree to allow the journal to review their data upon request.

Asil E, Volkan Yılmaz M, Ayyıldız F, Yalçın T. The effect of social media use on orthorexia nervosa: a sample from Turkey. Nutr Hosp 2023;40(2):384-390

DOI: <http://dx.doi.org/10.20960/nh.04217>©Copyright 2023 SENPE y Arán Ediciones S.L. Este es un artículo Open Access bajo la licencia CC BY-NC-SA (<http://creativecommons.org/licenses/by-nc-sa/4.0/>).**Correspondence:**Mustafa Volkan Yılmaz. Department of Nutrition and Dietetics. Faculty of Health Sciences. Ankara University. Tepebaşı, Fatih Cd. No: 197/A. 06290 Keçiören/ Ankara, Turkey
e-mail: yilmaz@ankara.edu.tr

Resumen

Objetivos: el presente estudio evaluó las tendencias ortoréxicas de los usuarios de las redes sociales y los factores que afectan a estas tendencias.

Métodos: un total de 2526 participantes adultos (696 hombres y 1830 mujeres, $28,4 \pm 10,3$ años de edad) completaron un cuestionario que incluye información personal, la escala de ortorexia nervosa (ORTO-11), la escala de redes sociales y conducta alimentaria (SMEB) y el cuestionario internacional de actividad física en formato corto (IPAQ). El índice de masa corporal (IMC) se calculó a partir del peso y la estatura declarados por los participantes. Se realizaron pruebas t o pruebas del chi cuadrado de muestras independientes para evaluar la diversa información de los participantes según la tendencia a la ortorexia nervosa. Se utilizó un análisis de regresión logística binaria para identificar los factores de riesgo.

Resultados: según el ORTO-11, el 56,1 % de los participantes tenían tendencia a la ortorexia nervosa y esta tendencia aumentaba con la edad y el IMC ($p < 0,05$). Las personas sin tendencia a la ortorexia nervosa dedicaban más tiempo ($172,2 \pm 119,9$ min/día) a las redes sociales. Los participantes que seguían páginas web con recomendaciones sobre alimentación saludable y deporte/ejercicios tenían un mayor riesgo de ortorexia nervosa que los que no seguían esas páginas ($p < 0,05$). Además, aunque había una diferencia significativa entre los niveles de actividad física de los participantes según la tendencia a la ortorexia nervosa, esta relación no era significativa en el modelo de regresión ($p > 0,05$).

Conclusión: este estudio indica que el incremento del uso de las redes sociales, especialmente de las páginas web que incluyen recomendaciones sobre salud y alimentación, podría favorecer la tendencia a la ortorexia nervosa. Por lo tanto, concienciar a las personas con tendencia a la ortorexia nervosa sobre las redes sociales puede tener un efecto beneficioso.

Palabras clave:

Ortorexia nervosa. Redes sociales. Conducta alimentaria. Trastornos alimentarios.

INTRODUCTION

Orthorexia nervosa (ON), first described by Bratman in 1997, is a term used for a possible new eating disorder characterized by extreme obsessive anxiety about healthy eating (1). Obsession with health and healthy food as seen in individuals with ON can cause negative effects such as malnutrition and deterioration in social or academic functioning (2). Healthy eating in orthorexic individuals becomes an indicator of self-respect and control of themselves, and because of their obsession they have rather strict rules of food selection and preparation (3). Individuals who spend most of their days searching for healthy foods or making the food preparation process the healthiest are affected both physically and mentally by the fact that they cannot enjoy eating over time (2). Orthorexia nervosa is not defined as an eating disorder in the DSM-V. However, scales that recently allowed for a more detailed assessment of ON began revealing the relationship between ON and eating disorders (4).

Today, both the developing technology and the lockdown during the COVID-19 pandemic have caused daily habits to change and the Internet to enter our lives more. In the Digital 2021 report of "We are social" and "Hootsuite", it is stated that the time spent on the Internet in 2020 increased by 16 minutes compared to 2019, and reached 6 hours 54 minutes. In addition to the use of the Internet, the use of social media has also become widespread. In the same report, it is stated that more than 53 % of the world population are social media users, and individuals between the ages of 16 and 64 years spend an average of 2 hours and 25 minutes a day on social media (5). However, the widespread and increasing use of social media has started to affect users both physically and mentally (6).

The relationship shown between social media use and eating disorders and body image is important (7). The incidence of body dissatisfaction, body image disorders, and eating disorders is increasing, especially among children and young adults, among whom social media use is more common (6). A study evaluating the relationship between social media addiction and ON has shown that high social media addiction increases the risk of ON (8).

Furthermore, among social media platforms, Instagram is the most commonly preferred by individuals with eating disorders (8,9). Quettiana et al. evaluated the relationship between intensity of social media use and eating disorders in their study of female university students, and showed that the increase in daily use of social media platforms, especially Instagram, was associated with a deterioration of eating behavior (9). Another recent study with university students also showed a high rate of social media addiction; however, social media addiction did not increase the risk of eating disorders (10).

Since orthorexia nervosa is an obsession with healthy eating, it was hypothesized that social media users who have a tendency to orthorexia might follow health-related webpages more frequently. This study aimed to determine the orthorexic tendencies of social media users and the factors affecting these tendencies.

MATERIALS AND METHODS

This cross-sectional study was conducted online between July and August 2021. Data were collected with an online questionnaire (via Google Forms). The ethics committee approval of the study was obtained from the Ankara University Ethics Committee (14.06.2021; 09/113). Before starting the study, the participants were informed about the study and work started if they declared their acceptance online. While preparing the study questions, it was ensured that the participants were able to easily understand and answer them on their own. The questionnaire form was announced on various social media platforms (Instagram, Facebook, WhatsApp, Twitter), and volunteers were allowed to participate in the survey during the 8 weeks between July 1st and August 25th, 2021. The population of this study consisted of Internet users between the ages of 19 and 65 living in Turkey. The data about the total number of Internet users in Turkey was obtained from the Turkish Statistical Institute. Accordingly, it was calculated that at least 663 individuals should participate in the study according to a 5 % margin of error and 99 % confidence level (11).

PARTICIPANTS AND DATA COLLECTION

A total of 3105 participants completed the online questionnaire. Duplicate submissions and incomplete or inconsistent data were excluded from the study (Fig. 1). After data cleaning, a total of 2526 volunteers between the ages of 18 and 65, without any known psychological diseases and who declared that they used at least one of the social media applications, were included in the study. The online questionnaire form prepared for collecting research data consisted of six parts. In the first two parts of the questionnaire participants filled in their general information and health information. In the third part of the questionnaire, the current body weight (kg) and height (cm) values of the individuals were recorded based on their self-report, and body mass index (BMI) values were calculated using the formula "kg/m²". According to the classification of the World Health Organization, the BMI value was evaluated as: < 18.5 equals underweight, 18.5-24.99 equals normal, 25.00-29.99 equals overweight, and ≥ 30.0 equals obese (12). The other parts of the questionnaire included the "Orthorexia Nervosa Scale (ORTO-11)," "Social Media and Eating Behavior Scale (SMEB)," and "International Physical Activity Questionnaire Short Form (IPAQ)."

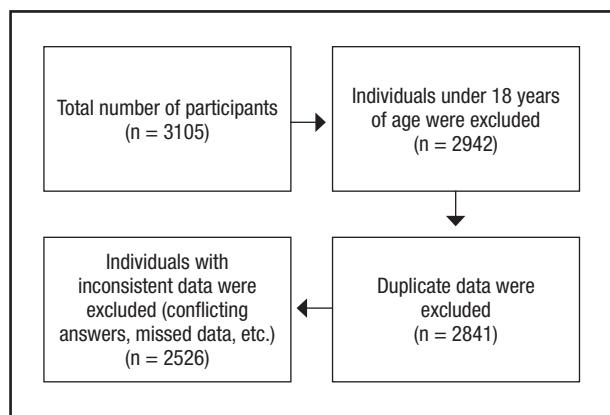


Figure 1.

Data cleaning.

The ORTO-11 scale used to determine the ON trends of the participants was created as a result of the Turkish validity-reliability study of the ORTO-15 test developed by Donini et al. (13). As a result of the study conducted by Arusoğlu et al. (14), it was determined that the Turkish use of ORTO-11 was more appropriate by removing 4 out of 15 questions from ORTO-15. Therefore, the ORTO-11 test was used in this study. In the scoring of ORTO-11 the sixth question was scored reversely, and the remaining questions were scored normally; an increase in the score indicates a decrease in the risk of ON. The cut-off point of the study was determined as 26 points at 25 %, and below this value it was evaluated as an orthorexic tendency.

The effect of social media on nutritional behavior was evaluated using the Social Media Eating Behavior Scale (SMEB) de-

veloped and validated by Keser et al. (15). The scale consists of 18 questions and is of a 5-point Likert type. As the score obtained from the scale increases, the effect of social media on eating behavior also increases.

The IPAQ short form has been used to determine the participants' physical activity level. Calculations were made as suggested and three levels (low, medium, and high) of physical activity were identified (16). The validity of the IPAQ short form has been shown in previous studies (17).

STATISTICAL ANALYSES

Statistical analyses were performed using the SPSS (IBM SPSS Statistics 21) software package. The Shapiro-Wilk goodness-of-fit test was used to examine whether the distributions of numerical variables fit a normal distribution, and descriptive statistics such as mean and standard deviation were provided for numerical variables with normal distribution. Percentage values and frequency tables were used for categorical variables. Risk factors affecting the ON tendency of the individuals were determined by binary logistic regression analysis. Before performing a binary logistic regression analysis, a univariate logistic regression analysis was performed on the independent variables used in the study. Independent variables with a p-value of up to 0.25 were included in the binary logistic regression model as possible risk factors. Variables with a p-value greater than 0.25 were excluded from the analysis. The Backward Elimination Method (Backward: LR) was used to determine the statistically significant variables. A Hosmer-Lemeshow test was also administered to evaluate the goodness of fit on the model obtained. Statistical significance was accepted at $p < 0.05$.

RESULTS

It was determined that 27.6 % of the individuals who participated in this study were male, 83.7 % had a university degree, 68.1 % were single, and 56.8 % were not working. The mean BMI of the participants was $23.6 \pm 4.3 \text{ kg/m}^2$, and 60.6 % of them had normal body weight. Daily social media usage time was 167.4 ± 141.2 minutes, SMEB scale score was 46.3 ± 21.3 , and ORTO-11 score was 25.6 ± 5.4 . The general characteristics of the participants are given in table I.

The evaluation of various information on the participants according to their ON tendency is given in table II. It was found that 74.6 % of the participants with orthorexia nervosa tendency were female, and both mean age and BMI were significantly higher than for those without ON tendency (29.3 ± 10.7 years, 27.2 ± 9.5 years; 23.9 ± 4.2 , 23.2 ± 4.4 ; $p < 0.05$). When the social media usage of the individuals participating in the research was evaluated, it was found that those without ON tendency spent 172.2 ± 119.9 minutes daily, while those with the tendency spent 161.1 ± 117.9 minutes on social media ($p < 0.05$), and individuals with ON tendency followed recipes, diet

meals, healthy nutrition recommendations, dietitian/nutrition specialist advice, sports/exercise recommendations, and mother-child education pages more than those without ON tendency ($p < 0.05$). The scores obtained from the SMEB scale applied to evaluate the effect of social media on eating behavior did not differ between the groups ($p > 0.05$). The number of individuals with moderate and high activity levels was significantly higher in the group determined to have orthorexia nervosa tendency ($p < 0.05$).

The ON trend of the individuals participating in the study increased 1.01 times with increasing age and 1.04 times with increasing BMI ($p < 0.05$, %CI: 1.003-1.024; $p < 0.05$, %CI: 1.013-1.062). It was found that the risk of ON was higher in individuals who followed the pages with healthy nutrition recommendations (OR: 2.441, %CI: 1.930-3.088), and sports-exercise recommendations (OR: 1.680, %CI: 1.369-2.060) on social media than in those who did not follow them ($p < 0.05$). However, the tendency to ON was found to be higher in those who did not follow restaurant (OR: 1.600, %CI: 1.216-2.105) and entertainment pages (OR: 1.268, %CI: 1.048-1.534) (Table III).

DISCUSSION

This study aimed to evaluate the use of social media by determining the demographic characteristics of individuals with ON tendencies. Sex, age, and BMI are some of the demographic characteristics that are thought to be related to ON, known as preoccupation with healthy eating. In this study, it was found that the risk of ON tendency was significantly higher in women than in men ($p < 0.05$) (Table III). This result, which has also been shown in various studies (18-21), may be due to the importance women attach to the relationship between health and nutrition (22,23). The greater attention paid to body weight and shape in women may also increase the tendency toward ON (24). However, in a meta-analysis conducted on this subject, it was determined that the difference between sexes varies according to the tool used in the assessment of ON status (25).

Another risk factor thought to be associated with ON tendency is age. In a study conducted with 801 participants in Turkey, it was shown that individuals aged 50 years and over had an increased tendency towards ON (22). In this study, it was determined that there was a significant relationship between age increase and ON tendency ($p < 0.05$). It is estimated that, with increasing age, more attention is paid to health, which leads individuals to pursue a healthy diet. However, there are different results in the literature regarding this subject (18,26,27). In their study, Varga et al. (26) found a positive but weak correlation between age and ON, while Fidan et al. (19) found that the risk of ON increased with younger age. However, it should be noted that participant education levels may affect the results, especially in studies with people who are educated in health or nutrition, such as in Fidan et al. (19,20).

It was determined in this study that ON tendency increased with increase in BMI ($p < 0.05$) (Table III). Oberle et al. (21) showed an increase in ON symptoms with increased BMI in their study in

Table I. General characteristics of the participants

	n (%) / mean ± SD
<i>Sex</i>	
Male	696 (27.6)
Female	1830 (72.4)
<i>Age (years)</i>	28.4 ± 10.3
18-24	1299 (51.4)
25-44	968 (38.3)
45-65	259 (10.3)
<i>Education level</i>	
Primary graduate	89 (3.5)
High school graduate	323 (12.8)
Bachelor's/Master's/PhD	2114 (83.7)
<i>Marital status</i>	
Single	1719 (68.1)
Married	807 (31.9)
<i>Working status</i>	
Working	1091 (43.2)
Not working	1435 (56.8)
<i>Income status</i>	
Less income than expenditure	411 (16.3)
Income equals expenditure	1334 (52.8)
More income than expenditure	781 (30.9)
<i>Smoking</i>	
Yes	554 (21.9)
No	1771 (70.1)
<i>Chronic disease presence</i>	
Yes	580 (23.0)
No	1946 (77.0)
BMI (kg/m^2)	23.6 ± 4.3
<i>BMI classification</i>	
Underweight	192 (7.6)
Normal	1531 (60.6)
Overweight	583 (23.1)
Obese	220 (8.7)
ORTO-11 score	25.6 ± 5.4
<i>ON tendency</i>	
With tendency (< 26)	
Without tendency (> 26)	1416 (56.1)
Time spent on social media (min/d)	1110 (43.9)
SMEB score	165.9 ± 118.9
	46.3 ± 21.3
<i>Physical activity level (n = 2240)</i>	
Low activity	875 (39.1)
Moderate activity	783 (34.9)
High activity	582 (26.0)

BMI: body mass index; ON: orthorexia nervosa; SMEB: Social Media and Eating Behavior Scale.

459 college students. In another study, a positive correlation was found between ON and BMI (28). It is possible that the reasons for this relationship between ON and BMI include the instinct to protect against the health risks caused by obesity by eating completely healthy. Studies on this subject show that the primary motivation of individuals with ON is to "maintain health" instead of losing weight (29). Additionally, focusing more and more on foods perceived as healthy while dieting also increases the risk of ON (4). However, Depa et al. (30) differentiated ON from healthy orthorexia, revealed the difference in dietary motivations of the two groups, and showed that weight loss and visual anxiety were substantial in ON. The

interest in body structure or shape of individuals with ON tendency has been shown in various studies (28,31). A study conducted with university students has shown an association between muscle mass, instead of BMI, and ON (31). The perfectionist features in these individuals play an essential role in weight control and body satisfaction (4). Barnes and Caltabiano (32) state that body image dissatisfaction is higher in individuals with ON tendency, which increases the risk of developing an eating disorder. The use of healthy eating in orthorexia nervosa for maintaining body weight and changing body image or shape indicates that ON is associated with other eating disorders (4,30).

Table II. Evaluation of various parameters of the participants according to ON tendency

	Without ON tendency n (%) / mean ± sd	With ON tendency n (%) / mean ± sd	p
<i>Sex</i>			
Male	336 (30.3)	360 (25.4)	0.007
Female	774 (69.7)	1056 (74.6)	
<i>Age (years)</i>	27.2 ± 9.5	29.3 ± 10.7	< 0.001
<i>Working status</i>			
Working	459 (41.4)	623 (44.6)	0.098
Not Working	651 (58.6)	784 (55.4)	
BMI (kg/m^2)	23.2 ± 4.4	23.9 ± 4.2	< 0.001
<i>BMI classification</i>			
Underweight	106 (9.5)	86 (6.1)	
Normal	688 (62.0)	843 (59.5)	
Overweight	218 (19.6)	365 (25.8)	
Obese	98 (8.8)	122 (8.6)	
<i>Time spent on social media (min/d)</i>	172.2 ± 119.9	161.1 ± 117.9	< 0.05
<i>Content followed on social media</i>			
Recipe pages (taste priority)	433 (39.0)	614 (43.4)	0.028
Diet recipe pages (health priority)	131 (11.8)	306 (21.6)	< 0.001
Healthy nutrition recommendation pages	180 (16.2)	504 (35.6)	< 0.001
Restaurant suggestion pages	158 (14.2)	156 (11.0)	0.015
Dietitian/nutritionist specialist pages	158 (14.2)	332 (23.4)	< 0.001
Sports/exercise pages	256 (23.1)	499 (35.2)	< 0.001
News/newspaper pages	680 (61.3)	856 (60.5)	0.679
Celebrity pages	296 (26.7)	343 (24.2)	0.161
Entertainment pages	669 (60.3)	717 (50.6)	< 0.001
Family education pages	139 (12.5)	229 (16.2)	0.01
<i>SMEB score</i>	46.8 ± 22.3	45.9 ± 20.5	0.295
<i>Physical activity level (n: 2240)</i>			
Low activity/Sedentary	411 (42.0)	464 (36.8)	
Moderate activity	332 (33.9)	451 (35.7)	
High activity	235 (24.1)	347 (27.5)	0.031

ON: orthorexia nervosa; BMI: body mass index; SMEB: Social Media Eating Behavior Scale.

Table III. Risk factors affecting participants' tendency toward ON

	B	S.E.	Wald	p	Exp (B)	95 % CI
Age	0.014	0.005	6.778	0.009	1.014	1.003-1.024
BMI	0.036	0.012	9.289	0.002	1.037	1.013-1.062
Sex	0.251	0.109	5.282	0.022	1.285	
Following healthy nutrition recommendation pages	0.893	0.120	55.380	0.000	2.441	2.009-3.199
Following restaurant suggestion pages	-0.470	0.140	11.250	0.001	0.625	0.468-0.810
Following sport/exercise pages	0.519	0.104	24.747	0.000	1.680	1.330-1.992
Following entertainment pages	-0.237	0.097	5.957	0.015	0.789	0.642-0.939

Social media has become an important communication and interaction tool that is used by everyone, regardless of demographic characteristics such as age, sex, or education level, where both true and false information is available. In the Digital 2021 report prepared by "We Are Social" and "Hootsuite," it is stated that individuals between the ages of 16 and 64 in Turkey used social media for an average of 177 minutes a day in 2020 (5). In this study, it was found that participants with ON tendencies spent an average of 161.1 ± 117.9 minutes per day on social media and followed pages with dietary meals, healthy eating, and sports-exercise recommendations more frequently ($p < 0.05$) (Table II). As a result of their study, Turner and Lefevre (8) showed that there is a significant relationship between the use of Instagram, with more visual content, and the ON tendency. Moreover, the higher tendency of individuals with ON to follow advice in social media rather than the suggestions of therapists is another result that shows the effect of social media on individuals with ON (33).

The lockdowns/quarantines implemented during the COVID-19 pandemic increased the use of both the Internet and social media (5). Nowadays, social media is also used as a platform where visual sharing of foods, nutritional recommendations, and recipes are given (34). Especially young individuals are open-minded about healthy eating and getting recipes from social media (35). It was found in this study that the risk of ON was 2.4 times higher in those who followed the pages with healthy nutrition recommendations and 1.68 times higher in those who followed the pages with sports-exercise recommendations ($p < 0.05$) (Table III). Tricas-Vidal et al. (36) determined in their study that women follow food-related social media accounts more than men and millennials from the z-generation. Additionally, it was found that the participants showed more interest in posts based on product/supplement promotion rather than scientific evidence (36). Therefore, health-related posts such as nutrition and exercise must also contain accurate information and be interesting in order to increase the number of followers. An exemplary study on this subject was conducted by Grantham et al. to raise awareness among the public about healthy nutrition during the pandemic. In the research,

the social media campaign carried out with the hashtag #eatwellcovid19 with experts in the field managed to increase the number of interactions and participants on all social media platforms within four months (37).

Greater use of social media can increase depressive symptoms (38), body-perception disorder, and eating disorder symptoms (39). Individuals with a tendency toward ON during the pandemic stated that they felt pressure to diet and lose weight on social media (40). Furthermore, individuals with eating disorders, including ON, prefer to follow the recommendations of social media influencers rather than health professionals, which hinders their treatment (7,33). In this study, it was found that individuals with ON tendencies had a higher BMI average, and that increases in BMI significantly increased the risk of ON. With this result, it is thought that the pages/contents that individuals with ON tendency prefer to follow on social media may cause the existing ON symptoms to progress further. All of these contributed to the fact that ON has started to be seen as an individual and social disorder (33). When these results are considered, health- and nutrition-related posts on social media should be shared carefully to prevent individuals with ON tendency to further progress, or to prevent the emergence of another eating disorder.

Although the high number of participants in this cross-sectional study is the study's strength, there are some limitations. It should also be noted that the male subset, often observed in voluntary survey studies, is underrepresented. The inability to collect data face to face caused that anthropometric measurements and time spent on social media were self-reported by the participants. Moreover, the ORTO-11 test was used since no other test had validity and reliability in Turkish for evaluating ON. Therefore, no differentiation could be made between the sub-dimensions of ON or between healthy orthorexia and orthorexia nervosa.

In conclusion, this study showed that the risk of tendency to ON could be affected by increased BMI, age, gender, and following certain web pages. Further studies are needed to understand the effects of social media on behavioral health concerns like ON.

REFERENCES

1. Villa M, Opawsky N, Manriquez S, Ananías N, Vergara-Barra P, Leonario-Rodríguez M. Orthorexia nervosa risk and associated factors among Chilean nutrition students: a pilot study. *Journal of Eating Disorders* 2022;10(1):6. DOI: 10.1186/s40337-022-00529-6
2. Oberle CD, Klare DL, Patyk KC. Health beliefs, behaviors, and symptoms associated with orthorexia nervosa. *Eat Weight Disord* 2019;24(3):495-506. DOI: 10.1007/s40519-019-00657-0
3. Brytek-Matera A, Fonte ML, Poggioalle E, Donini LM, Cena H. Orthorexia nervosa: relationship with obsessive-compulsive symptoms, disordered eating patterns and body uneasiness among Italian university students. *Eat Weight Disord* 2017;22(4):609-17. DOI: 10.1007/s40519-017-0427-4
4. Novara C, Maggio E, Piasentini S, Pardini S, Mattioli S. Orthorexia Nervosa: differences between clinical and non-clinical samples. *BMC Psychiatry*. 2021;21(1):341. DOI: 10.1186/s12888-021-03348-2
5. Social WA, Hootsuite. Digital 2021: The latest insights into the “state of digital” 2021. Available from: <https://wearesocial.com/uk/blog/2021/01/digital-2021-the-latest-insights-into-the-state-of-digital/>
6. Rounsefell K, Gibson S, McLean S, Blair M, Molenaar A, Brennan L, et al. Social media, body image and food choices in healthy young adults: A mixed methods systematic review. *Nutrition & Dietetics* 2020;77(1):19-40. DOI: 10.1111/1747-0080.12581
7. Marks RJ, De Foe A, Collett J. The pursuit of wellness: Social media, body image and eating disorders. *Children and Youth Services Review* 2020;119:105659. DOI: 10.1016/j.chlyouth.2020.105659
8. Turner PG, Lefevre CE. Instagram use is linked to increased symptoms of orthorexia nervosa. *Eat Weight Disord* 2017;22(2):277-84. DOI: 10.1007/s40519-017-0364-2
9. Qutteina Y, Nasrallah C, Kimmel L, Khaled SM. Relationship between social media use and disordered eating behavior among female university students in Qatar. *Journal of Health and Social Sciences* 2019;4(1):59-72. DOI: 10.19204/2019/rhns7
10. Ayıldız F, Şahin G. Effect of social media addiction on eating behavior, body weight and life satisfaction during pandemic period. *British Food Journal* 2022;124(54). DOI: 10.1108/BFJ-01-2022-0018
11. Krejcie RV, Morgan DW. Determining sample size for research activities. *Educational and psychological measurement* 1970;30(3):607-10.
12. World Health Organization (WHO). Body Mass Index-BMI. Available from: <https://www.euro.who.int/en/health-topics/disease-prevention/nutrition/a-healthy-lifestyle/body-mass-index-bmi>
13. Donini LM, Marsili D, Graziani MP, Imbriale M, Cannella C. Orthorexia nervosa: validation of a diagnosis questionnaire. *Eat Weight Disord* 2005;10(2):e28-32. DOI: 10.1007/BF03327537
14. Arusoğlu G, Kabakçı E, Köksal G, Merdol TK. Ortoreksiya Nervoza ve Orto-11'in Türkçe Uyarlaması. *Turk Psikiyatri Dergisi* 2008;19(3):283-91.
15. Keser A, Bayındır-Gümüş A, Kutlu H, Özтурk E. Development of the scale of effects of social media on eating behaviour: a study of validity and reliability. *Public health nutrition* 2020;23(10):1677-83. DOI: 10.1017/S1368980019004270
16. Group TI. International Physical Activity Questionnaire 2017. Available from: <https://sites.google.com/site/theipaq/>
17. Lee PH, Macfarlane DJ, Lam TH, Stewart SM. Validity of the international physical activity questionnaire short form (IPAQ-SF): A systematic review. *International Journal of Behavioral Nutrition and Physical Activity* 2011;8(1):115. DOI: 10.1186/1479-5868-8-115
18. Łucka I, Domarecki P, Janikowska-Holoweńko D, Plenikowska-Ślusarz T, Domarecka M. The prevalence and risk factors of orthorexia nervosa among school-age youth of Pomeranian and Warmian-Masurian voivodeships. *Psychiatr Pol.* 2019;53(2):383-98. DOI: 10.12740/PP/OnlineFirst/90633
19. Fidan T, Ertekin V, İşikay S, Kirpinar I. Prevalence of orthorexia among medical students in Erzurum, Turkey. *Comprehensive Psychiatry*. 2010;51(1):49-54. DOI: 10.1016/j.comppsych.2009.03.001
20. Asil E, Sürütçüoğlu MS. Orthorexia nervosa in Turkish dietitians. *Ecology of food and nutrition* 2015;54(4):303-13. DOI: 10.1080/03670244.2014.987920
21. Oberle CD, Samaghabadi RO, Hughes EM. Orthorexia nervosa: Assessment and correlates with gender, BMI, and personality. *Appetite* 2017;108:303-10. DOI: 10.1016/j.appet.2016.10.021
22. Pökön M, Başpinar MM, Basat O. Prevalence of Orthorexia Nervosa Tendency in Non-obese Population: A Cross-sectional Study. *The Anatolian Journal of Family Medicine* 2021;4(3):252-6. DOI: 10.5505/anatoljfm.2021.24085
23. Özcelik AO, Ucar A. Gender differences in adult's knowledge about dietary fats, cholesterol, fiber and energy. *Pak J Nutr* 2018;7:234-9. DOI: 10.3923/pjn.2008.234.239
24. Stotts LA. It's complicated: The relationship between orthorexia and weight/shape concerns, eating behaviors, and mood. *Eating Behaviors* 2020;39:101444. DOI: 10.1016/j.eatbeh.2020.101444
25. Strahler J. Sex differences in orthorexic eating behaviors: A systematic review and meta-analytical integration. *Nutrition* 2019;67-68:110534. DOI: 10.1016/j.nut.2019.06.015
26. Varga M, Thege BK, Dukay-Szabó S, Túry F, van Furth EF. When eating healthy is not healthy: orthorexia nervosa and its measurement with the ORTO-15 in Hungary. *BMC Psychiatry* 2014;14(1):59. DOI: 10.1186/1471-244X-14-59
27. McComb SE, Mills JS. Orthorexia nervosa: A review of psychosocial risk factors. *Appetite* 2019;140:50-75. DOI: 10.1016/j.appet.2019.05.005
28. Bartel SJ, Sherry SB, Farthing GR, Stewart SH. Classification of Orthorexia Nervosa: Further evidence for placement within the eating disorders spectrum. *Eating Behaviors* 2020;38:101406. DOI: 10.1016/j.eatbeh.2020.101406
29. Valente M, Brenner R, Cesuroglu T, Bunders-Aelen J, Syurina EV. "And it snowballed from there": The development of orthorexia nervosa from the perspective of people who self-diagnose. *Appetite* 2020;155:104840. DOI: 10.1016/j.appet.2020.104840
30. Depa J, Barrada JR, Roncero M. Are the Motives for Food Choices Different in Orthorexia Nervosa and Healthy Orthorexia? *Nutrients* 2019;11(3):697. DOI: 10.3390/nu11030697
31. Oberle CD, Lipschuetz SL. Orthorexia symptoms correlate with perceived muscularity and body fat, not BMI. *Eat Weight Disord* 2018;23(3):363-8. DOI: 10.1007/s40519-018-0508-z
32. Barnes MA, Caltabiano ML. The interrelationship between orthorexia nervosa, perfectionism, body image and attachment style. *Eat Weight Disord* 2017;22(1):177-84. DOI: 10.1007/s40519-016-0280-x
33. Cheshire A, Berry M, Fixsen A. What are the key features of orthorexia nervosa and influences on its development? A qualitative investigation. *Appetite* 2020;155:104798. DOI: 10.1016/j.appet.2020.104798
34. Vaterlaus JM, Patten EV, Roche C, Young JA. #Gettinghealthy: The perceived influence of social media on young adult health behaviors. *Computers in Human Behavior* 2015;45:151-7. DOI: 10.1016/j.chb.2014.12.013
35. Klassen KM, Douglass CH, Brennan L, Truby H, Lim MSC. Social media use for nutrition outcomes in young adults: a mixed-methods systematic review. *Int J Behav Nutr Phys Act* 2018;15(1):70. DOI: 10.1186/s12966-018-0696-y
36. Tricas-Vidal HJ, Vidal-Perachó MC, Lucha-López MO, Hidalgo-García C, Lucha-López AC, Montí-Ballano S, et al. Nutrition-Related Content on Instagram in the United States of America: Analytical Cross-Sectional Study. *Foods* 2022;11(2):239. DOI: 10.3390/foods11020239
37. Grantham JL, Verishagen CL, Whiting SJ, Henry CJ, Lieffers JR. Evaluation of a social media campaign in Saskatchewan to promote healthy eating during the COVID-19 pandemic: social media analysis and qualitative interview study. *Journal of Medical Internet Research* 2021;23(7):e27448. DOI: 10.2196/27448
38. Lup K, Trub L, Rosenthal L. Instagram# instasad?: exploring associations among Instagram use, depressive symptoms, negative social comparison, and strangers followed. *Cyberpsychology, Behavior, and Social Networking* 2015;18(5):247-52. DOI: 10.1089/cyber.2014.0560
39. Mabe AG, Forney KJ, Keel PK. Do you “like” my photo? Facebook use maintains eating disorder risk. *International Journal of Eating Disorders* 2014;47(5):516-23. DOI: 10.1002/eat.22254
40. Gobin KC, Mills JS, McComb SE. The Effects of the COVID-19 Pandemic Lockdown on Eating, Body Image, and Social Media Habits Among Women With and Without Symptoms of Orthorexia Nervosa. *Frontiers in Psychology* 2021;12:716998. DOI: 10.3389/fpsyg.2021.716998