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Orthorexia Nervosa as a Disorder of Less Intuition and Emotion Dysregulation

Sezgi Azlığı ve Duygu Düzenleme Bozukluğu Olarak Ortoreksiya Nervoza

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ABSTRACT

Emotion regulation difficulties are a significant concern in the realm of eating disorders, serving as either contributing factors or ongoing challenges. While extensive research has explored these issues within prominent eating disorders like anorexia (AN) and bulimia nervosa (BN), there is a noticeable gap when it comes to understanding emotion regulation difficulties (ERD) and intuitive eating (IE) characteristics in the context of orthorexia nervosa (ON). This study aims to bridge this knowledge gap by introducing a quantitative approach to investigate ERD and IE in a Turkish population affected by ON, involving 159 participants. The study's primary findings reveal that ON represents a non-adaptive eating behavior inherently marked by ERD. Notably, a significant gender difference was observed, indicating that men exhibit a higher likelihood of displaying orthorexic tendencies compared to women. Prior research has highlighted the importance of ERD and the absence of IE in the context of AN and BN. This study extends these findings to assert that these emotional factors also constitute critical criteria in the understanding and treatment of ON. Thus, clinicians should be attentive to the emotional aspects when addressing individuals affected by ON.

Keywords: Orthorexia nervosa, emotion regulation, intuitive eating, eating disorder

ÖZ

Duygu düzenleme güçlükleri, yeme bozuklukları alanında önemli bir sorundur ve hem etken faktörler hem de süregelen zorluklar olarak karşımıza çıkmaktadır. Anoreksiya (AN) ve bulimia nervoza (BN) gibi önde gelen yeme bozukluklarında bu konular kapsamlı araştırmalarla incelenmiş olsa da, ortoreksiya nervoza (ON) bağlamında duygu düzenleme güçlükleri (DDG) ve sezgisel yeme (SY) özelliklerinin anlaşılması söz konusu olduğunda gözle görülür bir boşluk bulunmaktadır. Bu çalışma, 159 katılımcının yer aldığı ON'dan etkilenen bir Türk örnekleminde DDG ve SY'yi araştırmak için nicel bir yaklaşım sunarak bu bilgi boşluğunu doldurmayı amaçlamaktadır. Çalışmanın birincil bulguları, ON'un doğası gereği DDG ile kendini gösteren, uyuma yönelik olmayan bir yeme davranışını temsil ettiğini ortaya koymaktadır. Özellikle, erkeklerin kadınlara kıyasla ortoreksik eğilimler sergileme olasılığının daha yüksek olduğunu gösteren önemli bir cinsiyet farkı gözlemlenmiştir. Önceki araştırmalar, AN ve BN bağlamında DDG'nin önemini ve SY'nin yokluğunu vurgulamıştır. Bu çalışma, bu duygusal faktörlerin ON'nin anlaşılması ve tedavisinde de kritik kriterler oluşturduğunu ileri sürmek için bu bulguları genişletmektedir. Bu nedenle, klinisyenler ON'dan etkilenen bireylere müdahale ederken duygusal yönlere dikkat etmelidir.

Anahtar sözcükler: Ortoreksiya nervoza, duygu düzenleme, sezgisel yeme, yeme bozukluğu

Introduction

Emotional regulation difficulties (ERD) are considered one of the characteristics of eating disorders (ED) (Ruscitti et al. 2016). Among the most-well-known ED, such as anorexia nervosa (AN) and bulimia nervosa (BN), the spread of processed food and the growing awareness of food choices' effects on different somatic diseases have increased people's awareness of healthy eating. Its exaggerated level has brought a new distinct condition: orthorexia nervosa (ON). ON has not yet been classified as a mental disorder; hence, it is not included as an eating disorder in DSM-5 (APA 2013) and ICD-11 (WHO 2021). Although there is no specific criterion for ON, particular clinical features of ON are defined in the literature (Koven et al. 2015, Dunn et al. 2016). According to Bratman (2000), ON is characterized by pathological fixation on healthy or clean eating. Compared to the most well-studied ED, AN and BN (Petre 2019), people with a strong tendency to ON spend most of their time following rigid rules and making excessive effort to choose, prepare, and consume healthy food. Among ED, researchers found the most similar features between AN and ON, such as giving excessive importance to food, food restraint, and stereotypical eating habits (Ramacciotti et al. 2011, Brytek Matera 2012). Psychological

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factors such as needing control, perfectionism, interpersonal difficulties, attention to detail, and obsessive symptoms are shared characteristics in ON and AN (Bratman 2000, Mathieu 2005, Fidan et al. 2010).

Emotional regulation difficulties (ERD) are considered a risk or maintenance factor of ED (Engel et al. 2013). People with AN and BN have been found to have distorted abilities regarding emotions (Harrison et al. 2010, Brockmeyer et al. 2012). Fairburn (2003) states that people with ED engage in dysfunctional mood-modulatory behavior rather than tolerating mood fluctuations and coping accordingly. For example, self-induced vomiting, binge eating, and intense workouts may be used as mood-modulatory behaviors in a people with an ED. People with ED have extreme difficulties regulating emotions, accepting emotional states, acknowledging the importance of emotions, and having the capacity to change emotional states (Ruscitti et al. 2016). To the best of our knowledge, only two studies have focused on the emotional aspects of ON and both studies revealed the link between ON and ERD (Vuillier et al. 2020, Obeid et al. 2021). A recent Vuillier (2020) study found a significant relationship between ON and ERD. Another study conducted in Lebanon supported this finding, but both studies are limited in their scope regarding the emotional aspects of ON (Obeid et al. 2021).

Other phenomena that are associated with difficulties in emotion regulation include impaired intuitive eating (IE). IE is an adaptive or positive eating style that ensures people rely on their physiological needs, hunger, and satiety signals. People with IE never focus on the emotional aspects when deciding hunger and satiety (Tylka 2006). According to Tylka (2006), people with ED rely on their emotional signals when eating, while those with adaptive eating approaches rely on their physiological hunger and satiety. IE consists of three essential components: a) unconditional permission to eat and consume the desired food in the case of hunger, b) eating as a physical need or desire rather than an emotional need or desire, c) the person determines the time and amount of eating, based on his inner hunger (Tribole et al.1995). A study focusing on the IE pattern in ED found a lower IE score in people with ED than those without (Van Dyck et al. 2016). Another study found a low level of adaptive-positive eating behavior in a female with a high ON tendency, (Rodgers et al. 2021). As mentioned above, impaired IE patterns are linked to emotional dysregulation problems (Tylka 2006). In a study comparing male and female participants, found less adaptive eating characteristics in people with ON tendencies (Rodgers et al. 2021). Another study focusing on healthy and unhealthy orthorexia found that unhealthy ON was associated negatively with IE, while healthy ON was associated with more IE (Anastasia et al. 2022).

Although there are similarities between ON, BN, and AN, people with AN and BN have distorted abilities to experience and differentiate emotions (Harrison et al. 2010, Brockmeyer et al.2012) . There is limited knowledge regarding emotional difficulties and intuitive aspects in ON. Another critical limitation of the studies conducted by Vuillier (2020) and Obeid (2021) is that they used the ORTH0-15 Scale to investigate the relationship between ON and ERD. However, this scale lacks clear cut-off score (Donini et al. 2004, Bosi et al. 2007, Aksoydan et al. 2009, Barnes et al. 2017, Fonte et al. 2017, Almeida et al. 2018) and has poor psychometric validity (Missbach et al. 2015, Roncero et al. 2017).

The current study has three aims: first, investigate Emotional dysregulation in ON. We hypothesized that emotion-regulation difficulties are significant predictors of ON, after controlling demographic variables and body mass index (BMI). Second, to investigate the level of IE in people with ON tendencies. We hypothesized that people with higher ON tendencies would report a lower level of IE. Third to investigate whether ON is more prevalent in females than males. This challenges the present work, which shows that ON is more prevalent in males than females and co-occurs with ERD and fewer IE characteristics.

Method

Sample

The present study used a quantitative research design to examine the relationship between emotion difficulties and ON. Data was collected through self-report surveys administered to a randomly selected sample of Turkish participants (N=105) included females (N=102) and males (N=57). The mean age was 25. Prior to the study we used G*Power 3.1.9 software (Faul et al. 2007) for sample size determination, based on obtained data from current study (2022), (N= 159), The effect size in the current study was 0.5 considered to be moderate using Cohen's (Cohen 1988). With a significant criterion of 0.5 and power = 0.80 the minimum sample size needed for the current study with the given effect size (0.5) is N=28 for linear regression and N=150 for t- test analysis. Therefore, the obtained sample size (N=159) in the present study is more than adequate to conduct an analysis. No research incentives or rewards were offered to participants. Informed consent was provided to all participants. In the present study individuals with a diagnosed eating disorder and current psychiatric disorder were excluded from our study. To obtain psychiatric status we asked, " Have you received mental treatment or

diagnosed with any mental illness in the past". The study focused on participants aged 18+ years and therefore participants below 18 years of age were not included in the study. To obtain information regarding age we asked a question" what is your age". Questionnaires were filled out online (Qualtrics) no in person psychiatric examination was made. To generalize our findings and minimize bias, randomized sampling method was applied. Demographic features of the participants are presented in Table 1.

Participation in this study was anonymous and voluntary. Data was obtained between November and March 2022. The study sample comprised English speaking Turkish citizens living in Turkey. We chose English speaking Turkish citizens because there was no Turkish version of the scale. The research forms were made into a link at https://elteppk.eu.qualtrics.com and sent to the participants via the link. The present study was conducted in accordance with Helsinki Declaration and approved by the institutional review board of Eötvös Lorand University, Budapest Hungary, (ELTE, KEB 2020/461)

Procedure

In this cross-sectional study, survey was done by Qualtrics software. The well detailed survey was shared on various social media platform (Facebook, WhatsApp, Instagram, Twitter, and Clubhouse). Clubhouse is an application where people create a room by giving a name to the room, and people enter rooms based on the topic (Constine 2020). As there was no Turkish scale version, we sent the survey link to English-speaking Turkish citizens. Before the questions, information about ethical principles, the primary purpose and data processing were provided. After receiving informed consent, subjects filled out the questionnaire anonymously.

Measures

Teruel Orthorexia Scale (TOS)

Barrada and Roncero Alan (2018a) developed the Teruel orthorexia scale. This scale measures orthorexia in two dimensions: healthy orthorexia and orthorexia nervosa, including 17 items. HeOr, which includes nine items. The healthy orthorexia subdimension measures the tendency to eat healthy. In contrast, the ON subdimension measures the negative and emotional consequences of trying to attain a pure/healthy eating life. High scores from the healthy orthorexia subdimension indicate that the engagement or interest in healthy eating is not pathological. In contrast, high ON sub-dimension scores show a pathological interest in healthy eating and a propensity for ON. Each item is scored on a 4-point Likert scale, ranging from 0 to 3. Participants were required to answer using the expressions "completely disagree," "slightly agree," "quite agree," or "completely agree" to show how frequently they identified with these statements. In the original study, the Cronbach α coefficient, which demonstrates the scale's internal consistency, and the internal consistency coefficient of the first factor, called healthy orthorexia, was found to be 0.85. The second factor's internal consistency coefficient, ON was found to be 0.81 (Barrada et al.2018). In our study, the internal consistency coefficient of the first factor, called healthy orthorexia, was found to be 0.85, and the internal consistency coefficient of the second factor, ON was found to be 0.84.

Difficulties in Emotion Regulation Scale (DERS)

The Difficulties in Emotion Regulation Scale was designed to evaluate emotion dysregulation in a detailed manner (Gratz et al. 2004). The emotion regulation questionnaire was designed to address difficulties within the following dimensions of emotion regulation: 1) being aware of emotions, 2) accepting emotions, 3) having the capacity to participate in goal-directed behavior and refrain from impulsive action, and 4) accessing to emotion regulation strategies regarded to be effective. The first scale measuring difficulties in emotion regulation consisted of 36 items (See appendix), then shortened to a 16-item version (DERS-16). Each item is scored on a 5-point Likert scale. Participants are asked to express how often they experience the statement in the items ranging from 1 to 5, where one is "almost never," 2 is "sometimes," 3 is "about half the time," 4 is "most of the time," 5 is "almost always." In DERS, a higher score indicates more emotional regulation difficulties. The internal consistency of the original version of the DERS was found to be 0.93 (Gratz et al. 2004). In the present study, the internal consistency coefficient of the DERS was found to be close, 0.92.

Intuitive Eating Scale (IES-2)

The IES measures adaptive versus disordered eating (Tylka 2006c). The first IES was created and tested by Hawks et al. (2004). However, it needed to provide adequate reliability in retests. The original IES-1 was comprised of 21 items and three sub-dimensions. Tylka revised this scale, and Kroon Van Diest (2013) and the IES -2 were

developed to assess people's propensity to follow their bodily hunger and satiety cues when one decides when, what, and amount of food. The questionnaire addresses the following dimensions: (a) Unconditional Permission to Eat (UPE), which refers to people's eagerness to eat when they are hungry; (b) Eating for physical rather than emotional reasons (EPR), which refers to an individual's eating patterns to determine whether people eat to overcome their negative feelings or due to physical hunger, (c) Reliance on Hunger and Satiety Cues (RHSC) refers to how an individual believes in their internal hunger and satiety signs and dependence on these signs to control their eating habits, and (d) Body Food Choice Congruence (BFCC), which refers to how consumed food makes you feel. İt is a 23-item questionnaire. Participants are asked to state how often they experience the statement in the items ranging from 1 to 5, where one is "strongly agree," 2 is "disagree," 3 is "neutral," 4 is "agree," 5 is "strongly agree." The higher the scale's total or sub-dimension scores, the higher the IES, (Madden et al. 2012). Internal consistency was between 0.85 and 0.88 for the total score of the IES in the original study (Tylka et al. 2013). In our sample, internal reliability was high for all scales α= 0.89 for the subscales of UPE α= 0.82, EPR, α= 0.82, RHSC, α= .90, and BFCC, α= 0.80.

Statistical Analysis

This study used IBM SPSS 26.0 (Statistics package program for social sciences 26.0) to analyze the data. Before starting the data analysis, the normal distribution of scales was considered to ensure accuracy. Skewness and kurtosis values were within the proper range -2 and +2, indicating that all items are typically distributed ,(Mallery et al. 2000). After the normal distribution was determined, the t-test and ANOVA were applied. To investigate the relationship between ON and IE behaviors, we conducted regression analysis and to investigate male and female groups difference on ON independent t-test was used. To investigate emotion regulation difficulties in ON hierarchical multiple regression analysis was conducted.

Results

The descriptive statistics are presented in Table 1. ERD significantly predicted ON and orthorexic participants scored less on the IE questionnaire (IES-2). Consistent gender differences were found in male participants who engaged more in orthorexia behavior than female participants with a medium effect size. Correlations between variables are presented in Table 2.

Table 1. Descriptive statistics of the sample

Characteristics	**N (=159)**	**%**
Gender		
Male	102	64.2
Female	57	35.8
Age	Ortalama	Standard Sapma
18-60+	29.30	10.61
Weight		
42-97+	65.92	15.91
Characteristics	N	%
Level of Education		
Elementary School	1	6
Vocational School	1	6
High School	12	7.5
College or University	109	68.6
Post gradual degree	36	22.6
Relationship Status		
Single	82	51.6
In a Relationship	37	23.3
Married	39	24.5
Divorced	1	6
Socioeconomic Status		
Below average	17	10
Average	111	70
Above average	31	20

We conducted a linear regression analysis to determine whether individuals with orthorexia behaviors have IE behaviors. As it was hypothesized, less IE behavior contributes to ON. Regression analysis results are presented in Table 4.

Table 2. Correlations between scales			
	1	**2**	**3**
1-TOS	1	**.301****	**-.40****
2-DERS	**.30****	1	**-.17***
3-IES	**-.40****	**-.17***	1

TOS: Teruel Orthorexia Scale, 2-DERS: Difficulty in Emotion Regulation Scale, 3-IES: Intuitive Eaing Scale, Bold character identifies significant results at the 0.05 level..

Table 3. The mean scores of TOS, DERS, and IES (mean ± SD)						
	Whole Group	**Male (N=102)**	**Female (N=57)**	**z**	**p**	**Effect size**
ON	1.67±0.54	1.82±0.53	1.59±0.53	2.22	0.01	**0.53**
HeOr	2.22±0.62	2.38±0.66	2.12±0.56	2.5	0.01	0.59
DERS	2.29±0.62	2.11±0.72	2.40±0.72	-2.80	0.01	0.72
IES	3.32±0.54	3.33±0.48	3.31±0.57	0.19	0.07	0.54

ON: Orthorexia Nervosa, HeOr: Healthy Orthorexia, DERS: Difficulty in emotion regulation scale, ES: Intuitive eating scale, *Bold values indicate significant difference. P - values are based on independent sample t test analysis..

The analysis aimed to observe whether ERD are significant predictors of ON after controlling for demographic variables (gender, age, education level, relationship status, standard of living) and BMI. It was hypothesized that ERD will positively predict ON. According to our findings, ERD contributed to ON. To test this hypothesis, a hierarchical multiple regression analysis was conducted. The hierarchical multiple regression analysis is presented in Table 5 and Table 6.

Tablo 4. Regression analysis of intuitive eating and orthorexia nervosa					
	Beta	**SE**	**95% CI**		**P**
			LL	UL	
Intercept	3.00	0.24	2.52	3.49	**<.001**
Intuitive eating	-0.40	0.73	-0.54	-0.25	**<.001**

N=159, CI: confidence interval; LL:Lower level, UL Upper level. Bold values indicate significant difference. Independent variable: Intuitive eating, Dependent variable: Orthorexia Nervosa, P- values are based on regression analysis..

We hypothesized that ON (or the higher tendency to ON) is more prevalent in females than males. The objective of the hypothesis is to observe whether there is a difference between male and female groups regarding ON. It was hypothesized that females would report more orthorexia tendencies than males. An independent t-test was used to test this hypothesis. The results show that males had more ON symptoms than females. These results suggest that males are more likely to exhibit ON behaviors than females. Independent t-test results of the male and female groups in ON groups are presented in Table 3.

Tablo 5. Multiple regression analysis result of emotion regulation difficulties in orthorexia nervosa			
		Orthorexia nervosa	
Predictors	B	R^2	ΔR2
Step 1			
Control Variables [b]		0.59	
Step 2			
DERS	0.27***	0.18	0.12***

N=159 [b] Control variables (Relationship status, socioeconomic status, level of education, gender, BMI: body mass index, Age ***P <.001, DERS: Difficulties in Emotion Regulation Scale. P - values are based on multiple regression analysis, B: Beta values, R^2 : R- squared, ΔR2 : adjusted R squared value.

Tablo 6. Model 2 with gender, age, education, socioeconomic status, BMI, relationship status and emotiona				
	B	**Estimate**	**SE**	**P**
Intercept	.553	1.060	.521	.291
Gender	-.179	-1.758	.102	.081
Age	.004	.812	.005	.418
Education	.061	.812	.075	.418
SES	-.014	.191	.075	.849
BMI	.017	1.489	.011	.139
Relationship	-.010	-.171	.060	.772
DERS	.277	4.835	0.57	.001

F (2.151=4.902, *p*<.001, R^2 =.18, R^2_{adj}=. 14; Ders: Difficulties in Emotion Regulation, SES: Socioeconomic Status, BMI: Body Mass Index

Discussion

The clinical features of ON are similar to those of AN and BN, (Bratman et al. 2000, Donini et al. 2004, Ramacciotti et al. 2011, Brytek-Matera et al. 2017). As difficulties in emotion regulation and low levels of IE have been considered as risk or maintenance factors for several types of eating disorders (Engel et al. 2013, Ruscitti et al. 2016; Van Dyck et al. 2016). Therefore, tremendous attention has been paid to investigation of the emotional characteristic of AN and BN. This has led to a scarcity in researching the above aspects of ON (Barthels et al. 2015). The aim of the present work is to investigate difficulties in emotion regulation and IE characteristics in individuals with orthorexia tendencies. Because earlier studies neglected healthy aspect of orthorexia and conducted with criticized ORTHO-15 scale (Missbach et al. 2015, Roncero et al. 2017, Vuillier et al. 2020, Obeid et al. 2021) due to its poor psychometric validity (Missbach et al. 2015, Roncero et al. 2017) in the current study we employed Teruel Orthorexia Scale (TOS) (Barrada and Roncero 2018). Moreover, we found that ON is a non-adaptive eating behavior that occurs with difficulties in emotion regulation. Therefore, the present study stated that ON may result from emotional dysregulation problems and is characterized by focusing on emotional cues rather than hunger and satiety cues.

Regarding the second hypothesis, our findings are consistent with previous findings examining IE in ON (Coimbra et al. 2021, Rodgers et al. 2021b) and support the assumption of a non-adaptive eating pattern in ON as an eating disorder (Tylka 2006, Van Dyck et al. 2016b). Among the subscales of IES, the highest inverse correlation was found between unconditional permission to eat (UPE) and ON. Another study found that UPE made the highest contribution to ON (Rodgers et al. 2021b). These results underscore the idea that non-adaptive eating behaviors in ON are mainly due to not giving oneself the freedom to consume what satisfies one's palate. Our results shed new light on the relationship between ON and poor IE and suggest that people with ON rely more on their emotional cues than on their physical hunger and satiety cues.

Similar results were also obtained in other studies on AN and BN (Harrison et al. 2010b, Brockmeyer et al. 2012b, Ruscitti et al. 2016b). Interestingly, non-acceptance of negative emotions and impulse control problems of DERS were the strongest positively correlated dimensions contributing to ON. These findings align well with previous studies, which also found the non-acceptance of emotions as a strongly correlated dimension in ON (Obeid et al. 2021a). Acceptance of negative emotions and problems with impulse control has been identified as the main contributor to the ERD in AN and BN (Fischer et al. 2008, Brockmeyer et al. 2014, Rowsell et al. 2016).

Our second hypothesis is whether emotion-regulation difficulties are significant predictors of ON after controlling for demographic variables and BMI because demographic variables can affect emotion regulation. We controlled for gender, age, education level, relationship status, standard of living, and BMI in our study. Regardless of age, gender, level of education, relationship status, standard of living and BMI, difficulty regulating emotion was a significant predictor of ON. The current findings are also consistent with our previous observations that ERD predicted ON. Accordingly, previous studies have highlighted the importance of emotion regulation problems in AN, BN (Harrison et al. 2010, Brockmeyer et al. 2012), and ON (Vuillier et al. 2020b, Obeid et al. 2021b, Strahler et al. 2022). Acceptance of negative emotions and problems with impulse control has been identified as the main contributor to the ERD in AN and BN (Fischer et al. 2008, Brockmeyer et al. 2014, Rowsell et al. 2016). These findings align with previous studies, which also found out that non-acceptance of emotions as a strongly correlated dimension in ON (Obeid et al. 2021). Considering these results, AN, BN, and ON have similar characteristics in the domain of ER difficulties. Perhaps ON is used to cope with complicated feelings, as observed in anorexic and bulimic patients (Wagener et al. 2010).

Regarding our third hypothesis, according to our literature review, we hypothesized that women have more orthorexia tendencies than men since ED is common in women. Because there is no clinically diagnosed sample with orthorexia, the present study compares men and women based on their OrNe score. Contrary to expectations, our study found that men are more orthorexia than women. These results corroborate the ideas first proposed in the literature by Donini (2004a). Other studies came to a similar conclusion (Fidan et al. 2010b, Karakus et al. 2017, Oberle et al. 2017, Stutts 2020). While some studies found more orthorexia tendencies in women, which our study failed to confirm (Arusoğlu et al. 2008, Keller et al. 2013, Koven 2013, Strahler 2021) and most studies found no association between gender and ON , (Aksoydan and Camci 2009, Brytek-Matera 2012, Valera et al. 2014, Bundros et al. 2016, Barnes and Caltabiano 2017, Dunn et al. 2017, Hayes et al. 2017, Livazović and Mudrinić 2017,Oberle et al. 2017, Reynolds 2018b,). This discrepancy could be attributed to several reasons. To better explain this finding, we first interviewed 20 male participants who took part in our study and asked what motivates them to eat healthily. The answers showed differences according to age. It was found that young participants value a healthy diet to look fit, while another group in order not to be exposed to outside services (to be taken care of by others) in old age. Second, since social media use was associated with

higher ON symptoms, (Turner and Lefevre 2017, Gann 2019) social media use could be the reason for high ON symptoms since men use more social media than women (Tuik 2022) in the Turkish population. A final potential explanation could be gender differences in exercise habits, as exercise leads to obsessive healthy eating (Strahler 2021).

Our study is the first study examining the ON and ERD in Turkish sample and study used TOS. Prior studies were conducted with ORTHO-15 which was criticized due to lack of clearly determined cut off score. However, the results of this study must be viewed considering some limitations. The primary limitation was that the study sample was limited to English-speaking participants. Thus, we were not able to reach a large number of participants, as Turkey ranks 69th out of 100 countries in the world in terms of English proficiency ranks at a range of 17% (Doublespeak 2021) Further, because questionnaires were filled out online (Qualtrics) no in person psychiatric examination was made therefore we relied on self-report statements to obtain information about participants psychiatric status and age. Another limitation is that metabolic diseases that require a change in diet, vegan, or vegetarian lifestyle are not included as an exclusion criterion, which may have influenced our results. This work can be a reference for future researchers to consider a larger sample size and use the Turkish language version of these scales to obtain more general results. Further studies can deepen our understanding of the relationship between parenting styles and ON.

Conclusion

ON represents a non-adaptive eating behavior marked by challenges in emotion regulation. This unique condition exhibits intriguing parallels with AN, and given the established link between ERD and parenting styles in AN, there arises a compelling avenue for future research. This exploration could explore into the sophisticated interplay of ERD within the context of ON and its potential association with various parenting styles. Unraveling these dynamics promises to shed light on the multifaceted nature of ON and deepen our understanding of its underpinnings.

References

Aksoydan E, Camci N (2009) Prevalence of orthorexia nervosa among Turkish performance artists. Eat Weight Disord, 14:33–37.

Almeida C, Santos L (2018) Orthorexia nervosa in a sample of Portuguese fitness participants. Eat Weight Disord, 4:443-451.

APA (2013) Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM 5). Washington DC, American Psychiatric Association.

Anastasiades E, Argyrides M (2022) Healthy orthorexia vs orthorexia nervosa Associations with body appreciation, functionality appreciation, intuitive eating and embodiment. Eat Weight Disord, 27:3197–3206.

Artusi R, Verderio P, Marubini E (2002) Bravais-Pearson and Spearman correlation coefficients meaning, test of hypothesis and confidence interval. Int J Biol Markers, 17:148–151.

Arusoğlu G, Kabakçi E, Köksal G, Merdol T K (2008) Orthorexia nervosa and adaptation of ORTO-11 into Turkish. Turk Psikiyatri Derg, 19:283-291.

Barnes M, Caltabiano M (2017a) The interrelationship between orthorexia nervosa, perfectionism, body image and attachment style. Eat Weight Disord 22:177-184.

Barrada R, Roncero M (2018a) Bidimensional structure of the orthorexia Development and initial validation of a new instrument. Anales de Psicología 34:283–291.

Barthels F, Meyer F, Pietrowsky R (2015) Duesseldorf Orthorexia Scale–Construction and evaluation of a questionnaire measuring orthorexic eating behavior. Z Klin Psychol Psychother (Gott), 44:97-105.

Bosi A, Güler C (2007) Prevalence of orthorexia nervosa in resident medical doctors in the faculty of medicine. Appetite, 49:661–666.

Bratman S, Knight D (2000) Health Food Junkies Overcoming the Obsession With Healthful Eating. New York, Broadway.

Brockmeyer T, Holtforth M, Bents H , Kämmerer A, Herzog W, Friederich C (2012a) Starvation and emotion regulation in anorexia nervosa. Compr Psychiatry 53:496-501.

Brockmeyer T, Skunde M, Wu M, Bresslein E, Rudofsky G, HerzogW (2014) Difficulties in emotion regulation across the spectrum of eating disorders. Compr Psychiatry, 55:565-571.

Brytek Matera A (2012a) Orthorexia nervosa an eating disorder, obsessive compulsive disorder or disturbed eating habit. Archives of Psychiatry and Psychotherapy, 14:55–60.

Brytek Matera A, Fonte L, Poggiogalle E, Donini M, Cena H (2017) Orthorexia nervosa: Relationship with obsessive compulsive symptoms disordered eating patterns and body uneasiness among Italian university students. Eat Weight Disord, 22:609-617.

Bundros J, Clifford D, Silliman K, Morris M (2016) Prevalence of Orthorexia nervosa among college students based on Bratman test and associated tendencies. Appetite, 101:86-94.

Coimbra M, Ferreira C (2021) Making the leap from healthy to disordered eating the role of intuitive and inflexible eating attitudes in orthorexic behaviours among women. Eat Weight Disord, 26:1793-1800.

Donini M, Marsili D, Graziani M, Imbriale M, Cannella C (2004a) Orthorexia nervosa: A preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. Eat Weight Disord, 9:151–157.

Dunn T, Bratman S (2016) A review of the literature and proposed diagnostic criteria. Eat Behav, 21:11–17.

Dunn T, Gibbs J, Whitney N, Starosta A (2017). Prevalence of orthorexia nervosa is less than 1%: Data from a US sample. Eat Weight Disord, 22:185-192.

Engel S, Wonderlich A, Crosby D, Mitchell E, Crow S, Peterson C (2013a) The role of affect in the maintenance of anorexia nervosa: Evidence from a naturalistic assessment of momentary behaviors and emotion. J Abnorm Psychol, 122:709-719.

Fairburn C, Cooper Z, Shafran R (2003) Cognitive behaviour therapy for eating disorders Atransdiagnostic theory and treatment. Behav Res Ther, 41:509-528.

Fidan T, Ertekin V, Isilay A, Kırpınar I (2010a) Prevalence of orthorexia among medical students in Erzurum, Turkey. Compr Psychiatry, 51:49-54.

Gann L (2019) Orthorexia nervosa: The role of social media# cleaneating. (Doctoral thesis). Iowa, University of Iowa

Gratz K , Roemer L (2004) Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. Behav Modif, 39:431-453.

Harrison A, Sullivan S, Tchanturia K, Treasure J (2010a) Emotional functioning in eating disorders Attentional bias, emotion recognition and emotion regulation. Psychol Med, 40:1887-1897.

Hawks S, Merrill R, Madanat H (2004) The intuitive eating scale: Development and preliminary validation. Am J Health Educ, 35:90-99.

Hayes O, Wu MS, De Nadai S, Storch A (2017) Orthorexia nervosa: An examination of the prevalence, correlates, and associated impairment in a university sample. J J Cogn Psychother, 31:124-135.

Karakus B, Hidiroglu S, Keskin N, Karavus M (2017) Orthorexia nervosa tendency among students of the department of nutrition and dietetics at a university in Istanbul. North Clin Istanb, 4:117-123.

Keller M, Konradsen H (2013) Ortoreksi blandt unge fitness-medlemmer. Klinisk Sygepleje, 7:63-71.

Koven N,Abry A W (2015) The clinical basis of orthorexia nervosa: Emerging perspectives. Neuropsychiatr Dis Treat, 11:385-394.

Koven N, Senbonmatsu R (2013) A neuropsychological evaluation of orthorexia nervosa. Open Journal of Psychiatry, 3:214-222.

Livazović G, Mudrinić I (2017) Dissatisfaction with physical appearance and behaviors associated with eating disorders in adolescents. Kriminologija Socijalna Integracija, 25:90–109.

Madden C, Leong S, Gray A, Horwath C (2012) Eating in response to hunger and satiety signals is related to BMI in a nationwide sample of 1601 mid-age New Zealand women. Public Health Nutr, 15:2272-2279.

George, D, Mallery, P. (2003) SPSS for Windows Step By Step: A Simple Guide and Reference 11.0 update 4th ed. Boston, Allyn Bacon.

Missbach B, Hinterbuchinger B, Dreiseitl V, Zellhofer S, Kurz C, König J (2015) When eating right, is measured wrong! A validation and critical examination of the ORTO-15 questionnaire in German. PLoS One, 10:e0135772.

Obeid S, Hallit S, Akel M, Brytek Matera A (2021a) Orthorexia nervosa and its association with alexithymia, emotion dysregulation and disordered eating attitudes among Lebanese adults. Eat Weight Disord, 26:2607-2616.

Oberle C, Samaghabadi R, Hughes E (2017) Orthorexia nervosa Assessment and correlates with gender BMI and personality. Appetite, 108:303–310.

Ramacciotti C, Perrone P, Coli E, Burgalassi A, Conversano C, Massimetti G (2018) Is the prevalence of orthorexia nervosa in an Australian university population. Eat Weight Disord, 23:453–458.

Rodgers R, White M, Berry R (2021) Orthorexia nervosa, intuitive eating, and eating competence in female and male college students. Eat Weight Disord, 26:2625-2632.

Roncero M, Barrada J, Perpiñá C (2017) Measuring orthorexia nervosa Psychometric limitations of the ORTO-15. Span J Psychol, 20:20: 41.

Rowsell M, MacDonald D, Carter J (2016) Emotion regulation difficulties in anorexia nervosa: Associations with improvements in eating psychopathology. J Eat Disord, 4:17.

Ruscitti C, Rufino K, Goodwin N, Wagner R (2016b) Difficulties in emotion regulation in patients with eating disorders. Borderline Personal Disord Emot Dysregul, 3:3.

Strahler J (2021) Trait mindfulness differentiates the interest in healthy diet from orthorexia nervosa. Eat Weight Disord, 26:993-998.

Strahler J, Wachten H, Neuhofer S, Zimmermann P (2022) Psychological correlates of excessive healthy and orthorexic eating emotion regulation attachment, and anxious depressive stress symptomatology. Front Nutr, 9:817047.

Stutts L A (2020) It's complicated: The relationship between orthorexia and weight shape concerns eating behaviors and mood. Eat Behav, 39:101444.

Tribole E, Resch E (1995) I ntuitive Eating: A Recovery Book for the Chronic Dieterary New York, Broadway.

Turner P G, Lefevre C (2017) Instagram use is linked to increased symptoms of orthorexia nervosa. Eat Weight Disord, 22:277–284.

TUIK (2022) Hanehalkı Bilişim Teknolojileri Kullanım Araştırması 2022. Anakara, Türkiye İstatistik Kurumu.

Tylka T (2006c) Development and psychometric evaluation of a measure of intuitive eating. J Couns Psychol, 53:226-240.

Tylka L, Kroon Van Diest A (2013) The Intuitive Eating Scale–2: Item refinement and psychometric evaluation with college women and men. J Couns Psychol, 60:137-153.

Valera J, Ruiz P, Valdespino R, Visioli F (2014) Prevalence of orthorexia nervosa among ashtanga yoga practitioners. A pilot studies. Eat Weight Disord, 19:469–472.

Van Dyck Z, Herbert B, Happ C, Kleveman G,Vögele C (2016b) German version of the intuitive eating scale. Psychometric evaluation and application to an eating disordered population. Appetite, 105:798–807.

Vuillier L, Robertson S, Greville-Harris M (2020b) Orthorexic tendencies are linked with difficulties with emotion identification and regulation. J Eat Disord, 8:15.

Wagener A, Much K (2010) Eating disorders as coping mechanisms. J College Stud Psychother, 24:203–212.

Westwood H, Kerr-Gaffney J, Stahl D, Tchanturia K (2017) Alexithymia in eating disorders Systematic review and meta-analyses of studies using the Toronto Alexithymia Scale. J Psychosom Res, 99:66–81.

WHO (2021) International Classification of Diseases, Eleventh Revision (ICD-11) Geneva, World Health Organization.

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