



Original research article

Comparison of orthorexic tendencies among students in health-related and non-health-related fields of study in Slovenia

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Abstract

Future health professional students are constantly exposed to health advice, instructions, and recommendations, which may be associated with greater preoccupation with health-related topics beyond normal concern. In recent decades, an obsession with what is healthy, including healthy eating, has become increasingly evident. The aim of this study was to examine orthorexic tendencies among future health professional students and non-health-related students in Slovenia. The sample included 454 students who anonymously completed the ORTO-15 questionnaire and provided selected demographic data. Future health professional students had significantly lower ORTO-15 scores than non-health-related students, indicating stronger orthorexic tendencies ($p < 0.001$). Among future health professionals, stronger orthorexic tendencies were observed in men, older students, and students with higher BMI, although in the regression analysis only study programme and gender remained significant predictors. These findings suggest that orthorexic tendencies may be more pronounced in health-related students and may be shaped by both study context and individual characteristics. The results highlight the need for health-related education to promote a balanced approach to healthy eating and to avoid reinforcing overly restrictive dietary attitudes.

Keywords: Health professions students; Orthorexia nervosa; Orthorexic tendencies; ORTO-15; Students

Introduction

In recent decades, the social emphasis on health and a healthy lifestyle has become not only a desire but almost an imperative. Awareness of health-related diseases and food contamination by environmental toxins has increased in recent years, and interest in ecological and healthy food is also rising (Vos et al., 2017). A healthy lifestyle and balanced diet are desirable, but an excessive focus on healthy eating can become pathological, as in orthorexia nervosa (Dell'Osso et al., 2016). This obsession is driven by the desire to optimise one's health and well-being (Bratman and Knight, 2000).

Orthorexia nervosa emerged at the end of the 20th and the beginning of the 21st century, when increasing social emphasis on health, well-being, and nutrition came to the fore (Bratman, 2017). The name for this relatively new eating disorder derives from Greek, where *orthos* means correct and *orexia* means appetite (Costa et al., 2017; Dell'Osso et al., 2016). It is characterised by an extreme focus on food quality, preparation, and strict dietary standards (Bratman and Knight, 2001;

Dell'Osso et al., 2016; Dittfeld et al., 2013). Individuals with orthorexia nervosa are concerned not with the quantity of food, but with its quality (Koven and Abry, 2015). The condition often begins as an attempt to maintain health or prevent disease and may escalate into rigid dietary restrictions and the exclusion of entire food groups (Bratman and Knight, 2001; Donini et al., 2022). Such restrictions can, over time, begin to control an individual's life and may lead to malnutrition, reduced quality of life, and other health consequences (Dunn and Bratman, 2016; Koven and Abry, 2015).

The reported prevalence of orthorexia nervosa varies widely across studies. This is partly because there is still no standardised diagnostic tool and because findings differ depending on the study population, assessment tools, questionnaire cut-off values, and sociocultural context (Budhiwianto et al., 2023; Carpita et al., 2024; López-Gil et al., 2023; McInerney et al., 2024; Niedzielski and Kaźmierczak-Wojtaś, 2021). Nevertheless, some groups appear to be more vulnerable than others. In particular, orthorexia nervosa has been found more frequently among individuals who study or work in health-related professions than in other fields (McInerney et al., 2024). It appears

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to be especially common among health-related students who are more exposed to topics related to nutrition, disease prevention, health, and personal responsibility for health (Gramatikopoulou et al., 2018; Korinth et al., 2010; McNerney et al., 2024). Such a strong focus on a healthy lifestyle can be adaptive, but in some individuals it may develop into excessive rigidity and a pathological focus on clean or proper eating.

The prevalence of orthorexia nervosa among health professionals and students in health-related fields varies widely, with reported rates ranging from 3.3% to 80% (Depa et al., 2017; Freire et al., 2020). Some studies suggest that orthorexic tendencies are particularly pronounced in medicine, nursing, and nutrition-related fields (Acar Tek and Karaçil Ermumcu, 2016; Fidan et al., 2010; Tremelling et al., 2017). It has also been suggested that, compared to their peers, students of health-related subjects display more pronounced patterns of focus on health and eating before they even begin their studies, and that their knowledge about health may further maintain and strengthen existing concerns and fixations with food (Korinth et al., 2010). Erol and Özer (2019) also found that physicians who obtained information from nutrition professionals had a significantly higher rate of eating disorders, supporting the hypothesis that nutritional knowledge may contribute to the development of orthorexia nervosa.

Recent studies have found that the concept of healthy eating obsession or orthorexia-like tendencies varies according to demographic characteristics, particularly age, gender, level of education, and sociocultural factors (Donini et al., 2022). However, findings remain inconsistent. Some studies report no statistically significant role of gender or BMI, whereas others suggest differences depending on the population studied and the measure used (Brytek-Matera et al., 2015; Karakus et al., 2017; Plichta and Jezewska-Zychowicz, 2019; Strahler, 2019; Yilmaz, 2023). Therefore, this study predicts that obsession with healthy eating will differ based on these variables.

More specifically, the aim of this study was to examine the prevalence of orthorexic tendencies among future health professional students and students in non-health-related programmes in Slovenia. The main objective was to explore the extent of the obsession with healthy eating in both groups, and to assess differences by gender, age, BMI, and type of study programme. The research question was whether students of health professions exhibit more pronounced orthorexic tendencies than other students, and whether this association persists after accounting for gender, age, and BMI.

Materials and methods

Study design

This study used a quantitative, descriptive, cross-sectional design. Data were collected through an online survey between March and December 2025.

Study participants

The survey targeted students from two universities in Slovenia, including one health care faculty and one medical faculty. Prior to data collection, the required sample size was estimated using G*Power 3.1.9.7 based on previous studies, including Awad et al. (2021), and on an estimated orthorexia nervosa prevalence of 45% among health professional students (Arslantaş et al., 2017). With a 95% confidence level and a 5% margin of error, the minimum required sample size was 336 participants. The final sample of 454 students exceeded this requirement.

The study included 454 undergraduate students aged 19–24 years ($M = 20.72$, $SD = 2.48$), of whom 79.1% were women and 20.9% were men. Of these, 178 (40.0%) were enrolled in health-related programmes (nursing and medicine), and 276 (60.0%) in non-health-related programmes. Participation was voluntary and limited to students aged 19–24 years who provided informed consent.

Socio-demographic information

Participants were asked to indicate their field of study, age, and gender.

Orthorexia behaviours, tendencies, and obsession with healthy eating

Orthorexic tendencies were measured using ORTO-15 (Donini et al., 2022), a self-report questionnaire that assesses orthorexia nervosa. The questionnaire includes 15 items addressing the selection, preparation, consumption, effects of, and attitudes towards presumed healthy foods. Participants rated their responses on a 4-point Likert scale (1 = always, 2 = often, 3 = sometimes, 4 = never). The total score ranges from 15 to a maximum of 60 points. In line with previous studies, a cut-off point of 40 was used only for descriptive and categorical analyses of elevated orthorexic tendencies. This threshold was not used to establish a diagnosis of orthorexia nervosa. Participants with an ORTO-15 score below 40 were considered to have an orthorexic tendency, while those with a score of 40 or above were evaluated as not having an orthorexic tendency.

Body mass index

BMI was determined using self-reported height and weight. It was calculated with the standard formula: weight (kg)/height (m^2) (Alvarenga et al., 2012).

Data collection

Data were collected through an anonymous online survey administered via EnKlikAnketa (1KA). The questionnaire was distributed to undergraduate students through the student information system during the second semester of the 2024/2025 academic year and the first semester of the 2025/2026 academic year. Participation was voluntary, and electronic informed consent was obtained before survey completion. No personal identifiers were collected, and access to the dataset was restricted to the lead researcher.

Data analysis

ORTO-15 scores were analysed as a continuous variable, with lower scores indicating stronger orthorexic tendencies. The primary analyses were based on continuous ORTO-15 scores, while the cut-off score was used only for descriptive categorical comparisons. For categorical analyses, participants were classified as ON score <40 or ON score ≥ 40 . BMI was grouped according to World Health Organization criteria as underweight (<18.50 kg/ m^2), normal weight (18.50–24.99 kg/ m^2), and overweight (≥ 25.00 kg/ m^2). Data were analysed using IBM SPSS Statistics 29. Descriptive statistics included frequencies, means, medians, and standard deviations. Group differences were examined using the chi-square test, Mann–Whitney U test, and Kruskal–Wallis H test. Multiple linear regression was used for multivariable analysis, and model assumptions were evaluated using residual diagnostics. A p -value < 0.05 was considered statistically significant.

Ethical considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Commission of the Uni-

versity of Primorska for Ethics in Human Subjects Research (No. 4264-19-6/23). Participation was voluntary and based on electronic informed consent.

Results

Participants' BMI ranged from 15 to 31.97 kg/m², with a mean of 23.32 kg/m² (SD = 8.05). Most participants (74.0%) were

classified as normal weight, 9.5% as underweight, and 16.5% as overweight (Table 1). The mean ORTO-15 score was 52.96 (SD = 8.5). Using the conventional cut-off score of 40, 13.5% of participants scored below the threshold, suggesting elevated orthorexic tendencies. This proportion should not be interpreted as a clinical prevalence estimate. As lower ORTO-15 scores indicate greater orthorexic tendency, these were interpreted as reflecting stronger orthorexic tendencies.

Table 1. Sample characteristics by study group

Characteristics	Total sample (<i>n</i> = 454)	Future health professionals (<i>n</i> = 178, 39.2%)	Non-health students (<i>n</i> = 276, 60.80%)	Test	<i>p</i> -value
Gender					
Male (<i>n</i> , %)	95 (20.9)	28 (15.7)	67 (24.3)	$\chi^2 = 4.765$	0.03
Female (<i>n</i> , %)	359 (79.1)	150 (84.3)	209 (75.7)		
Age, M (SD)	20.72 (2.48)	20.69 (1.3)	21.04 (1.5)	$U = 27216.5$	0.05
≤21 years (<i>n</i> , %)	305 (67.2)	126 (70.8)	179 (64.9)		
≥22 years (<i>n</i> , %)	149 (32.8)	52 (29.2)	97 (35.1)		
BMI, M (SD)	23.32 (8.05)	22.9 (4.6)	23.56 (9.5)	$H = 19179.5$	0.05
Underweight (<i>n</i> , %)	43 (9.5)	16 (9.0)	27 (9.8)		
Normal (<i>n</i> , %)	336 (74.0)	129 (72.5)	207 (75.0)		
Overweight (<i>n</i> , %)	75 (16.5)	33 (18.5)	42 (15.2)		

Note: χ^2 – Chi-squared test; U – Mann–Whitney U tests; H – Kruskal–Wallis H test

Future health professionals had a lower mean ORTO-15 score than non-health students (48.42, SD = 10.6 vs. 55.90, SD = 5.2). This difference was statistically significant

($U = 15,260.5$, $Z = -6.825$, $p < 0.001$), indicating stronger orthorexic tendencies among future health professionals (Table 2).

Table 2. Differences in ORTO-15 scores by sex, age, and BMI within the study groups

ORTO-15	Future health professionals (<i>n</i> = 178)				Non-health students (<i>n</i> = 276)			
	<i>n</i>	MR	Test	<i>p</i>	<i>n</i>	MR	Test	<i>p</i>
Gender								
Male	28	71.1	$U = 1585.5$	0.04	67	124.6	$U = 6073$	0.102
Female	150	92.9			209	142.9		
Age								
≤21 years	126	98.1	$U = 2189.0$	<0.001	179	134.9	$U = 8033.5$	0.305
≥22 years	52	68.6			97	145.2		
BMI								
Underweight	16	127.0	$H = 11.67$	0.003	28	117.8	$H = 3.132$	0.209
Normal weight	129	88.9			206	143.2		
Overweight	33	73.5			42	129.4		

Note: MR – mean rank; U – Mann–Whitney U tests; H – Kruskal–Wallis H test

Among future health professionals, males had lower ORTO-15 scores than females, and students aged 22 years or older had lower scores than those aged 21 years or younger. The distribution of ORTO-15 scores by sex in both study groups is shown in Chart 1. ORTO-15 scores also varied across BMI categories, with the lowest scores observed in the overweight group. In contrast, no statistically significant differences in ORTO-15 scores by sex, age, or BMI were found among non-health students. In the categorical analysis (Table 3), higher orthorexic tendency was more frequent among older future health professionals, whereas the gender difference did not reach statistical significance.

A multiple linear regression was conducted to examine whether study programme, gender, age, and BMI predicted ORTO-15 scores (Table 4). The overall model was statistically significant, $F(4, 449) = 33.51$, $p < 0.001$, and explained 23% of the variance in ORTO-15 scores (adjusted $R^2 = 0.22$). Study programme and gender were significant predictors, whereas age and BMI were not. Specifically, non-health students and females had higher ORTO-15 scores, indicating weaker orthorexic tendencies compared with future health professionals and males.

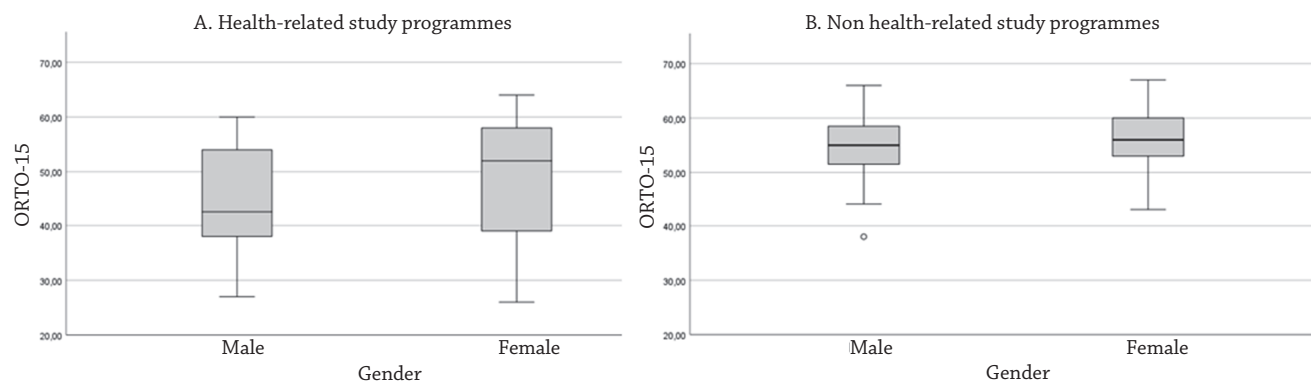


Chart 1. Orthorexic tendencies by sex among future health professionals and non-health students

Table 3. Orthorexic tendency according to some characteristics of the participants

	Future health professionals (<i>n</i> = 178)					Non-health students (<i>n</i> = 276)				
	<i>n</i>	High ON tendency	Low ON tendency	Test*	<i>p</i>	<i>n</i>	High ON tendency	Low ON tendency	Test*	<i>p</i>
Gender										
Male	28	13 (46.4)	15 (53.6)	2.4	0.093	67	1 (1.5)	66 (98.5)	3.1	0.243
Female	150	47 (31.3)	103 (68.7)			209	0 (0.0)	209 (100.0)		
Age										
≤21 years	126	31 (24.6)	95 (75.4)	16.0	<0.001	179	1 (0.6)	178 (99.4)	0.5	0.649
≥22 years	52	29 (55.8)	23 (44.2)			97	0 (0.0)	97 (100.0)		
BMI										
Underweight	16	1 (6.7)	15 (93.3)	6.62	0.026	28	0 (0.0)	27 (100.0)	/	/
Normal weight	129	45 (34.9)	84 (65.1)			206	0 (0.0)	206 (100.0)		
Overweight	33	14 (33.7)	19 (66.3)			42	1 (2.4)	41 (97.6)		

Note: ON – orthorexia nervosa; * Chi-squared test

Table 4. Multiple linear regression predicting orthorexic tendencies

Dependent variable Orthorexic tendencies	B	S.E.	β	<i>t</i>	<i>p</i> -value	<i>R</i>	<i>R</i> ²
Constant	32.35	5.57		5.8	<0.001		
Study programme	8.69	0.77	0.481	11.27	<0.001		
Gender	2.37	0.90	0.112	2.62	0.009	0.488	0.238
Age (year)	0.04	0.25	0.006	0.14	0.887		
BMI (kg/m ²)	0.053	0.05	0.049	1.16	0.247		

Note: *N* = 454, *R*² = 0.488, adjusted *R*² = 0.238, *F*(4, 449) = 33.42, *p* < 0.001. Study programme was coded 2 – non-health-related, 1 – health-related. Gender was coded 1 – male, 2 – female. Lower ORTO-15 scores indicate greater orthorexic tendency.

Discussion

The aim of the present study was to examine the prevalence of orthorexic tendencies among future health professional students and students in non-health-related studies in Slovenia, and to assess differences in terms of gender, age, BMI, and type of study programme. The main finding was that future health professional students showed stronger orthorexic tendencies than non-health-related students. This is consistent with the literature, which shows that orthorexic tendencies are often higher in individuals who study or work in health-related fields (McInerney et al., 2024). A possible explanation is that health-related students are more focused on health and

exposed to messages about healthy eating, body care, and personal responsibility for health, which may contribute to greater concern about food quality. In addition, some studies have reported a link between studying in health-related fields and a greater tendency towards orthorexic behaviour (Asil and Sürücüoğlu, 2015; Batıgün and Utku, 2006; Plichta and Jezewska-Zychowicz, 2019; Yilmaz, 2023). Future health professional students, including those studying medicine and nursing, are undoubtedly more exposed to topics related to health, disease prevention, nutrition, and personal responsibility for health, and healthy eating may be a more central part of their identity. Such a strong focus on a healthy lifestyle can be adaptive, but in some individuals, it may develop into excessive rigidity, strict dietary rules, and a pathological focus on “clean”

or “proper” eating. Another possible explanation is that these students may have higher levels of perfectionism. Previous research has consistently linked orthorexia nervosa with perfectionism, particularly with setting very high personal standards and being excessively concerned about making mistakes (Pratt et al., 2024). This explanation is particularly relevant for medical and nursing students, where high performance, self-control, and adherence to norms are often strongly emphasised. Stress may also be an additional factor. Studies among medical students suggest that orthorexic behaviour may occur alongside stress and pressure from the study environment, while strict control of eating may provide a sense of order or control (Jbir et al., 2023). Our results are therefore consistent with findings from studies reporting a greater tendency towards orthorexia nervosa in healthcare workers and health-related students. Some authors attribute this to stress, work or study burden, and a stronger focus on health (Kulak et al., 2022; Özdemir and Arslan, 2024).

Next, we examined whether the level of orthorexic tendencies differed significantly according to gender, age, and BMI. Contrary to our expectation, men showed stronger orthorexic tendencies than women, while no significant gender differences were found among non-health-related students. Previous research on gender differences in relation to orthorexia nervosa is inconsistent, with some studies reporting no significant gender differences (Brytek-Matera et al., 2015; Plichta and Jezewska-Zychowicz, 2019; Yilmaz, 2023). Conversely, Elias et al. (2022) and Atsizata and Cangöl Sögüt (2024) reported that women may be more likely to display orthorexic behaviour due to social expectations regarding body appearance and greater exposure to nutrition-related information. In our study, this finding should be interpreted with caution, especially as the sample was predominantly female. A meta-analytic review of gender differences showed that results also depend on the measurement tool (Strahler, 2019). Some studies among students or health-related samples have shown higher orthorexic tendencies in men (Karakus et al., 2017). One possible explanation is that, among men, orthorexic tendencies may be more closely related to physical performance, muscularity, exercise-related motives, and rigid dietary control rather than thinness-oriented concerns (White et al., 2020). However, these factors were not assessed in the present study, so this explanation remains preliminary.

We were also interested in whether orthorexic behaviour appeared more often among younger or older participants. Older future health professionals showed stronger orthorexic tendencies than younger ones, and this difference was statistically significant ($p < 0.001$). In the group of non-health students, we did not find such differences. In our study, the age difference was very narrow (19–21 vs. 22–24 years), so we must be cautious when interpreting the effect of age in a broader developmental sense. It may be more meaningful to understand it as a possible sign of greater exposure to education in a health-related field. Older students may have been exposed to topics related to nutrition, health, disease prevention, and personal responsibility for health for a longer period. Therefore, in some individuals a greater concern for a healthy lifestyle may gradually develop into more rigid eating patterns. This is in line with a recent review (McInerney et al., 2024), which emphasises that greater knowledge of nutrition and diet is linked to a higher risk of orthorexic tendencies in healthcare workers and students. Another possible explanation is greater academic pressure in older students or in those who have studied for a longer period. Studies among medical students suggest that orthorexic tendencies may appear together with

higher stress (Jbir et al., 2023). Therefore, it is possible that in older health-related students, stricter control of food partly reflects a combination of greater health awareness, higher personal standards, and greater burden. As we did not measure other factors and because the age range was small, it is possible that age actually acts as an indicator of something else, such as longer duration of study or greater involvement in a health-related identity.

Among health-related students, we found a statistically significant difference: those with a higher BMI (overweight) exhibited stronger orthorexic tendencies. Among non-health students, these differences were not observed. The BMI difference was evident within the group of health-related students, where the overweight group had the lowest ORTO-15 values, indicating stronger orthorexic tendencies. However, in the regression analysis, BMI did not remain a statistically significant independent predictor, suggesting that the association may be present at the bivariate level but may not persist after accounting for other variables. One possible explanation is that individuals with higher BMI more often have experience with weight control, dieting, motivation to control body weight, and greater attention to “proper” eating. When this control of eating becomes stronger and very rigid, it may manifest as a stronger orthorexic orientation in some individuals. This explanation is consistent with the literature (e.g., McComb and Mills, 2019), which shows that the links between ON and BMI are mixed. Meanwhile, ON is associated with dieting, restrictive eating, attempts to lose weight, and, in some studies, also with body dissatisfaction or body image concerns. However, this explanation should be interpreted with caution, as the links between BMI and orthorexia are inconsistent in the literature. Other studies also show that BMI alone is not necessarily a decisive predictor of orthorexic behaviour, but probably interacts with other lifestyle and psychological factors (McInerney et al., 2024; Bundros et al., 2016; Demirel and Celik, 2021).

Our study has several limitations that should be considered when interpreting the results. Although the sample size was satisfactory ($n = 454$), the sample was predominantly female. Another limitation arises from the use of the self-report ORTO-15 questionnaire. Although it has been widely used in previous studies, its reliability has been questioned, particularly regarding its ability to accurately measure orthorexia and to distinguish clearly between an unhealthy fixation on food and a general interest in healthy eating. Mitrofanova et al. (2021) observed that ORTO-15 may respond to dietary concerns but does not effectively identify the harmful aspects of orthorexia nervosa. Barrada and Meule (2024) also noted that research based on weak or invalid measurements can produce biased results and reduce the clarity of findings. Therefore, the current results should be interpreted as indicating tendencies towards orthorexia rather than as a diagnosis of orthorexia nervosa. Future research should use stronger and more recently validated tools for assessing orthorexia nervosa. In addition, we did not include other factors in the study, such as study burden, stress, lifestyle, mental health, or level of exposure to health information, which could significantly affect the occurrence of orthorexia nervosa. Because of the cross-sectional design, no causal conclusions can be drawn. In particular, it cannot be determined whether health-related education contributed to stronger orthorexic tendencies or whether students with a pre-existing interest in healthy eating and health-related concerns were more likely to choose health-related study programmes. Therefore, the observed differences should be interpreted as associations rather than evidence of increased risk caused by the study programme.

For future research, we recommend including a larger and more representative sample of students, using updated and validated measurement tools for assessing orthorexia nervosa, and adopting a longitudinal approach that would allow changes over time to be tracked. In addition, it would be useful to explore psychological factors such as anxiety, perfectionism, and self-image, and to examine the effect of access to health information on the internet. Such an approach could contribute to a better understanding of the mechanisms influencing the development of orthorexia nervosa, and to the design of targeted preventive measures and support programmes for health-related students.

Despite these limitations, our study has several important strengths. A key strength is that, to our knowledge, this is one of the first studies in Slovenia to compare orthorexic tendencies between health-related and non-health-related students, providing a new contribution to understanding these phenomena in the local context. Another important strength is the systematic approach to analysis, as we tested several hypotheses that together offer a broader picture of the prevalence of this phenomenon. Our study therefore provides an important basis for further research on orthorexia nervosa among health-related students. It encourages discussion about the importance of mental health, eating habits, and the use of digital information in health-related contexts.

Conclusion

Although orthorexic tendencies have been studied in various student populations, evidence suggests that students in health-related fields may be particularly vulnerable, especially during the early stages of their studies or training. Our findings may therefore be relevant not only for understanding orthorexic tendencies in students, but also for early recognition, awareness, and prevention within health sciences education. In conclusion, orthorexic tendencies in this study were more pronounced among health-related students, indicating that study context may play an important role. These findings suggest that future health professionals may constitute a group for whom early recognition, awareness, and preventive approaches are especially important.

Author contributions

MČB and *VB* designed the study and prepared the manuscript. *MČB* performed the data analysis. *MČB* and *VB* collected the data. Both authors read, revised, and approved the final manuscript.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Conflict of interest

The authors have no conflict of interest to declare.

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