https://doi.org/10.5559/di.34.1.05

BIOLOGICAL, BEHAVIOURAL, PSYCHOLOGICAL AND SOCIAL PREDICTORS OF ORTHOREXIA NERVOSA AMONG YOUNG WOMEN IN CROATIA

Divna BLAŽEV
Zagreb, Croatia

UDK: 613.2-053.67-055.2(497.5)
616.89-008.441.42-053.67-055.2(497.5)
Original scientific paper
Received: July 10, 2024

This study aimed to explore the relationship between orthorexia nervosa and biological, behavioural, psychological, and social factors among young women in Croatia. A sample of 1,337 adolescent girls aged 18-21 participated in this cross-sectional study. Participants completed an online questionnaire assessing orthorexia and related factors. Hierarchical multiple linear regression analysis, including five predictor blocks (biological, behavioural, psychological, social factors, and health-related social media engagement), explained 36% of the variance in orthorexia symptoms. Social factors contributed the most (10.6%), followed by psychological (9.9%) and behavioural factors (8.7%). Significant predictors of more severe symptoms included restrictive dieting, obsessive-compulsive traits, narcissistic perfectionism, body dissatisfaction, internalisation of thin and muscular ideals, media pressures, and higher engagement with health-related social media content. These findings show the need for educational programmes and interventions aimed at early detection and treatment of orthorexia, protecting the mental and physical health of young women.

Keywords: orthorexia, orthorexia nervosa, eating disorder, disordered eating, dieting

✉ Divna Blažev
E-mail: blazev.divna@gmail.com

INTRODUCTION

Orthorexia nervosa, from the Greek "orthos" (correct) and "orexis" (appetite), refers to an obsession with healthy eating. First introduced by Bratman in 1997, it describes individuals fixated on consuming "correct" food. What begins as a health improvement goal can evolve into an obsession, leading to the avoidance of perceived unhealthy foods. Although not officially recognised as a distinct disorder in major diagnostic manuals like the DSM-5 or ICD-11, Donini et al. (2022) proposed preliminary diagnostic criteria. They define orthorexia as an intense focus on "healthy" eating, causing emotional distress and guilt when rules are not followed, potentially leading to both physical and mental health issues. This behaviour may coexist with or develop from other eating disorders, often as a form of control, particularly in individuals with chronic illnesses. Studies show the significant health consequences of orthorexia (Strahler et al., 2018) and its association with atypical beliefs, emotions, and behaviours related to food (Brytek-Matera et al., 2022; Coimbra & Ferreira, 2020).

LITERATURE REVIEW

Orthorexia nervosa and biological factors

Extensive research has explored the link between orthorexia nervosa and biological factors like age, gender, BMI, and parental body weight, considering these as potential predispositions. It is well established in the literature that eating disorders are generally more common in women (Croatian Institute of Public Health, 2018; Donini et al., 2004), particularly adolescent girls and young adult women (American Psychiatric Association, 2014). Studies indicate orthorexia nervosa is similarly most prevalent among women (Keller & Konradsen, 2013; Koven & Senbonmatsu, 2013) and young adults (Almeida et al., 2018; Livazović & Mudrinić, 2017).

The relationship between BMI and orthorexia nervosa has produced mixed results. Some studies suggest a higher BMI is associated with a greater predisposition towards orthorexia nervosa, potentially due to efforts to adopt healthier dietary practices for weight loss (Brytek-Matera et al., 2020; Hyrnik et al., 2016), which can lead to the development of orthorexia nervosa (Oberle et al., 2017). However, other studies have found no significant correlation between BMI and orthorexia nervosa, indicating that orthorexia nervosa may not be directly related to body weight (Ferreira & Coimbra, 2020; Sanlier et al., 2016).

Orthorexia nervosa and behavioural factors

Restrictive dieting, the most extensively studied factor, is widely recognised as a central contributor to the development of eating disorders (Fairburn, 2008; Hilbert et al., 2014; Neumark-

-Sztainer et al., 2010) and specifically to orthorexia nervosa (Hyrnik et al., 2016; Novara et al., 2022; Reynolds, 2018). This is because restrictive diets often heighten individuals' fixation on "healthy" eating, which can be fuelled by the fear of weight gain. Over time, adherence to rigid dietary rules can lead to a preoccupation with food quality and purity, elevating the risk of orthorexia nervosa. As individuals increasingly prioritise these strict dietary principles, their relationship with food may become more obsessive and restrictive, placing them at risk for orthorexia nervosa symptoms such as anxiety around food choices, social isolation, and intense guilt when deviating from self-imposed rules (McComb & Mills, 2019).

Orthorexia nervosa and psychological factors

Psychological factors, such as obsessive-compulsive symptoms, perfectionism, and body dissatisfaction, affect how individuals perceive their eating habits and react to food.

Research shows a strong link between orthorexia nervosa and obsessive-compulsive symptoms, with individuals exhibiting OCD traits often showing more severe orthorexia symptoms (Bartel et al., 2020; Strahler et al., 2018). This connection arises from shared characteristics, such as obsessive thoughts, concerns about food purity, and ritualistic eating behaviours. People with orthorexia feel an overwhelming need to consume only "clean" and "healthy" foods, leading to compulsive food selection practices resembling OCD rituals (Bratman & Knight, 2000; Kinzl et al., 2006). They may become preoccupied with food origin, quality, and fear of contamination, closely scrutinising ingredient lists and labels. This focus on dietary purity can result in ritualistic eating patterns, like adhering to specific preparation methods or meal timing to reduce anxiety. When these dietary standards are not met, it may trigger negative emotional, cognitive, or social impacts, reinforcing compulsive behaviours (Barrada & Meule, 2024). These overlapping traits show the need to explore how OCD behaviours influence orthorexia severity and persistence.

Similarly, orthorexia nervosa is closely linked to perfectionism, particularly maladaptive perfectionism, which involves setting unrealistically high standards and intense fear of failure (Stolz & Ashby, 2007). Individuals with orthorexia often channel these tendencies into extreme control over their diet, focusing on consuming only "pure" and "healthy" foods (Shafran et al., 2002). This leads to obsessive meal planning, strict rules, and anxiety when standards are not met, resulting in symptoms like food-related guilt, social eating avoidance, and rigid dietary practices. Studies show that those with orthorexia are more likely to harshly judge themselves for deviating from their diet, reinforcing cycles of restriction and self-mon-

itoring (Bartel et al., 2020; McComb & Mills, 2019; Oberle et al., 2017). The perfectionistic drive extends beyond health to a desire for dietary "purity", often influencing self-worth and intensifying fears of "unhealthy" foods. These findings indicate the need to better understand perfectionism's role in the development and persistence of orthorexia nervosa, especially as these individuals struggle with the pursuit of an unachievable dietary ideal.

Orthorexia nervosa is often linked to body dissatisfaction, as individuals adopt rigid "clean" eating habits in pursuit of an idealised "healthy" body. This can lead to symptoms like anxiety over "impure" foods and extreme dietary control. When there is a gap between one's actual body and the ideal, body image concerns can intensify (Higgins, 1987; Wonderlich et al., 2010). Studies show a positive association between orthorexia and body dissatisfaction, with restrictive eating often aimed at achieving both a desired body shape and health ideals (Barthels et al., 2021; Pauzé et al., 2021). However, some research suggests that individuals with orthorexia may prioritise health over appearance (Almeida et al., 2018; Plichta et al., 2019). Other studies indicate that food choices in orthorexia are more related to weight control than health (Depa et al., 2019). Given the prevalence of body dissatisfaction, particularly among women, further exploration of its link to orthorexia in young women is important.

The relationship between parents' weight and orthorexia nervosa in children reflects complex behaviours and attitudes surrounding food. The home environment strongly influences children's eating habits, shaping what they eat, how much, and when, from infancy through adolescence (Briefel et al., 2009; Couch et al., 2014). Parental eating habits, especially those of parents with lower or average BMI, are linked to more balanced eating behaviours in children (Williams et al., 2017). When parents practise restrictive or health-focused eating, children may adopt similar patterns, increasing their likelihood of developing restrictive behaviours themselves. Given that parents play a key role in shaping dietary attitudes, their BMI and eating habits are often studied as risk factors for eating disorders, including orthorexia. Due to challenges in directly measuring parental BMI, this study will rely on participants' perceptions of their parents' weight to explore the connection to orthorexia symptoms, acknowledging the subjective nature of this data.

Orthorexia nervosa and social factors

The sociocultural theory, particularly the *Tripartite Model* (Thompson et al., 1999), explains how family, peers, and media shape body image and influence eating behaviours. These social factors provide constant pressure to conform to societal ideals, which individuals may internalise as personal standards. This

internalisation is strongly linked to the development of eating disorders and emerging research suggests a similar association with orthorexia nervosa (Schaefer et al., 2015). In the context of orthorexia, sociocultural pressures promote "health" and "clean eating" as markers of success, expanding beyond thinness to include dietary purity. Family influence is significant, as parents may model or encourage restrictive eating habits, which children may adopt (Bratman & Knight, 2000). Peer influence also plays a role in the development of orthorexia nervosa, especially during adolescence, when social acceptance is crucial, and peers may reinforce restrictive eating behaviours (Menzel et al., 2010). Media representations of ideal bodies and "clean" lifestyles not only contribute to the internalisation of sociocultural standards but also intensify the drive to achieve dietary purity (Alfoukha et al., 2017; Eriksson et al., 2008). Social media, increases these pressures by constantly showcasing images and content centred on healthy lifestyles, thereby reinforcing the notion that restrictive, health-focused eating is both socially endorsed and essential for self-worth (Haddad et al., 2019).

With the rise of the internet and social media, sociocultural pressures have intensified. Social media have become a key source of communication and information (Hausmann et al., 2017). However, constant exposure to healthy eating content can lead to body dissatisfaction and disordered eating patterns (Radovic et al., 2016). This virtual environment encourages orthorexia nervosa as individuals try to replicate the often-idealised lifestyles portrayed on social media, contributing to the development and reinforcement of orthorexia nervosa (Turner & Lefevre, 2017).

PRESENT STUDY

Most research on orthorexia nervosa focuses on individual factors rather than taking a comprehensive approach. In Croatia, studies have explored specific relationships, such as orthorexia nervosa and the Mediterranean diet (Martinovic et al., 2022b), narcissism (Hoven Lorentzen, 2022; Martinovic et al., 2022a), perfectionism, physical activity (Šupraha et al., 2021), BMI, eating habits, and body perception (Rađa et al., 2021). However, research examining these factors together is limited, despite their combined importance in understanding orthorexia nervosa. Given the rising influence of social media, this study also examines how engagement with health-related content on these platforms might contribute to orthorexia nervosa. Understanding the combined predictors of orthorexia nervosa and their relative importance is essential for advancing research in this area.

Since orthorexia nervosa and other eating disorders are more common among women in adolescence and early adult-

hood, this study focused on women aged 18-21. This age group is particularly susceptible to social influences and is forming long-term health behaviours, making it crucial for early identification and understanding of orthorexia nervosa development.

The study aimed to explore the relationship between orthorexia nervosa and key biological, behavioural, psychological, and social factors among young women in Croatia. It had three goals: (1) to identify predictors of orthorexia nervosa among young women, (2) to assess their relative importance, and (3) to examine whether following health-related content on social media predicts orthorexia nervosa alongside other factors.

METHOD

Participants

Out of 2,826 initial respondents, 353 (12.5%) dropped out after opening the survey. Participants were required to confirm two statements: (1) "I confirm I have read and understood the study instructions," and (2) "I confirm I am a female aged 18-21." Six participants declined the first, 38 declined the second, and 13 identified as male, leading to their exclusion. Additionally, 974 (34.5%) provided only demographic information or answered initial items but did not complete the survey, and 105 (3.7%) failed two control questions (e.g., "Select number 2"), resulting in exclusion. After these steps, the final response rate was 47.3%.

The study included a convenience sample of 1,337 late adolescent girls aged 18 to 21 ($Mdn = 20.00$; $IQR = 2.00$) from Croatia. Participants were from various regions: 29.9% ($n = 400$) from the Pannonian region, 26.3% ($n = 353$) from the Adriatic region, 22.7% ($n = 303$) from the Northern region, and 21.1% ($n = 282$) from Zagreb. Most participants had completed a four-year high school education (82.7%, $n = 1,106$), with smaller proportions holding a university undergraduate degree (8.5%, $n = 113$), three-year high school education (5.7%, $n = 76$), or only elementary education (3.1%, $n = 42$).

Measures

The Düsseldorf Orthorexie Scale (DOS, Chard et al., 2018) has 10 self-assessment items measuring *orthorexic eating behaviour*, such as "If I eat something I consider unhealthy, I feel really bad". Responses are on a 4-point Likert scale from "This does not apply to me" (1 point) to "This applies to me" (4 points). The total score ranges from 10 to 40, with higher scores indicating more pronounced orthorexic behaviour. In this study, Cronbach's alpha was 0.87.

Biological factor measures. *Body mass index* (BMI) measures nutritional status and is calculated as weight in kilograms divided by height in meters squared (WHO, 2010). Participants provided their height (cm) and weight (kg) to calculate BMI, with higher scores indicating higher BMI.

Behavioural factor. *Restrictive dieting* was assessed with a yes-or-no question: "Are you currently following a diet with the primary goal of losing weight?"

Psychological factors. The Obsessive-Compulsive Inventory-Revised (OCI-R, Foa et al., 2002) is an 18-item scale used to measure *obsessive-compulsive symptoms*, assessing six areas: washing, checking, ordering, obsessing, hoarding, and neutralising. Participants rated distress on a 5-point Likert scale (0 = "Not at all"; 4 = "Extremely") over the past month. The total score ranges from 0 to 72, with higher scores indicating more symptoms. In the current study, the OCI-R scale's Cronbach's alpha was 0.91.

Perfectionism was measured using the Big Three Perfectionism Scale-Short Form (BTPS-SF, Feher et al., 2020), which assesses three factors: rigid perfectionism ("I have a strong need to be perfect", 4 items), self-critical perfectionism ("I have doubts about everything I do", 6 items), and narcissistic perfectionism ("I am highly critical of other people's imperfections", 6 items). Responses are on a 5-point Likert scale (1 = "Disagree strongly"; 5 = "Agree strongly"). Scores range from 4 to 20 for rigid, 6 to 30 for self-critical and narcissistic perfectionism, with higher scores indicating greater perfectionism. In this study, Cronbach's alpha was 0.85 (rigid), $\alpha = 0.87$ (self-critical), and $\alpha = 0.77$ (narcissistic).

Body dissatisfaction was measured using the Contour Drawing Rating Scale (CDRS; Thompson & Gray, 1995), which presents nine female body figures ranging from the thinnest (1) to the heaviest (9). Participants selected figures that best represented their current and ideal body shapes. The discrepancy between the current and ideal figure selections (current-ideal body figure) served as an index of body dissatisfaction, with larger discrepancies indicating greater dissatisfaction relative to an idealised body image. A discrepancy score of 0 signifies satisfaction with body image, a score between 1 and 4 suggests mild dissatisfaction, and a score of 5 or higher indicates high body dissatisfaction.

Perception of parents' appearance was measured using the Contour Drawing Rating Scale (CDRS; Thompson & Gray, 1995), adapted to assess mother and father separately. The scale features 9 male and 9 female figures, ranked from thinnest (1) to heaviest (9). Participants selected a figure representing their parent's current appearance, with higher scores indicating perception of heavier appearance.

Social factors. *Internalisation of appearance ideals and appearance related pressures* were measured with the Sociocultural Attitudes Towards Appearance Questionnaire 4 (SATAQ-4, Schaefer et al., 2015), which consists of 22 items across five subscales: Internalisation: Thin/Low body fat (5 items); Internalisation: Muscularity/Athletic (5 items); Pressures: Family (4 items); Peers (4 items); Media (4 items). Participants rated agreement on a 5-point Likert scale (1 = "Definitely disagree"; 5 = "Definitely agree"). Higher scores indicate greater internalisation of appearance ideals and perceived pressures. The scale has been previously used in Croatian samples, demonstrating satisfactory psychometric properties across earlier versions (Pokrajac-Bulian et al., 2008; Pokrajac-Bulian & Ambrosi-Randić, 2007; Rukavina & Pokrajac-Bulian, 2006), as well as in the SATAQ-4 version used in this study (Anić, et al., 2022; Blažev, 2023). In the present study, Cronbach's alpha coefficients were 0.88 (whole scale), $\alpha = 0.80$ (Internalisation: Thin/Low body fat), $\alpha = 0.88$ (Internalisation: Muscularity/Athletic), $\alpha = 0.84$ (Pressures: Family), $\alpha = 0.90$ (Pressures: Peers) and $\alpha = 0.94$ (Pressures: Media).

Health-related content engagement on social media was operationalised by the frequency of following fitness, exercise and healthy diet related accounts. It was assessed with three questions: 1) The number of social media platforms participant follow (ranging from 0 to 7), 2) The frequency of engagement with health-related content on these platforms ("I do not follow"; "Less than 15 minutes"; "15-30 minutes"; "30-60 minutes"; "1-2 hours"; "2-3 hours" and "More than 3 hours") and 3) The number of accounts participants follow on these platforms (ranging from 0 to 99). Higher numbers indicate a greater number of social networks, more time spent following, and more accounts following in relation to health-related content.

Procedure

The study was approved by the Ethics Committee of the Department of Psychology of the Faculty of Humanities and Social Sciences at the University of Zagreb and data was collected online in April and May 2021. The survey, using the Limesurvey platform, was shared through Facebook groups, paid ads targeting women aged 18-21, and contacts at secondary schools and universities. Participants were informed about the study's purpose, confidentiality, and voluntary participation. The 30-40 minute questionnaire ensured data privacy, with personal information collected only for a voluntary prize draw. Email addresses were deleted after winners were notified of vouchers worth 33, 20, 13, and 7 euros.

Data analysis

Descriptive statistics were analysed first, followed by testing assumptions for hierarchical regression (Table 1). The Shapiro-Wilk test indicated significant deviations from normality ($p <$

0.001), but these were mild and unlikely to substantially affect the results of the regression models, with skewness (-1 to +1) and kurtosis values below critical thresholds (3 for skewness, 10 for kurtosis), making the results reliable (Kline, 2011).

Factors	*Mdn*	*IQR*	*Min*	*Max*	*TR*	*Skew.*	*Kurt.*	*S-W*
Variables								
Orthorexia nervosa symptoms	19.0	8.0	10.0	38.0	10-40	0.41	-0.07	0.97*
Biological								
Age	20.0	2.0	18.0	21.0	-	-0.36	-1.26	0.83*
Body mass index	21.4	4.1	14.7	43.0	-	1.58	3.72	0.89*
Behavioural								
Restrictive dieting								
No *n* (%)	552 (45.7)							
Yes *n* (%)	657 (54.3)							
Psychological								
Obsessive-compulsive symptoms	21.0	20.0	0.0	68.0	0-72	0.65	-0.07	0.96*
Rigid perfectionism	9.0	5.0	4.0	16.0	4-20	0.22	-0.77	0.96*
Self-critical perfectionism	12.0	8.0	6.0	24.0	6-30	0.41	-0.75	0.95*
Narcissistic perfectionism	7.0	2.0	6.0	24.0	6-30	2.15	5.56	0.71*
Body dissatisfaction	1.0	1.0	0.0	8.0	0-8	1.06	2.24	0.86*
Mother's perceived appearance	7.0	3.0	1.0	9.0	1-9	-0.68	0.16	0.93*
Father's perceived appearance	7.0	2.0	1.0	9.0	1-9	-0.68	0.63	0.93*
Social								
Internalisation: Thin/Low body fat	10.0	6.0	5.0	20.0	5-25	0.44	-0.58	0.96*
Internalisation: Muscularity/Athletic	8.0	6.0	5.0	20.0	5-25	0.82	-0.12	0.90*
Pressures: Family	6.0	4.0	4.0	16.0	4-20	1.48	1.56	0.79*
Pressures: Peers	4.0	3.0	4.0	16.0	4-20	1.54	1.42	0.71*
Pressures: Media	11.0	8.0	4.0	16.0	4.20	-0.08	-1.33	0.90*
Health-related content engagement on social media								
Number of social networks	2.0	2.0	0.0	6.0	-	0.27	-0.43	0.93*
Number of people/pages followed	4.0	4.0	0.0	26.0	-	2.37	6.19	0.73*
Time spent following: None *n* (%)	133 (10.0)							
<15 min *n* (%)	487 (36.5)							
15–30 min *n* (%)	411 (30.8)							
30–60 min *n* (%)	198 (14.8)							
1–2 hours *n* (%)	77 (5.8)							
2–3 hours *n* (%)	20 (1.5)							
>3 hours *n* (%)	10 (0.7)							

TABLE 1
Descriptive statistics of the orthorexia nervosa symptoms, biological, behavioural, psychological, social and health-related content engagement on social media factors (N = 1209)

*$p < 0.05$

Spearman correlations (Table 2) showed low to moderate correlations among variables, with no significant multicollinearity. The highest correlation was between BMI and perceived appearance (r = 0.78), below the critical threshold of 0.80 (Tabachnick & Fidell, 2013). Tolerance values exceeded 0.2, and

➲ TABLE 2
Spearman correlation coefficients – Intercorrelations among the various scales of the biological, behavioural, psychological, social and health-related content engagement on social media factors and orthorexia nervosa symptoms (N = 1209)

	Age	BMI	Mother	Father	Diet	OCS	RPerf	SPerf	NPerf	Diss	Thin	Musc	Fam	Peer	Med	NbSN	Time	Page
Ortho	-0.04	0.21**	0.06*	0.02	0.32**	0.24**	0.28**	0.23**	0.16**	0.27**	0.41**	0.36**	0.22**	0.19**	0.30**	0.26**	0.30**	0.31**
Age		0.00	0.01	-0.01	0.03	-0.13**	-0.09**	-0.03	-0.05*	-0.08**	-0.12**	-0.01	-0.03	-0.09**	-0.03	-0.07*	-0.05	-0.02
BMI			0.22**	0.16**	0.39**	0.02	0.00	0.09**	-0.02	0.51**	0.08**	-0.04	0.32**	0.24**	0.26**	0.06*	0.04	0.08**
Mother				0.17**	0.08**	0.01	0.01	0.06*	0.05	0.18**	0.05	-0.01	0.03	0.10**	0.08**	0.01	-0.02	-0.01
Father					0.10**	0.05	0.04	0.06*	0.02	0.11**	0.05	0.03	0.05	0.08**	0.04	-0.01	0.04	0.01
Diet						0.10**	0.10**	0.12**	0.03	0.30**	0.27**	0.13**	0.19**	0.16**	0.25**	0.12**	0.12**	0.18**
OCS							0.34**	0.45**	0.22**	0.22**	0.32**	0.08**	0.25**	0.23**	0.26**	0.11**	0.08**	0.06*
Rperf								0.54**	0.47**	0.13**	0.43**	0.28**	0.17**	0.22**	0.32**	0.12**	0.11**	0.13**
Sperf									0.32**	0.25**	0.37**	0.15**	0.24**	0.29**	0.37**	0.03	0.02	0.03
Nperf										-0.02	0.20**	0.10**	0.12**	0.13**	0.16**	-0.01	0.01	0.02
Diss											0.30**	-0.04	0.37**	0.34**	0.33**	0.12**	0.06*	0.10**
Thin												0.43**	0.19**	0.26**	0.39**	0.16**	0.15**	0.18**
Musc													0.05	0.08**	0.17**	0.25**	0.31**	0.33**
Fam														0.38**	0.20**	0.09**	0.08**	0.12**
Peer															0.40**	0.10**	0.10**	0.10**
Med																0.15**	0.11**	0.14**
NbSN																	0.56**	0.55**
Time																		0.58**

Note: Ortho – The Düsseldorf Orthorexie Scale; BMI – The body mass index; Mother – Mother's perceived appearance; Father – Father's perceived appearance; Diet – Restrictive dieting; OCS – Obsessive-compulsive symptoms; Rperf – Rigid perfectionism; Sperf – Self-critical perfectionism; Nperf – Narcissistic perfectionism; Diss – Body dissatisfaction; Thin – Internalisation: Thin/Low body; Musc – Internalisation: Muscularity/Athletic; Fam – Pressures: Family; Peer – Pressures: Peers; Med – Pressures: Media; NbSN – The number of social networks used to follow content related to health-related content; Time – The time spent following health-related content on social networks; Page – The number of people or pages followed on social networks for health-related content; $^{*}p < 0.05$; $^{**}p < 0.01$.

VIF values were below 3, confirming the absence of multicollinearity (Kline, 2011; Supplementary Table 1, Appendix).

Hierarchical multiple linear regression (Table 3) was performed using the enter method to explore the relationship between orthorexia nervosa symptoms and five predictor blocks: biological, behavioural, psychological, social, and health-related social media engagement.

RESULTS

Descriptive statistics and assumptions for hierarchical regression analysis

Table 1 shows that participants scored below average on the DOS scale, indicating low orthorexia nervosa symptoms. The average BMI was 21.4, classifying participants as normal weight. Over half (54.3%) reported engaging in restrictive dieting. Among psychological factors, participants exhibited mild obsessive-compulsive symptoms, self-critical and narcissistic perfectionism, and body dissatisfaction. They perceived their parents' weight as normal to slightly above average. For social factors, participants showed mild internalisation of thin- and muscular-ideal standards, with mild sociocultural pressures from family, peers, and media. On social media, participants followed health-related content on two platforms and four accounts on average. Most (67.3%) spent up to 30 minutes daily on such content, while 10.0% did not follow it at all.

Hierarchical multiple linear regression analysis in predicting orthorexia nervosa symptoms among young women

Hierarchical multiple linear regression (Table 3 and Table 4) assessed the relationship between orthorexia nervosa symptoms and five predictor blocks: biological, behavioural, psychological, social, and health-related social media engagement. The model was statistically significant ($p < 0.001$) and explained 36% of the variance in orthorexia nervosa symptoms. Biological factors explained 3.0%, behavioural factors 8.7%, psychological factors 9.9%, social factors 10.6%, and social media engagement 3.8%.

Restrictive dieting ($\beta = 0.16$; $p < 0.001$) significantly predicted orthorexia nervosa symptoms among behavioural factors. For psychological factors, obsessive-compulsive symptoms ($\beta = 0.10$; $p < 0.001$), narcissistic perfectionism ($\beta = 0.06$; $p = 0.027$), and body dissatisfaction ($\beta = 0.12$; $p < 0.001$) were significant predictors of orthorexia nervosa among young women. Among social factors, thin-ideal ($\beta = 0.12$; $p < 0.001$) and muscular-ideal internalisation ($\beta = 0.20$; $p < 0.001$), along with media-related appearance pressure ($\beta = 0.07$; $p = 0.009$), predicted more severe orthorexia nervosa symptoms among young

women. Regarding social media engagement, spending more time following health-related content (β = 0.15; $p < 0.001$) and following more health-related accounts (β = 0.07; $p = 0.016$) were significant predictors of orthorexia nervosa among young women. All other predictors were not significant ($p > 0.05$).

➲ TABLE 3
Hierarchical multiple linear regression: Model summary with five blocks of predictors (N = 1209)

Factors	ΔF	$df1$	$df2$	p	R^2	ΔR^2
Biological	18.6**	2	1206	< 0.001	0.030	0.030
Behavioural	118.0**	1	1205	< 0.001	0.116	0.087
Psychological	21.7**	7	1198	< 0.001	0.216	0.099
Social	37.3**	5	1193	< 0.001	0.322	0.106
Social media	23.5**	3	1190	< 0.001	0.360	0.038

Note: Social media = Health-related content engagement on social media; ** $p < 0.001$

🡻 TABLE 4
Final step of hierarchical multiple linear regression: Independent predictors of orthorexia nervosa (N = 1209)

Factors	Variables	β
Biological	Age	0.01
	BMI	0.04
Behavioural	Restrictive dieting	0.16**
Psychological	Obsessive-compulsive symptoms	0.10**
	Rigid perfectionism	0.03
	Self-critical perfectionism	0.01
	Narcissistic perfectionism	0.06*
	Body dissatisfaction	0.12**
	Mother's perceived appearance	0.02
	Father's perceived appearance	-0.04
Social	Internalisation: Thin/Low body fat	0.12**
	Internalisation: Muscularity/Athletic	0.20**
	Pressures: Family	0.02
	Pressures: Peers	-0.05
	Pressures: Media	0.07*
Health-related content engagement on social media	Number of networks	0.04
	Time spent following	0.15**
	Number of people/pages	0.07*

Note: β = standardised b coefficient; Restrictive dieting (0 = "no"; 1 = "yes"); ** $p < 0.001$; * $p < 0.01$

DISCUSSION

The main aim of the study was to explore the relationship between orthorexia nervosa and most researched biological, behavioural, psychological and social factors among young women in Croatia. Among all tested factors, social factors were the ones that explained the most of orthorexia nervosa variance (10.6%), followed by psychological (9.9%) and behavioural factors (8.7%), while biological factors (3.0%), and health-related content engagement on social media explained the least of orthorexia nervosa variance (3.8%).

This study found that psychological factors such as pronounced obsessive-compulsive symptoms, narcissistic perfectionism, and higher body dissatisfaction predicted more severe orthorexia nervosa symptoms. These findings align with previous research (Bartel et al., 2020; Oberle et al., 2017) and provide a deeper understanding of orthorexia nervosa's underlying factors. Orthorexia nervosa is characterised by an extreme focus on "healthy" and "clean" eating, involving behaviours linked to obsessive-compulsive patterns and perfectionism. These behaviours include meticulous planning, ritualistic meal preparation, eating in a specific order, reflecting intrusive, repetitive thoughts about food and health, characteristic obsessive-compulsive symptoms (Kinzl et al., 2006). Additionally, there is a persistence in rigorous diets and self-imposed dietary rules, with feelings of intense guilt when these standards are not met (Fairburn, 2008), reflecting perfectionism in which high self-imposed standards are followed. Interestingly, only narcissistic perfectionism, where individuals demand perfection from others and feel superior due to dietary discipline, significantly predicts orthorexia nervosa, while rigid or self-critical perfectionism do not, suggesting that perceived dietary superiority is a more important factor.

Furthermore, higher body dissatisfaction (discrepancy between current and ideal body) predicted more severe orthorexia nervosa symptoms. According to self-discrepancy theory (Higgins, 1987), individuals compare their "actual self" (current self-perception) with their "ideal self" (how they wish to be). Discrepancies among them can lead to negative emotions and behaviours aimed at reducing them. In orthorexia nervosa, this results in a strong need to eat only "healthy" and "clean" food to align the "actual self" with the "ideal self," often a thinner, healthier image. The study found that higher body dissatisfaction, rather than actual BMI, predicted orthorexia nervosa symptoms, highlighting the importance of psychological perception over actual weight. This suggests that individuals with higher body dissatisfaction may develop more severe orthorexia nervosa symptoms to control perceived excess weight, regardless of their actual BMI.

Also, this study found that restrictive dieting significantly predicts more severe orthorexia nervosa, aligning with previous research (Novara et al., 2022; Reynolds, 2018). While often adopted to improve body image, restrictive diets rarely lead to long-term weight loss or achieving the desired body ideal (Mann et al., 2007). Instead, dieting can increase body dissatisfaction (Donovan et al., 2014) and contribute to the development (Fairburn, 2008), or maintenance of eating disorders (Hilbert et al., 2014), including orthorexia nervosa.

This study found that internalised desires for thinness and muscularity predicted orthorexia nervosa symptoms, consistent with the Tripartite Model (Thompson et al., 1999). This model suggests that disordered eating behaviours often develop from internalising societal standards around body image and dietary practices. For young women, these sociocultural pressures may not always be consciously recognised; rather, they may internalise societal ideals as personal goals, manifesting in the pursuit of thinness, muscularity, or a "healthy" appearance associated with orthorexia nervosa. Young women may not consciously perceive these sociocultural pressures, but it seems they internalise these pressures as a striving for thinness and muscularity. For instance, young women may perceive the ideal body as not only thin but also fit and healthy, merging ideals of beauty with health in a way that aligns closely with orthorexia nervosa's emphasis on "clean" or restrictive eating. This internalisation reflects the broader influence of societal expectations on self-concept and behaviours, where ideals related to appearance subtly drive attitudes towards eating.

The finding that only perceived media pressures significantly predicted orthorexia nervosa symptoms, while family and peer pressures did not, may reflect several underlying factors specific to young women in this age range. During adolescence and early adulthood, individuals often experience a shift in influence from family to broader social contexts, particularly media. In this phase, media pressures may feel more relevant and compelling than family or peer expectations (Alfoukha et al., 2017). Furthermore, nowadays young adults are typically high consumers of social media (Hausmann et al., 2017), where idealised images of "health" and "wellness" are pervasive (Mete et al., 2019). This intense exposure could mean that media messages about health and body image become more internalised (Goodman, 2011), overshadowing family and peer influences. Moreover, media is often viewed as an "expert" source on health, while health and fitness influencers are often seen as authorities on these topics, potentially overriding the impact of family or peers, who may not hold the same level of perceived expertise on these matters.

The final aim was to determine if health-related content engagement on social media predicts orthorexia nervosa symptoms, in addition to other factors. This study found that more time following such content and engaging with more pages or people promoting it predicts more severe orthorexia nervosa symptoms. This aligns with findings linking social media use to body image concerns and disordered eating (Turner & Lefevre, 2017; Villa et al., 2022). Constant exposure to idealised body types and "clean" eating messages can lead to an obses-

sion with healthy foods, a sign of orthorexia nervosa. Social media algorithms can worsen this by amplifying popular health-related content, repeatedly exposing users to it and deepening unhealthy eating habits. However, the number of social networks followed for health-related content does not predict orthorexia nervosa. Instead, the level of involvement with the content is more significant in predicting orthorexia nervosa symptoms than the number of sources followed.

The cross-sectional design of this study limits causal conclusions about the relationships between predictors and orthorexia nervosa symptoms. Longitudinal studies are needed to advance our understanding. While this design shows potential risk factors or correlations, it cannot determine whether these factors precede, coincide with, or result from orthorexia nervosa symptoms. Another limitation is the use of a convenience sample of young women aged 18 to 21, which restricts the generalisability of the findings. This narrow age range may overlook variations across life stages, as factors influencing orthorexia nervosa can shift with age due to changes in social roles, health, and priorities. Since orthorexia nervosa affects diverse age groups, future research should include a broader age range. For example, orthorexia nervosa in adolescents may be linked to peer influence, while in older adults, it might relate to health concerns or age-related body image issues. The study's exclusive focus on females also limits its ability to explore gender differences in orthorexia nervosa prevalence and predictors. Future research including both men and women could reveal whether social influences or body image concerns affect genders differently.

Reliance on self-reported weight and height to calculate BMI may introduce inaccuracies, as participants often misreport these values. This limits BMI's reliability as a biological indicator, potentially impacting findings, since neither age nor BMI significantly predicted orthorexia nervosa symptoms. The focus on BMI also fails to account for body composition details like body fat or muscle mass, as well as metabolic differences. Future studies should use objective assessments, including body fat, muscle ratios, metabolic markers, and genetic or physiological factors, to better understand the biological basis of orthorexia nervosa symptoms.

It would also be valuable for future research to compare the data between individuals who report following a restrictive diet ($N = 657$) and those who do not ($N = 552$), to better understand its relationship with orthorexia nervosa. Psychological factors such as general anxiety and health-related fears should also be explored, as orthorexia nervosa may relate to anxieties about food health and cleanliness. Future studies should further investigate the social media's role in predicting

orthorexia nervosa symptoms. While this study identifies social media engagement as a predictor, it does not examine the quality of content consumed or specific interactions. Metrics like the number of accounts followed or time spent on social media oversimplify its influence. Research should focus on content types, such as health- versus appearance-focused media, and the role of influencers. Additionally, examining interactions like comments, shares, and likes could provide deeper insights into how engagement patterns contribute to orthorexia nervosa symptoms.

Another limitation of this study is the measurement of orthorexia nervosa symptoms. While the DOS is widely used and validated (e.g., Aloi et al., 2023; Cerolini et al., 2021), some items, such as "I have certain nutrition rules that I adhere to," may misinterpret healthy eating habits as orthorexia nervosa. Future research should consider the TOS scale (Barrada & Roncero, 2018), which distinguishes healthy orthorexia from orthorexia nervosa.

The online format also raises concerns about participant demographics and a high dropout rate, with only 47% completing the questionnaire. This attrition may reflect survey length, complexity, participant fatigue, or reduced engagement in an online setting, potentially introducing bias.

Eligibility criteria (e.g., age, gender, and required confirmations) and control questions excluded many participants, reducing the sample size and potentially introducing bias, as those who completed the survey may differ in traits like conscientiousness or patience. Collecting personal data for a prize raffle may have encouraged socially desirable responses, leading to underreporting of orthorexia nervosa symptoms. Future studies could minimise this bias by ensuring full anonymity or using indirect questioning methods.

This study is, to the best of the author's knowledge, the first to comprehensively examine the relationship between biological, behavioural, psychological, and social factors and orthorexia nervosa in Croatian girls aged 18 to 21. It identifies key predictors, such as obsessive-compulsive tendencies, narcissistic perfectionism, body dissatisfaction, and media pressure, suggesting that orthorexia nervosa shares traits with other obsessive-compulsive disorders and can be understood through a biopsychosocial lens.

Health-related social media engagement emerged as a significant predictor, showing the need for further research on how idealised body and wellness portrayals influence orthorexia nervosa. These findings support targeted interventions, such as incorporating obsessive-compulsive traits, perfectionism, and social media engagement into assessments to identi-

fy at-risk individuals. Psychotherapy addressing body dissatisfaction and digital literacy programmes to counter media pressures may also help. Additionally, school and university health programmes could include modules on the risks of restrictive dieting and media influence to promote healthier relationships with food and body image in young women.

APPENDIX

Supplementary Table 1
Tolerance and variance inflation factors indices of the biological, behavioural, psychological, social and health-related content engagement on social media factors (N = 1209)

Factors	Variables	Tolerance	VIF
Biological	Age	0.95	1.06
	Body mass index	0.56	1.72
Behavioural	Restrictive dieting	0.79	1.27
Psychological	Obsessive-compulsive symptoms	0.71	1.41
	Rigid perfectionism	0.53	1.89
	Self-critical perfectionism	0.52	1.91
	Narcissistic perfectionism	0.75	1.34
	Body dissatisfaction	0.55	1.81
	Mother's perceived appearance	0.93	1.08
	Father's perceived appearance	0.94	1.06
Social	Internalisation: Thin/Low body fat	0.57	1.77
	Internalisation: Muscularity/Athletic	0.68	1.47
	Pressures: Family	0.63	1.58
	Pressures: Peers	0.68	1.48
	Pressures: Media	0.67	1.49
Health-related content engagement on social media	Number of social networks	0.65	1.53
	Time spent following	0.61	1.65
	Number of people/pages followed	0.70	1.42

REFERENCES

Alfoukha, M. M., Hamdan-Mansour, A. M., & Banihani, M. A. (2017). Social and psychological factors related to risk of eating disorders among high school girls. *The Journal of School Nursing, 35*(3), 169–177. https://doi.org/10.1177/1059840517737140

Almeida, C., Vieira Borba, V., & Santos, L. (2018). Orthorexia nervosa in a sample of Portuguese fitness participants. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 23*(4), 443–451. https://doi.org/10.1007/s40519-018-0517-y

Aloi, M., Moniaci, M., Rania, M., Carbone, E. A., Martino, G., Segura-Garcia, C., & Liuzza, M. T. (2023). Relationship between disgust and orthorexia nervosa and psychometric properties of the Italian Düsseldorf orthorexia scale in a general population sample. *Journal of Eating Disorders, 11*(1). https://doi.org/10.1186/s40337-023-00899-5

American Psychiatric Association (APA). (2014). *The Diagnostic and Statistical Manual of Mental Disorders, Fifth edition* (*DSM-5*) (*5th edition*). Naklada Slap.

Anić, P., Pokrajac-Bulian, A., & Mohorić, T. (2022). Role of sociocultural pressures and internalization of appearance ideals in the motivation for exercise. *Psychological Reports, 125*(3), 1628–1647. https://doi.org/10.1177/00332941211000659

Barrada, J. R., & Meule, A. (2024). Orthorexia nervosa: Research based on invalid measures is invalid. *Journal of Global Health, 14*, 03007. https://doi.org/10.7189/jogh.14.03007

Barrada, J. R., & Roncero, M. (2018). Bidimensional structure of the orthorexia: Development and initial validation of a new instrument. *Anales de Psicologia, 34*(2), 283–291. https://doi.org/10.6018/analesps.34.2.299671

Bartel, S. J., Sherry, S. B., Farthing, G. R., & Stewart, S. H. (2020). Classification of orthorexia nervosa: Further evidence for placement within the eating disorders spectrum. *Eating Behaviors, 38,* 101406. https://doi.org/10.1016/j.eatbeh.2020.101406

Barthels, F., Kisser, J., & Pietrowsky, R. (2021). Orthorexic eating behavior and body dissatisfaction in a sample of young females. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 26*(6), 2059–2063. https://doi.org/10.1007/s40519-020-00986-5

Blažev, D. (2023). *Provjera biopsihosocijalnog modela ortoreksije* (*Verification of the biopsychosocial model of orthorexia*) [Doctoral dissertation]. University of Zagreb, Faculty of Humanities and Social Sciences. https://doi.org/10.17234/diss.2023.8734

Bratman, S. (1997). Health food junkie. *Yoga Journal, 136*, 42–50. https://www.beyondveg.com/bratman-s/hfj/hf-junkie-1a.shtml

Bratman, S., & Knight, D. (2000). *Health food junkies: Orthorexia nervosa – Overcoming the obsession with healthful eating*. Broadway.

Briefel, R. R., Wilson, A., & Gleason, P. M. (2009). Consumption of low-nutrient, energy-dense foods and beverages at school, home, and other locations among school lunch participants and nonparticipants. *Journal of the American Dietetic Association, 109*(2), 79–90. https://doi.org/10.1016/j.jada.2008.10.064

Brytek-Matera, A., Plasonja, N., & Décamps, G. (2020). Assessing orthorexia nervosa: Validation of the Polish version of the Eating habits questionnaire in a general population sample. *Nutrients, 12*(12), 3820. https://doi.org/10.3390/nu12123820

Brytek-Matera, A., Pardini, S., Szubert, J., & Novara, C. (2022). Orthorexia nervosa and disordered eating attitudes, self-esteem and physical activity among young adults. *Nutrients, 14*(6), 1289. https://doi.org/10.3390/nu14061289

Cerolini, S., Vacca, M., Zagaria, A., Donini, L. M., Barbaranelli, C., & Lombardo, C. (2021). Italian adaptation of the Düsseldorf orthorexia scale (I-DOS): Psychometric properties and prevalence of orthorexia nervosa among an Italian sample. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 27*(4), 1405–1413. https://doi.org/10.1007/s40519-021-01278-2

Chard, C. A., Hilzendegen, C., Barthels, F., & Stroebele-Benschop, N. (2018). Psychometric evaluation of the English version of the Düsseldorf orthorexie scale (DOS) and the prevalence of orthorexia nervosa among a U.S. student sample. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 24*(2), 275–281. https://doi.org/10.1007/s40519-018-0570-6

Coimbra, M., & Ferreira, C. (2020). Making the leap from healthy to disordered eating: The role of intuitive and inflexible eating attitudes in orthorexic behaviours among women. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 26*(6), 1793–1800. https://doi.org/10.1007/s40519-020-00998-1

Couch, S. C., Glanz, K., Zhou, C., Sallis, J. F., & Saelens, B. E. (2014). Home food environment in relation to children's diet quality and weight status. *Journal of the Academy of Nutrition and Dietetics, 114*(10), 1569–1579. https://doi.org/10.1016/j.jand.2014.05.015

Croatian Institute of Public Health (CIPH). (2018). *Međunarodna klasifikacija bolesti i srodnih zdravstvenih problema* (*International statistical classification of diseases and related health problems*). Medicinska naklada.

Depa, J., Barrada, J. R., & Roncero, M. (2019). Are the motives for food choices different in orthorexia nervosa and healthy orthorexia? *Nutrients, 11*(3), 697. https://doi.org/10.3390/nu11030697

Donini, L. M., Marsili, D., Graziani, M. P., Imbriale, M., & Cannella, C. (2004). Orthorexia nervosa: A preliminary study with a proposal for diagnosis and an attempt to measure the dimension of the phenomenon. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 9*(2), 151–157. https://doi.org/10.1007/bf03325060

Donini, L. M., Barrada, J. R., Barthels, F., Dunn, T. M., Babeau, C., Brytek-Matera, A., Cena, H., Cerolini, S., Cho, H. H., Coimbra, M., Cuzzolaro, M., Ferreira, C., Galfano, V., Grammatikopoulou, M. G., Hallit, S., Håman, L., Hay, P., Jimbo, M., Lasson, C., Lindgren, E. C., … Lombardo, C. (2022). A consensus document on definition and diagnostic criteria for orthorexia nervosa. *Eating and Weight Disorders: EWD, 27*(8), 3695–3711. https://doi.org/10.1007/s40519-022-01512-5

Donovan, C. L., Chew, D., & Penny, R. (2014). Perfecting weight restriction: The moderating influence of body dissatisfaction on the relationship between perfectionism and weight control practices. *Behaviour Change, 31*(3), 189–204. https://doi.org/10.1017/bec.2014.11

Eriksson, L., Baigi, A., Marklund, B., & Lindgren, E. C. (2008). Social physique anxiety and sociocultural attitudes toward appearance impact on orthorexia test in fitness participants. *Scandinavian Journal of Medicine & Science in Sports, 18*(3), 389–394. https://doi.org/10.1111/j.1600-0838.2007.00723.x

Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders* (1st ed.). The Guilford Press.

Feher, A., Smith, M. M., Saklofske, D. H., Plouffe, R. A., Wilson, C. A., & Sherry, S. B. (2020). The Big three perfectionism scale–short form (BTPS-SF): Development of a brief self-report measure of multidimensional perfectionism. *Journal of Psychoeducational Assessment, 38*(1), 073428291987855. https://doi.org/10.1177/0734282919878553

Ferreira, C., & Coimbra, M. (2020). To further understand orthorexia nervosa: DOS validity for the Portuguese population and its relationship with psychological indicators, sex, BMI and dietary pattern. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 26*(7), 2127–2134. https://doi.org/10.1007/s40519-020-01058-4

Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The Obsessive-compulsive inventory: Development and validation of a short version. *Psychological Assessment, 14*(4), 485–496. https://doi.org/10.1037/1040-3590.14.4.485

Goodman, J. R. (2011). Mapping the sea of eating disorders: A structural equation model of how peers, family, and media influence body image and eating disorders. *Visual Communication Quarterly, 12*(3–4), 194–213. https://doi.org/10.1080/15551393.2005.9687457

Haddad, C., Obeid, S., Akel, M., Honein, K., Akiki, M., Azar, J., & Hallit, S. (2019). Correlates of orthorexia nervosa among a representative sample of the Lebanese population. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 24*(3), 481–493. https://doi.org/10.1007/s40519-018-0631-x

Hausmann, J. S., Touloumtzis, C., White, M. T., Colbert, J. A., & Gooding, H. C. (2017). Adolescent and young adult use of social media for health and its implications. *Journal of Adolescent Health, 60*(6), 714–719. https://doi.org/10.1016/j.jadohealth.2016.12.025

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*(3), 319–340. https://doi.org/10.1037/0033-295X.94.3.319

Hilbert, A., Pike, K. M., Goldschmidt, A. B., Wilfley, D. E., Fairburn, C. G., Dohm, F. A., Walsh, B. T., & Striegel Weissman, R. (2014). Risk factors across the eating disorders. *Psychiatry Research, 220*(1–2), 500–506. https://doi.org/10.1016/j.psychres.2014.05.054

Hoven Lorentzen, B. (2022). *Orthorexia nervosa and its association with narcissism in professional athletes.* [Published master's thesis]. School of medicine, University of Split. https://repozitorij.mefst.unist.hr/islandora/ object/mefst:1469

Hyrnik, J., Janas-Kozik, M., Stochel, M., Jelonek, I., Siwiec, A., & Rybakowski, J. K. (2016). The assessment of orthorexia nervosa among 1899 Polish adolescents using the ORTO-15 questionnaire. *International Journal of Psychiatry in Clinical Practice, 20*(3), 199–203. https://doi.org/10.1080/13651501.2016.1197271

Keller, M. F., & Konradsen, H. (2013). Ortoreksi blandt unge fitness--medlemmer. *Klin Sygepleje, 27*(4), 63-71. https://doi.org/10.18261/ISSN 1903-2285-2013-04-06

Kinzl, J. F., Hauer, K., Traweger, C., & Kiefer, I. (2006). Orthorexia nervosa in dieticians. *Psychotherapy and Psychosomatics, 75*(6), 395–396. https://doi.org/10.1159/000095447

Kline, R. B. (2011). *Principles and practice of structural equation modelling* (5th ed.). The Guildford Press.

Koven, N. S., & Senbonmatsu, R. (2013). A neuropsychological evaluation of orthorexia nervosa. *Open Journal of Psychiatry, 3*, 214–222. https://doi.org/10.4236/ojpsych.2013.32019

Livazović, G., & Mudrinić, I. (2017). Nezadovoljstvo tjelesnim izgledom i ponašanja povezana s poremećajima u prehrani adolescenata (Dissatisfaction with physical appearance and behaviors associated with eating disorders in adolescents). *Kriminologija & socijalna integracija, 25*(1), 71–89. https://doi.org/10.31299/ksi.25.1.3

Mann, T., Tomiyama, A. J., Westling, E., Lew, A.-M., Samuels, B., & Chatman, J. (2007). Medicare's search for effective obesity treatments: Diets are not the answer. *American Psychologist, 62*(3), 220–233. https://doi.org/10.1037/0003-066x.62.3.220

Martinovic, D., Tokic, D., Martinovic, L., Rakusic, M., Kumric, M., Rusic, D., Vilovic, M., Vrdoljak, J., Ticinovic Kurir, T., & Bozic, J. (2022a). Orthorexia nervosa and its association with narcissism in fitness center users. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 27*(6), 2155–2163. https://doi.org/10.1007/s40519-022-01368-9

Martinovic, D., Tokic, D., Martinovic, L., Vilovic, M., Vrdoljak, J., Kumric, M., Bukic, J., Ticinovic Kurir, T., Tavra, M., & Bozic, J. (2022b). Adherence to Mediterranean diet and tendency to orthorexia nervosa in professional athletes. *Nutrients, 14*(2), 237. https://doi.org/10.3390/nu14020237

McComb, S. E., & Mills, J. S. (2019). Orthorexia nervosa: A review of psychosocial risk factors. *Appetite, 140,* 50–75. https://doi.org/10.1016/j.appet.2019.05.005

Menzel, J. E., Schaefer, L. M., Burke, N. L., Mayhew, L. L., Brannick, M. T., & Thompson, J. K. (2010). Appearance-related teasing, body dissatisfaction, and disordered eating: A meta-analysis. *Body Image, 7*(4), 261–270. https://doi.org/10.1016/j.bodyim.2010.05.004

Mete, R., Shield, A., Murray, K., Bacon, R., & Kellett, J. (2019). What is healthy eating? A qualitative exploration. *Public Health Nutrition, 22*(13), 2408–2418. https://doi.org/10.1017/s1368980019001046

Neumark-Sztainer, D., Bauer, K. W., Friend, S., Hannan, P. J., Story, M., & Berge, J. M. (2010). Family weight talk and dieting: How much do they matter for body dissatisfaction and disordered eating behaviors in adolescent girls? *Journal of Adolescent Health, 47*(3), 270–276. https://doi.org/10.1016/j.jadohealth.2010.02.001

Novara, C., Pardini, S., Visioli, F., & Meda, N. (2022). Orthorexia nervosa and dieting in a non-clinical sample: A prospective study. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 27*(6), 2081–2093. https://doi.org/10.1007/s40519-021-01353-8

Oberle, C. D., Samaghabadi, R. O., & Hughes, E. M. (2017). Orthorexia nervosa: Assessment and correlates with gender, BMI, and personality. *Appetite, 108,* 303–310. https://doi.org/10.1016/j.appet.2016.10.021

Pauzé, A., Plouffe-Demers, M.-P., Fiset, D., Saint-Amour, D., Cyr, C., & Blais, C. (2021). The relationship between orthorexia nervosa symptomatology and body image attitudes and distortion. *Scientific Reports, 11*(1), 13311. https://doi.org/10.1038/s41598-021-92569-2

Plichta, M., Jezewska-Zychowicz, M., & Gębski, J. (2019). Orthorexic tendency in Polish students: Exploring association with dietary patterns, body satisfaction and weight. *Nutrients, 11*(1), 100. https://doi.org/10.3390/nu11010100

Pokrajac-Bulian, A., & Ambrosi-Randić, N. (2007). Sociocultural attitudes towards appearance and body dissatisfaction among adolescent girls in Croatia. *Eating and Weight Disorders, 12*(4), 86–-91. https://doi.org/10.1007/BF03327601

Pokrajac-Bulian, A., Ambrosi-Randić, N., & Kukić, M. (2008). Thin-ideal internalization and comparison process as mediators of social influence and psychological functioning in the development of disturbed eating habits in Croatian college females. *Psihologijske teme, 17*(2), 221–245.

Radovic, A., Gmelin, T., Stein, B. D., & Miller, E. (2016). Depressed adolescents' positive and negative use of social media. *Journal of Adolescence, 55*(1), 5–15. https://doi.org/10.1016/j.adolescence.2016.12.002

Rađa, K. (2021). Tjelesna percepcija i učestalost ortoreksije u mladih osoba (Body image and the prevalence of orthorexia nervosa in young people) [Published undergraduate thesis]. Faculty of food technology and biotechnology, University of Zagreb. https://repozitorij.pbf.unizg.hr/islandora/object/pbf:4003/datastream/PDF/

Reynolds, R. (2018). Is the prevalence of orthorexia nervosa in an Australian university population 6.5%? *Eating and Weight Disorders, 23*, 453–458. https://doi.org/10.1007/s40519-018-0535-9.

Rukavina, T., & Pokrajac-Bulian, A. (2006). Thin-ideal internalization, body dissatisfaction and symptoms of eating disorders in Croatian adolescent girls. *Eating and Weight Disorders, 11*(1), 31–37. https://doi.org/10.1007/BF03327741

Sanlier, N., Yassibas, E., Bilici, S., Sahin, G., & Celik, B. (2016). Does the rise in eating disorders lead to increasing risk of orthorexia nervosa? Correlations with gender, education, and body mass index. *Ecology of Food and Nutrition, 55*(3), 266–278. https://doi.org/10.1080/03670244.2016.1150276

Schaefer, L. M., Burke, N. L., Thompson, J. K., Dedrick, R. F., Heinberg, L. J., Calogero, R. M., Bardone-Cone, A. M., Higgins, M. K., Frederick, D. A., Kelly, M., Anderson, D. A., Schaumberg, K., Nerini, A., Stefanile, C., Dittmar, H., Clark, E., Adams, Z., Macwana, S., Klump, K. L., . . . Swami, V. (2015). Development and validation of the Sociocultural attitudes towards appearance questionnaire-4 (SATAQ-4). *Psychological Assessment, 27*(1), 54–67. https://doi.org/10.1037/a0037917

Shafran, R., Cooper, Z., & Fairburn, C. G. (2002). Clinical perfectionism: A cognitive-behavioural analysis. *Behaviour Research and Therapy, 40*(7), 773–791. https://doi.org/10.1016/s0005-7967(01)00059-6

Stolz, K., & Ashby, J. S. (2007). Perfectionism and lifestyle: Personality differences among adaptive perfectionists, maladaptive perfectionists, and nonperfectionists. *The Journal of Individual Psychology, 63*, 414–423.

Strahler, J., Hermann, A., Walter, B., & Stark, R. (2018). Orthorexia nervosa: A behavioral complex or a psychological condition? *Journal of Behavioral Addictions, 7*(4), 1143–1156. https://doi.org/10.1556/2006.7.2018.129

Šupraha, A.-M., Kovačić, D., Komar, L., Mateša, P., & Glavaš, D. (2021). The mediation role of physical activity in the relationship of perfectionism with healthy orthorexia and orthorexia nervosa. *Croris.hr*, 74–74. https://croris.hr/crosbi/publikacija/prilog-skup/727182

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Pearson.

Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantlef-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. American Psychological Association. https://doi.org/10.1037/10312000

Thompson, M. A., & Gray, J. J. (1995). Contour drawing rating scale. *Exacting beauty: Theory, assessment, and treatment of body image disturbance*, 76. https://doi.org/10.1037/t08507-000

Turner, P. G., & Lefevre, C. E. (2017). Instagram use is linked to increased symptoms of orthorexia nervosa. *Eating and Weight Disorders – Studies on Anorexia, Bulimia and Obesity, 22*(2), 277–284. https://doi.org/10.1007/s40519-017-0364-2

Villa, M., Opawsky, N., Manriquez, S., Ananías, N., Vergara-Barra, P., & Leonario-Rodriguez, M. (2022). Orthorexia nervosa risk and associated factors among Chilean nutrition students: A pilot study. *Journal of Eating Disorders, 10*(1). https://doi.org/10.1186/s40337-022-00529-6

Williams, J. E., Helsel, B., Griffin, S. F., & Liang, J. (2017). Associations between parental BMI and the family nutrition and physical activity environment in a community sample. *Journal of Community Health, 42*(6), 1233–1239. https://doi.org/10.1007/s10900-017-0375-y

Wonderlich, S. A., Peterson, C. B., Smith, T. L., Klein, M., Mitchell, J. E., Crow, S. J., & Engel S. G. (2010). Integrative cognitive-affective therapy for bulimia nervosa. In C. M. Grillo & J. E. Mitchell (Eds.), *The treatment of eating disorders: A clinical handbook* (pp. 317–338). Guilford Press.

World Health Organisation (WHO). (2010, May 6th). *A healthy lifestyle – WHO recommendations*. https://www.who.int/europe/news-room/fact-sheets/item/a-healthy-lifestyle---who-recommendations

Biološki, ponašajni, psihološki i socijalni prediktori ortoreksije nervoze kod mladih žena u Hrvatskoj

Divna BLAŽEV
Zagreb, Hrvatska

Cilj ovog istraživanja bio je ispitati odnos između ortoreksije nervoze i bioloških, ponašajnih, psiholoških i socijalnih čimbenika kod mladih žena u Hrvatskoj. Istraživanje je obuhvatilo 1337 žena od 18 do 21 godine, koje su ispunile online upitnik o ortoreksiji i povezanim čimbenicima. Hijerarhijska višestruka regresijska analiza sa pet blokova prediktora (biološki, ponašajni, psihološki i socijalni čimbenici, kao i praćenje sadržaja vezanog uz zdravlje na društvenim mrežama), objasnila je 36 % varijance u simptomima ortoreksije. Socijalni čimbenici objasnili su najveći dio varijance (10,6 %), zatim psihološki (9,9 %) i ponašajni čimbenici (8,7 %). Značajni prediktori izraženijih

simptoma bili su provođenje restriktivne dijete, opsesivno-kompulzivni simptomi, narcistični perfekcionizam, nezadovoljstvo tijelom, internalizirani ideal mršavosti i mišićavosti, medijski pritisci i praćenje sadržaja povezanih sa zdravljem na društvenim mrežama. Rezultati istraživanja mogli bi pomoći u razvoju obrazovnih programa i intervencija usmjerenih na rano otkrivanje i liječenje ortoreksije, čime bi se zaštitilo mentalno i tjelesno zdravlje mladih žena.

Ključne riječi: ortoreksija, ortoreksija nervoza, poremećaji hranjenja, poremećaji u prehrani, provođenje dijete