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Orthorexia Nervosa and Quality of Life in an Austrian Sample of Young Adults – An Exploratory Study

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Running Title:

Orthorexia Nervosa in Young Austrians

Abstract

Young adulthood is a sensitive phase that comes with many developmental tasks. Successful mastery of these challenges is crucial not only for long-term physical and mental health. A positive relationship with one's own body and associated healthy dietary and behavioral patterns are essential building blocks for healthy adolescence and adult life. But being overly concerned with healthy food may lead to decreased quality of life and negative (mental) health outcomes. This study was conducted via a cross-sectional online questionnaire including the *Düsseldorfer Orthorexieskala (DOS), the WHO Quality of Life BREF and questions about life style and nutritional habits.* We investigated the prevalence of ON and its relation ship with different aspects of quality of life and lifestyle factors (sport and nu trtional habits) in a sample of young adults in Austria. No significant difference in the DOS-scores of male and female participants were found and no significant difference between students and non-students. High DOS-scores significantly impair all three domains of QoL. We did not find a significant relationship between high DOS-scores and taking nutritional supplements or being vegan, vegetarian or omnivore. Participants with high DOS-scores spent significantly more hours per week with sport/exercising.

Introduction

Adolescents and young adults are in a sensitive transitional phase in which important developmental tasks must be mastered. Successful mastery of these challenges is crucial not only for long-term physical and mental health, but also for economic success and interpersonal relationships throughout the lifespan. Failure to successfully overcome these challenges is a major cause of mental illness [1]. Adolescents and young adults, especially young women, are particularly at-risk of developing eating disorders. In Austria, 31% of all females aged 10 to 18 might be affected. A study based on nationally representative US survey data found the highest annual prevalence at age 21, with initial onset mostly before the age of 25 [2]. In the "growing up" phase, independence and personal responsibility also develop with regard to important health-related behavior patterns [3]. A positive

relationship with one's own body and associated healthy dietary and behavioral patterns are essential building blocks for healthy adolescence and adult life. Healthy nutritional habits are not only associated with better physical well-being but also with increased mental health and well-being [4]. However, an obsession towards healthy foods may cause negative outcomes in physical and mental health as well as overall quality of life. The concept of Orthorexia Nervosa (ON) describes this phenomenon of the obsession towards the quality rather than the quantity of food. It includes very particular rules about the origin, processing, and/or preparation of foods [5]. Consuming foods that do not comply with these rules can cause feelings of guilt, fear and worries. ON leads to avoidance of certain foods or categories of foods and therefore can cause malnutrition and

unintentional weight loss. ON is not recognized as a distinct eating disorder but ON may also impair the overall quality of life (QoL), social relations and psychological well-being [6]. The prevalence of ON may be correlated with the educational status, knowledge about nutrition, and health consciousness. Some studies found an increased prevalence among university students [6, 7], but prevalence estimates for Austria are not available to date.

Therefore, the aims of this study are to investigate the prevalence of ON and its relationship with different aspects of quality of life and lifestyle factors (sport and nutritional habits) in a sample of young adults in Austria.

Method / Material

Recruitment and Procedure

The study was conducted via a cross-sectional online questionnaire with three main parts. The whole survey took approximately 20 minutes. Participants were recruited via a panel distribution of the Österreichische Gallup-Institut GmbH. All participants gave informed consent at the beginning of the questionnaire by ticking a box indicating their consent. The questionnaire could only be started with given consent. Participation was voluntary.

Materials

The first part of the questionnaire covered sociodemographic questions such as age, gender, height and weight. The second part covered quality of life via the *WHO Quality of Life BREF*-questionnaire [8] as well as the ON-questionnaire *Düsseldorfer Orthorexieskala (DOS).* We used the *WHOQOL* domains physical (PHYS), psychological (PSYCH) and social (SOC), with higher scores indicating higher quality of life on a scale of 0 to 100. *DOS* scores of 30 or higher are considered as clinically relevant, scores of 25 or higher indicate a tendency towards orthorectic eating behavior. The third part included questions about life style, nutritional style and supplement consumption.

Analysis

For statistical analysis, SPSS 28.0.1.0 was used (IBM Corp., 2021). We compared the mean values of all variables between female and male participants as well as students and non-students. We conducted Pearson correlations to analyze significance and compute the correlation coefficients between WHOQOL scores (physical, psychological and social) of participants with DOS scores. Chi² tests were used to assess the relationship between DOS-scores (high: >=25, low: <25) and nutrition style (vegan, vegetarian, omnivorous) as well as DOS-scores (high: >=25, low: <25) and the intake of nutritional supplements (Yes, No). A two-sample t-test was performed to compare the mean hours of sport per week

in participants with high (≥ 25) and low DOS-scores (<25).

Results

Participants

Our purposive sample consisted of a total of 400 participants between 18 and 30 years (mean age: 24.92 years, SD = 3.51). Mean Body-Mass-Index (BMI) in the sample was 23.28 (SD=4.19). 115 participants identified as male, 282 as female, 3 as non-binary. 0.9% of male and 4.6% of female participants were vegan, 6.1% of male and 16% of female participants were vegetarian. The 3 non-binary participants were excluded from all gender specific analysis. 81.5% of our sample had a high school diploma (Matura) or a university degree. The sample consisted of 183 employed people, 32 workers, 19 school students, 19 currently unoccupied people and 17 people with "other occupations". 130 persons were students of different disciplines, 78% of them were female. Table 1

Prevalence of ON

Overall, 3% (n=12; 4 male, 8 female, two of them students) of our sample had 30 or more points in the DOS questionnaire, indicating clinically relevant orthorexia nervosa symptoms. Overall, 16.3% showed values of 25 or higher indicating a tendency towards orthorectic eating behavior. 22.6% of male and 13.8% of female participants as well as 18.5% of the students had 25 or more points in the DOS questionnaire.

DOS-Scores and Different Aspects of Quality of Life, BMI and Age

Correlations between 3 different domains of qualitiy of life, measured by the WHOQOL, and DOS-scores can be found in Table 2. All three aspects of quality of life are significantly and negatively correlated with DOS-sores.

DOS-Scores and Nutrition Style

A Chi-Square test of Independence was performed to assess the relationship between DOS-scores (high: >=25, low: <25) and nutrition style (vegan, vegetarian, omnivorous). There was no significant relationship between the two variables, X^2(df, 2) = 2.43, p = .30.

Table 1. Mean values and standard deviations of BMI, DOS-scores, QoL physical, psychological and social domain, hours per week invested in sport (exercise).

	Female (n=282) Mean (SD)	Male (n=115) Mean (SD)	Non-Students (n=270) Mean (SD)	Students (n=130) Mean (SD)
BMI	22.67 (4.01)**	24.78 (4.22)**	23,50 (4.48)	22.85 (3.49)
DOS	18.18 (5.33)	18.70 (6.07)	18.66 (5.72)	17.62 (5.12)
WHOQOL-Phys.	72.39 (15.97)	73.01 (17.38)	73.60 (17.22)	74.59 (14.32)
WHOQOL-Psych.	65.68 (16.53)	64.82 (20.26)	64.80 (19.08)	66.76 (14.14)
WHOQOL-Soz.	66.96 (20.95)**	58.91 (22.40)**	61.81 (21.91)*	68.97 (20.73)*
Sport (h/week)	3.09 (3.55)	3.67 (3.82)	3.00 (3.59)*	3.79 (3.68)*

** sig. gender difference p <.001, sig. Difference between students and non-students p<.05

Table 2: Correlation coefficients and p-Values between DOS-scores, QoL Domains, BMI and age.

	r	*p*
BMI	.08	.09
Age	.02	.65
Quality of Life PSYCH	-.14	.005*
Quality of Life PHYS	-.19	< .001**
Quality of Life SOC	-.14	.007*

* Significant correlation p<.05, ** significant correlation p=< .001

DOS-Scores and Nutrition Supplements

A Chi-Square test of Independence was performed to assess the relationship between DOS-scores (high: >=25, low: <25) and the intake of nutritional supplements (Yes, No). There was no significant relationship between the two variables, X^2(df, 1) = 1.50, p = .22.

DOS-Scores and Sport

A two-sample t-test was performed to compare the mean hours of sport per week in participants with high (≥ 25) and low DOS-scores (<25). There was a significant difference in hours of sport per week between high DOS-scores (>=25) (m = 5.26 h, SD = 5.19) and low DOS-scores (<25) (m = 2.87, SD =3.11); t(73.14) =3.60, p = <.001. Participants with high DOS-scorers spending significantly more hours on sport per week.

Discussion

We investigated the prevalence of ON and its relationship with different aspects of quality of life and lifestyle factors (sport and nutritional habits) in a sample of young adults in Austria.

We found no significant difference in the DOS-scores of male and female participants, and no significant difference between students and non-students. High DOS-scores significantly impair all three domains of QoL. We did not find a significant relationship between high DOS-scores and taking nutritional supplements or being vegan, vegetarian or omnivore. Participants with high DOS-scores spent significantly more hours per week with sport/exercising.

In several studies, the prevalence of ON is reported between 3% and 6.9% in the general population [9, 10]. ON was reported to show a higher prevalence in people with higher BMI [11]. Findings on gender differences in the prevalence of ON are contradictory, in contrast to many other eating disorders that show a distinctly higher prevalence in women [12]. Strahler et al. report a higher tendency towards pathologically healthy eating in women [6]. Another group suspected to be at risk for developing ON are university students with a prevalence 8% and up to 12.4% being at risk of developing ON [13]. Differences in prevalence according to age could not be clearly established [12].

In our study we did not find significant differences in DOS-scores neither between female and male participants nor between the students and non-students' group. More than 80% of our sample are highly educated, therefore it could be considered that high education has a higher predictive value for ON than being a university student [14]. DOS-scores did not significantly correlate with BMI and age, but it must be taken into account that about 80% of our sample had a BMI of 25 or lower and that our age range was

only between 18 and 30 years. Therefore, we have a relatively young sample with overall low BMI scores. The overall prevalence of ON estimated with the DOS was 3% and therefore in line with the results of other studies [9, 10]. 16.3% of our sample may be at risk of developing orthorectic eating behavior. With 22.6% of male and 13.8% of female participants, more men seem to be at risk. Ab Hamid et al explain a similar finding in their study with a particular eagerness of men to maintain body shape [15].

ON can have a negative impact on physical and mental health and it can lead to social problems. ON can lead to malnutrition caused by a narrowed food pallet resulting in vitamin deficiencies or thyroid and gonadal dysfunction, amenorrhea, and menstrual disturbances [16-18]. Furthermore, ON poses a risk for developing obsessive compulsive disorders (OSD) and other eating disorders. Studies also found tendencies towards excessively high demands on themselves and harsh criticism themselves [19-21]. ON can cause disturbances in social interactions by avoiding social events that include eating or through the narrowed interest and activities related to food and eating [22, 23]. Our data shows that high values in the DOS-questionnaire are negatively correlated with all three domains of quality of life; physical, psychological, and social. Other studies found similar negative relations between ON and quality of life [15, 24]. Vegan and vegetarian diets are associated with ON in different studies [5, 10]. In our sample, we could not find a connection between high values in the DOS-questionnaire and vegan or vegetarian diet. ON may also be associated with other health related aspects of life like exercising [25] and health knowledge and health consciousness [14, 26]. We tested if DOS-scores are associated with the hours exercising and the tendency to take nutritional supplements as a particular form of health-conscious behavior. In line with the results of a review and meta-analysis of Strahler et al [25], we found a significant correlation between the hours of exercise per week but no difference in taking supplements.

Conclusion

Careful and conscious selection of foods and viewing nutrition as part of a healthy lifestyle is not a pathological behavior. But thinking too much about food and nutrition, executing extreme dietary restrictions, harsh self-criticism, and an impaired social life due to strict dietary rules can be a sign of possible ON. Even if ON is not an official diagnosis according to DSM or ICD, it impairs health and quality of life in those affected. There is a need for research regarding ON and its differences and similarities with other eating disorders as well as regarding risk and protective factors. More knowledge about ON could lead to improved diagnostic and screening tools. This might be an important preventive measure to detect and treat ON in early stages.

Declaration of interest

We have no conflict of interest to declare.

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