

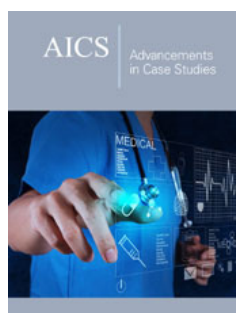
Prevalence and Characteristics of Orthorexia Nervosa in a Sample of University Students in Poland

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Abstract

Aim: The aim of the study was to determine the prevalence of orthorexia nervosa (ON) among young adults from Poland as well as search for factors which enhance the risk of orthorexia nervosa.

Material and Method: The study group consisted of 136 subjects (95 females, 3 non-binary and 38 males). The mean age of female participants was 20.21+/-3.27 years, and of male participants-18.93+/-3.67 years. In the study, we used a proprietary questionnaire to collect patient data, as well as following diagnostic questionnaires: ORTO-15 by Donini et al. (score of 35 was considered as cut-off point) and EAT-26 by Garner and Garfinkel. The results were statistically analyzed.

Results: Among the overall surveyed respondents, the proportion of those found to be at risk for orthorexia was 26.5% (36 subjects). Eating disorders were found in a total of 15.4% (21) of the respondents. The risk of orthorexia occurred significantly more often in those who had an eating disorder, 71.4% (15), than in those who did not, 18.3% (21). A statistically significant association was found between the presence of an eating disorder and the occurrence of orthorexia risk (chi square=25.790 p <0.001). Depression was present (according to respondents' self-assessment and evaluation) in 57.3% (78) of respondents or their families. The highest score of risk was observed in the group of students when the respondent experienced depression. A statistically significant association was found between the presence of depression and the occurrence of orthorexia risk (chi square=3.924 p =0.048). There were no statistically significant differences in the risk of orthorexia in groups from big cities and small towns. The studied social factors did not show impact on the risk of orthorexia as well as gender and BMI.

Conclusion: The prevalence of orthorexia nervosa (ON) among young adults from Poland was 26%. A statistically significant association was found between the presence of eating disorders and the risk of orthorexia, confirming that ON is most likely a slightly different clinical manifestation of the eating disorder. The respondent's depressive disorders were the only statistically significant factor increasing the risk of orthorexia.

Keywords: Orthorexia; Eating disorders; Prevalence; Young adults

Introduction

Eating disorders have risen to become a major concern of our time, we are observing an increasing number of people struggling with complications arising from poor nutrition. As the role of food is not only to satisfy hunger by providing the right amount of calories required, but also to regulate emotions and communicate in social relationships-we are witnessing significantly more people with underweight, obesity and other eating disorders - such as a pathological fixation on healthy eating, first named and described by S. Bratman in 1997 as orthorexia [1,2]. The underlying causes of eating problems lie in substantial disturbances in self-perception, as well as in pursuit of unrealistic goals for one's body image, self-imposed strict dieting leading eventually to changes in the functioning of the appetite regulating mechanisms and cachexia. From psychodynamic and developmental perspectives, maladaptive patterns of resolving internal conflict as well as the hardships of the separation and individualization process accompanying adolescence are particularly relevant factors in eating disorders. Rather than resolving the aforementioned issues in interpersonal relationships,

they are “shifted to food and the body.” These problems are usually the result of disruptions in early childhood relationships with primary attachment objects-the relationship with the mother, as the primary nurturing object, plays a special role. The importance of this very relationship and the early childhood pattern of it, linked to the feeding relationship, is an essential determinant in the life of a particular person for the development of later dysfunctions in self-perception and approaches to food and eating [7-11].

Occasionally, a significant factor sustaining eating disorders consists of undisclosed problems of the family or individual family members, such as bereavement, addictions, crisis in the parental relationship, thus the symptoms of eating disorders perform an adaptive function and protect the family from confronting situations that are challenging to resolve. Typically, eating disorders cluster all the family’s problems as if through a lens, with no proper understanding and support given not only to the person delegated by the system to the role of patient but also to the entire family, treatment becomes very troublesome and ineffective. Relying on both the theoretical basis for understanding eating disorders and clinical experience, the authors of the study attempted to estimate the prevalence of orthorexia, its affiliation with eating disorders, and an analysis of factors that could increase its risk.

Material and Method

The study group consisted of 136 subjects (95 females, 3 non-binary persons and 38 males). The mean age of female participants was 20.21+/-3.27 years, and of male participants-18.93+/-3.67 years. In the study, we used a proprietary questionnaire to collect patient data, as well as following diagnostic questionnaires: ORTO-15 by Donini et al. [12] (score of 35 was considered as cut-off point) and EAT-26 by Garner and Garfinkel. We believe that for more effective diagnosis it would be advisable to adopt a cut-off point for orthorexia in the ORTO-15 at the level of 35 points, as postulated in prior study as well as by other researchers due to the cut-off point suggested by the author of the questionnaire artificially inflates the results (threshold is associated with considerable overdiagnosis of the phenomenon). We believe so based on our previous studies

Table 1: Risk of orthorexia vs. onset of eating disorders.

ORT-15	EAT-26				Total	
	No eating disorders		Eating disorders		Number of people	Share (w %)
	Number of people	Share (w %)	Number of people	Share (w %)		
Healthy eating behaviors Orthorexia-	94	81,7%	6	28,6%	100	73,5%
Risk of orthorexia Orthorexia+	21	18,3%	15	71,4%	36	26,5%
Total	115	100,0%	21	100,0%	136	100,0%

Among the overall respondents, the proportion of those identified as being at risk for orthorexia was 26.5% (36 people). Eating disorders were observed in a total of 15.4% (21) of the respondents. The risk of orthorexia occurred significantly more frequently in those who had an eating disorder, 71.4% (15), than in those who did not, 18.3% (21). A statistically significant association was found between the presence of an eating disorder and the risk of orthorexia (chi square=25.790 p<0.001). Using the odds ratio, it was determined what is the likelihood of occurrence of the risk of

and the observations of other researchers [2-5]. The survey was conducted online, respondents completed it voluntarily, and received no compensation for their time. The data were statistically analyzed.

Statistical methods

Describing the normality of quantitative characteristics, the arithmetic mean was used to assess the average level and the standard deviation was used to assess dispersion. Verification of the hypothesis of normality of the distribution of the studied variables was carried out with the W Shapiro-Wilk test. For comparisons of the level of the studied variables between groups, due to the lack of normality of the distribution of the variables, the non-parametric Mann-Whitney U test (for two variables) and the Kruskal-Wallis test (for comparisons of three variables) were used. Structure indices were used to show the regularity of qualitative data (categorized characteristics), and chi-square independence was used to compare distributions and assess relationships between variables. Correlation intensity was assessed using Spearman’s rho correlation coefficient. The odds ratio (OR) was used along with a 95% confidence interval to assess how far greater or lesser the chance of orthorexia risk is in one group compared to another group. In all statistical tests, p≤0.05 was taken as the level of statistical significance. Statistical analysis was performed using IBM SPSS Statistics vs.27 and Statistica 13.1.

Results

Orthorexia nervosa and eating disorders are heavily intertwined, this provides evidence that ON belongs to the spectrum of eating disorders, it is only distinguished by a specific manifestation in terms of clinical symptoms.

Risk: Orthorexia vs. eating disorders

We examined whether there was an association between the risk of orthorexia (ORT-15 scale) and the

presence of eating disorders (EAT-26 scale). The results are shown in Table 1.

orthorexia in those diagnosed with an eating disorder. The obtained result OR [95% CI] =11,190[3,883;32,247] indicates that the chance of occurrence of the orthorexia in the group with an eating disorder is over 11 times higher than in the group without an eating disorder. In addition, a statistically significant correlation was found between the EAT-26 and ORTO-15 scores (Spearman’s rho=-0.482 p<0.001), the higher the EAT-26 score, the lower the ORTO-15 score on average, that is, the higher the level of eating disorder, the higher the risk of orthorexia on average (Chart 1).

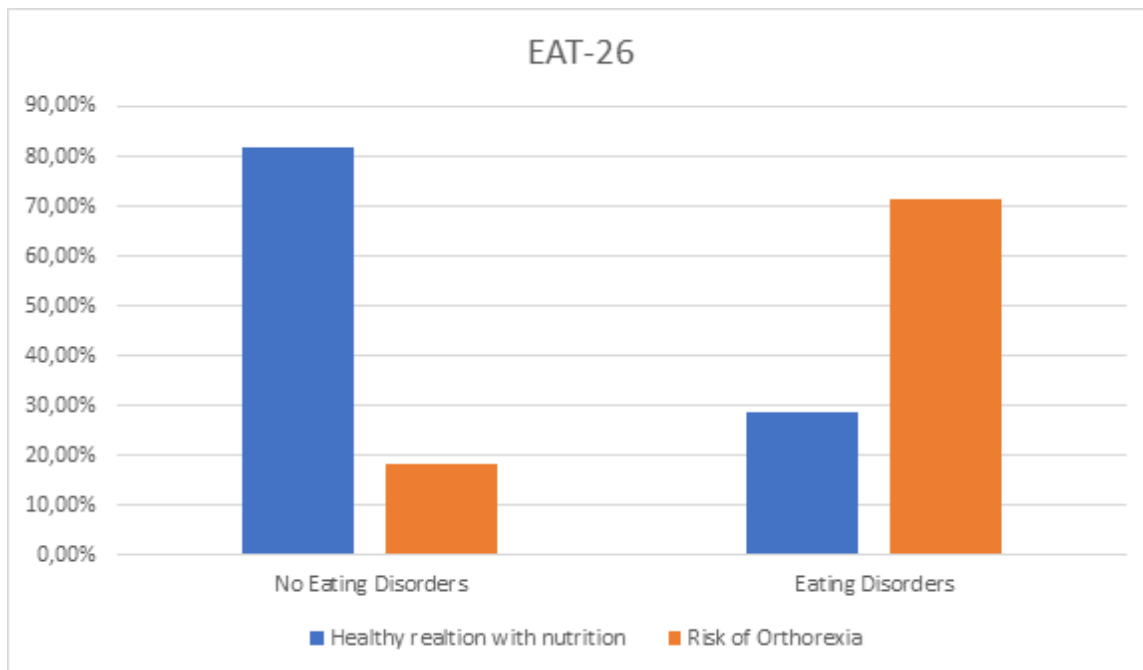


Chart 1: Risk of orthorexia vs. occurrence of eating disorders.

Risk: Orthorexia vs. studying health sciences

An attempt was made to investigate whether health sciences students are more likely to have orthorexia; unfortunately, it was not possible to collect a sufficiently large group; survey replies were made by respondents from both medical, technical and humanities

universities, as well as those with no university education.

Risk: orthorexia vs. depression

We examined whether there was an association between the risk of orthorexia (ORT-15 scale) and the presence of depression in the subjects or their families. The results are shown in Table 2.

Table 2: Orthorexia risk vs. depression occurrence in study subjects.

ORT-15	Depression				Total	
	None		Yes			
	Number of people	Share (w %)	Number of people	Share (w %)	Number of people	Share (w %)
Healthy eating behaviors Orthorexia	71	78,9%	29	63,0%	100	73,5%
Risk of orthorexia Orthorexia+	19	21,1%	17	37,0%	36	26,5%
Total	90	100,0%	21	100,0%	136	100,0%

Depression was prevalent (according to self-assessment) in 33.8% (46) of the subjects. The risk of orthorexia occurred more often in those who had depression - 37.0% (17) than in those who did not - 21.1% (19). A statistically significant association was found between the presence of depression and the occurrence of orthorexia risk (chi square=3.924 p =0.048). Using the odds ratio,

it was determined what the chance of orthorexia risk was for those who had depression. The resulting OR[95% CI]=2.191[1,000;4,798] indicates that the chance of orthorexia risk in the depressed group is 2.2 times higher than in the group without the disorder (Chart 2), Table 3.

Table 3: Risk of orthorexia vs. occurrence of depression in family of subjects.

ORT-15	Depression				Total	
	None		Yes			
	Number of people	Share (w %)	Number of people	Share (w %)	Number of people	Share (w %)
Healthy eating behaviors Orthorexia-	56	73,7%	44	73,3%	100	73,5%
Risk of orthorexia Orthorexia+	20	26,3%	16	26,7%	36	26,5%
Total	76	100,0%	60	100,0%	136	100,0%

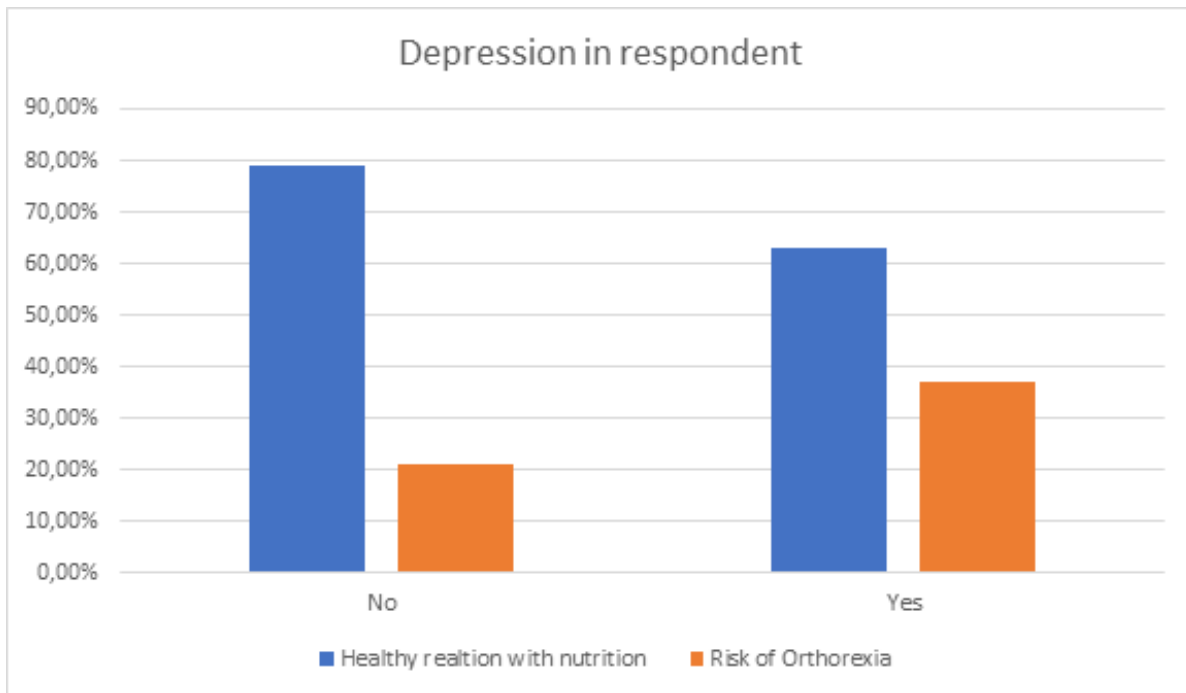


Chart 2: Risk of orthorexia vs. occurrence of depression in study subjects.

Depression was present (according to respondents’ assessment) in 44.1% (60) of respondents’ families. The risk of orthorexia occurred almost as often when there was and wasn’t depression in the family. The proportion of subjects who were found to be at risk for orthorexia was 26.7% (16) and 26.3% (20), respectively. There was no statistically significant association between the presence of

depression in the family and the occurrence of orthorexia risk (chi square=0.002 p =0.963). The odds ratio indicating what the chance of orthorexia risk is in those with a history of depression is OR[95% CI]=1.018[0.473;2.192] and indicates that the chance of orthorexia risk in those with a family history of depression is the same in the group without the disorder (Table 4).

Table 4: Risk of orthorexia vs. occurrence of depression in subjects or in their family.

ORT-15	Depression				Total	
	None		Yes			
	Number of people	Share (w %)	Number of people	Share (w %)	Number of people	Share (w %)
Healthy eating behaviors Orthorexia-	45	77,6%	55	70,5%	100	73,5%
Risk of orthorexia Orthorexia+	13	22,4%	23	29,5%	36	26,5%
Total	58	100,0%	78	100,0%	136	100,0%

Depression was present (according to respondents’ self-assessment and evaluation) in 57.3% (78) of respondents or their families. The risk of orthorexia occurred more often if the respondent or his family had depression. The proportion of subjects who were found to be at risk for orthorexia was 29.5% (23), respectively, which was 7.1 percentage points higher than when there was no depression. There was no statistically significant association between the presence of depression in the subjects or in their family and the occurrence of orthorexia risk (chi square=0.855 p =0.355). The odds ratio indicating what the chance of orthorexia risk is in subjects with or in their families with depression is OR[95% CI]=1.447[0.660;3.177], and reports that the chance of orthorexia risk in this group of subjects is more than

44.7% higher than in the group without the disorder.

Risk: Orthorexia vs. BMI

The survey showed that those who were observed to be at risk for orthorexia had a mean body mass index (BMI) of 22.07 (±4.78), while the group in which healthy behavior was observed had a mean BMI of 23.06 (±4.50). There was no statistically significant difference between the values (Mann-Whitney U=1673.5 p=0.533). No statistically significant correlation was found between the level of body mass index and ORT-15 score (Spearman’s rho= 0.042, p=0.626). The chart below shows the frequency of orthorexia depending on BMI (Table 5).

Table 5: Cross table OTO_2GR*BMI Chi kwadrat=0,735 p=0,693

			BMI3GR			
			Underweight	In standard	Overweight or obese	Total
OTO_2GR	Healthy eating behaviors	Volume	8	74	18	100
		% z BMI3GR	66,7%	75,5%	69,2%	73,5%
	Risk of orthorexia	Volume	4	24	8	36
		% z BMI3GR	33,3%	24,5%	30,8%	26,5%
Total		Volume	12	98	26	136
		% z BMI3GR	100,0%	100,0%	100,0%	100,0%

Risk: orthorexia vs. addiction in the respondent and/or family member

the risk of orthorexia (ORT-15 scale) and the use of psychoactive substances by the subjects or their family members. The results are shown in Table 6.

We examined whether there was an association between

Table 6: Psychoactive substance use by respondents and their family members.

Psychoactive substance	Ortoreksja+		Chi kwadrat	p-value
	Number of people	Share (in %)		
subjects				
Alcohol				
Never or rarely	27	25,0	0,583	0,445
1-2 times a month or more frequently	9	32,1		
Drugs				
Not using/trying	30	24,2	3,744	0,053
Use regularly	6	50,0		
Cigarettes				
Don't smoke	25	24,3	1,054	0,305
Smoking	11	33,3		
Relatives				
Psychoactive substances				
Absence of stimulants	21	28,8	0,427	0,513
Alcohol, nicotinism, drug addiction	15	23,8		

No statistically significant relationship was found with the use of stimulants by the subjects or in their families and the incidence of orthorexia risk. In the case of drug use, a p-value of 0.053 was obtained with the very small size of this group-12 people, so no statistically significant relationship between the variables should be found.

It was analyzed whether the place of residence in relation to the size of its population, (defined in the questionnaire as a village, a city with a population of less than 100,000 people, a city with a population of more than 100,000 people), could somehow influence the development of ON, and no evidence was found for the importance of this parameter (Table 7).

Risk: orthorexia vs. place of residence (large/small city/rural)

Risk: orthorexia vs. gender of the person surveyed

Table 7: Cross table OTO_2GR * Place of residence Chi kwadrat=3,001 p=0,083

			Place of residence		Total
			Rural, city of up to 100,000 inhabitants.	City of more than 100,000 inhabitants	
OTO_2GR	Healthy eating behaviors	Volume	35	65	100
		% z place of residence	83,3%	69,1%	73,5%
	Risk of orthorexia	Volume	7	29	36
		% z place of residence	16,7%	30,9%	26,5%
Total		Volume	42	94	136
		% z place of residence	100,0%	100,0%	100,0%

In the study group of 136 people, 95 women, 38 men and 3 non-binary people completed questionnaires. Gender had no statistically significant effect on the development of orthorexia nervosa (Table 8).

Table 8: Cross table OTO_2GR * Gender Chi kwadrat=2,093 p=0,351

			Gender			Total
			Woman	Man	Non-binary	
OTO_2GR	Healthy eating behaviors	Volume	67	30	3	100
		%Gender	70,5%	78,9%	100,0%	73,5%
	Risk of orthorexia	Volume	28	8	0	36
		%Gender	29,5%	21,1%	0,0%	26,5%
Total		Volume	95	38	3	136
		%Gender	100,0%	100,0%	100,0%	100,0%

Risk: orthorexia vs. respondent age

There was no statistically significant effect of age on the risk of orthorexia. Similarly, factors such as age, education, parents' occupational status; having siblings, a life partner or remaining single are not significant.

Discussion

The prevalence score for orthorexia in the present study, set at 26.5%, is significantly higher than the prevalence studied by Donini, the author of the original publication on orthorexia and the most widely used diagnostic worksheet. In the original study, the risk of orthorexia was set at 6.9% [12]. Nevertheless, it is similar to our previous study involving a group of 864 people, at which time the prevalence of the disorder was estimated at 27% [6].

The gender of respondents in our observations is not a risk factor for orthorexia. Both previous and current studies do not support the widespread view that women, as people who are more focused on taking care of their health and are more likely to choose healthy lifestyles and diets, are more prone to a pathological fixation on eating, and are not consistent with the fact that eating disorders are significantly more common in women. Perhaps orthorexia is that clinical variant of eating disorders that is equally common in both sexes. Donini showed a higher prevalence of orthorexia among men [1], while a 2011 Turkish study showed a female preponderance among orthorexics in the population there [13] and our previous study in a younger age group, also found no difference regarding gender [6].

Another observation from the study is a lack of correlation of orthorexia with demographic and social characteristics of the subjects. A Polish study by Hrynik showed a significantly higher prevalence of orthorexia among children of working parents [14], while our study showed no significant correlation with occupational status or parental education. Similarly, orthorexia was not shown to correlate with having siblings, having a life partner or remaining single. Thus, social factors seem to have a negligible impact on the occurrence of orthorexia risk in adolescents and young adults.

The effect of psychoactive substance use among the subjects and their parents on the risk of orthorexia was not proven. Other results were presented by Hrynik, noting a higher rate of orthorexia

among adolescents who smoke [14]. This information leads one to wonder whether the survey sufficiently identified the phenomenon of abuse or addiction to psychoactive substances and whether respondents gave honest answers. It seems that in eating disorders as well as in abusers or addicts-there is a similar problem with the recognition and regulation of emotions, so theoretically there could be coincidence between these disorders.

The present study has not proven a correlation of orthorexia with body mass index. In our previous study, as well as that of other authors-a significantly higher risk of orthorexia appeared with increasing BMI [6,14,15]. Among the studies referenced in this article, only Donini et al. [12] did not support the thesis of a connection between orthorexia and BMI. In contrast, other authors identify low BMI as a risk factor for the disorder [16,17]. It seems that this parameter requires further observation.

The current research found a statistically significant association between the presence of depression and the occurrence of orthorexia risk. Herpertz-Dahlmann and Remschmidt [18,19] conducted a study in which they compared the co-occurrence of eating disorder symptoms and depression, the results confirmed the conjecture regarding the reciprocal relationship between eating disorders and depression. Depressed patients were significantly more likely to have one form of eating disorder: anorexia or bulimia nervosa. Leassle et al. [20] point out that one of the most important aspects of eating disorder psychopathology is specific cognitive processing disorders and irrational self-esteem beliefs. In their study, they found positive correlations between the severity of depression and cognitive functioning - the higher the level of eating disorders, the higher the scores on the depression scale. Striving to maintain a slim figure, as well as perfectionism - correlated with the occurrence of depression. In the study, the authors proved the influence of cognitive impairment, characteristic of eating disorders, on the development and maintenance of depressive disorders. The correlation found in the current study confirms the cited observations.

Conclusion

The current findings seem to confirm reports by other researchers highlighting the high correlation between orthorexia and eating disorders [21]. We believe that in the absence of

particularly significant and unequivocally identified risk factors specific to orthorexia-it should be included in the spectrum of eating disorders. All the more so because the factors indicated in the studies-dissatisfaction with one's appearance and weight, striving for a slim figure, preoccupation with dieting and intense exercise-as statistically significant for the development of orthorexia, are equally significant in other eating disorders, especially for anorexia nervosa. Further research, of course is needed and the refinement and standardization of research tools to objectify observations.

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