Journal of Preventive Medicine and Holistic Health 2021;7(2):79–83

Content available at: https://www.ipinnovative.com/open-access-journals

Journal of Preventive Medicine and Holistic Health

Journal homepage: https://www.jpmhh.org/

Original Research Article

Preliminary screening for orthorexia nervosa in undergraduate student population of north India using ORTO-15 questionnaire

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ARTICLE INFO

Article history:
Received 04-06-2021
Accepted 05-08-2021
Available online 29-11-2021

Keywords:
Eating disorder
Orthorexia Nervosa
young students

ABSTRACT

Background: Orthorexia is a term used for "obsession for healthy and proper nutrition". ON is a recently identified disorder and prevalence studies are mainly limited to Eurasian and Scandanavian countries. There is a paucity of literature currently available for Asian population and more specifically for the Indian population. Therefore, the present study was designed to estimate the prevalence of Orthorexia Nervosa in Indian population.
Aim: To estimate the prevalence of ON in young North Indian population and to highlight its characteristics.
Materials and Methods: The study population consisted of 448 young students (males=173, females=275). The ORTO-15 questionnaire developed by Donini et al. was used to determine the prevalence. Subjects who scored below 40 were classified as having ON.
Result: Mean score of the participants in the ORTO-15 was using a 40 point threshold. A total of three fourth of the young students in the study group exhibited orthorexic tendency.
Conclusion: High prevalence of ON in young students necessitates that Orthorexia Nervosa trends in general population be assessed in Indian subcontinent for better understanding of eating disorders and its interplay with socio-cultural diversities.

1. Introduction

Orthorexia term was first described in 1977 by Steven Bratman and comes from two Greek words orthos (right, correct) and orexis (appetite).Orthorexia nervosa(ON) is a pathological obsession with biologically pure foods with the aim of maintaining health, ultimately leading to important dietary restrictions, stereotyped eating (e.g., rawfoodism, macrobiotics, veganism and fruitarianism) and psychological distress.[1,2]

ON is a recently identified phenomenon with researchers reporting its prevalence mainly in certain Eurasian and Scadanavian countries. There is a paucity of literature related to Orthorexia in Asian population, particularly for the Indian subcontinent. To our knowledge, till date no study has reported orthorexic tendency in Indian population; therefore the present study was designed to investigate the prevalence of ON in a sample of undergraduate students by using a psychometric instrument, developed by Doninini et al., the ORTO-15questionnaire.[3]

2. Material and Methods

A population based cross-sectional study was done on North Indian undergraduate students belonging to various streams in different colleges in and around Karnal. The study was conducted by the Department of Physiology, KCGMC, Karnal in collaboration with the Dietetics Department.

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https://doi.org/10.18231/j.jpmhh.2021.016

The study was approved by Institutional Ethics board of KCGMC, Karnal vide letter no KCGMC/IEC/2019/39).

2.1. Subjects

The study population consisted of 448 undergraduate students in the age group of 18-20 years pursuing graduation in different educational streams like Medical, Paramedical, Science and Arts. Exclusion criteria: students less than 18 years old (as they were considered insufficiently autonomous in their food choices) and students undergoing specific diet therapy for diagnosed health problems (eg. Diabetes and renal disease). The students were approached in their campuses during the lectures or in the break between lectures after taking due permission from their concerned authorities. The purpose and the methodology of the study was explicitly explained. They were enrolled for the study after obtaining written informed consent and participation was completely voluntary. Strict confidentiality regarding the information being provided by them was assured.

Self reported anthropometric data and associated socio-demographic profile regarding participants, age, gender, height, weight and educational stream was recorded after enrolment. WHO referenced (2007) percentile values of the body mass index (BMI = weight [kg]/height [m2]) was used to assess the anthropometric status according to age and sex. The different weight categories according to BMI were classified as underweight≤ 18.5, normal weight 18.5-24.99, overweight 25-29.99 and obese >30.[4]

2.2. Instrument

The enrolled study students were approached face to face to fill the ORTO-15 questionnaire in order to screen them for orthorexic tendency.[2] The English version used for this study was adapted from the original Italian by Donini et al.[3]

The ORTO-15, a self-administered questionnaire designed to investigate the presence of Orthorexia. It has been derived from a previously existing model by Bratman et al.[5] It contains 15 closed multiple-choice items designed within the framework of a four- step Likert scale assessment (always, often, sometimes, never) investigating the obsessive attitude of the subjects in choosing, buying, preparing and consuming food they consider to be healthy. Answers suggestive of a pathologic "orthorexic" tendency towards nutrition were given a score of "1" (given to always or never, according to the specific item), while healthier one receive a "4" score. The sum total of scores gives the final score of the test. The subjects scoring below 40 in the ORTO-15 test are defined as Orthorexic (having highly sensitive behaviour), normal eating behaviour reaches more normal standards as the score increases. Validation of the cut off score for the 40-point (sensitivity 100%, specificity 73.6%, positive predictive value 73.6%, negative predictive value 0%) was taken for statistical analysis in this study.[5]

2.3. Statistical analysis

The data was analysed using SPSS statistical package version 25. And checked for deviations from normality. Descriptive analyses were performed to continue data (age, weight, height and BMI) and for categorical data, frequency and percentage scales were used to analyse the observations made during the preliminary screening. Chi square, Fischer's exact test and ANOVA was used to assess independent associations and parametric variables.

2.4. Observations

The level of statistical significance was accepted at $p< 0.05$ and confidence interval of 95% for all tests.[2,3]

3. Results

3.1. Sociodemographic and anthropometric sample characteristics

Of the 448 participants,275 were women(61.4%) and173 were men(38.6%). The mean age of participants was 19.25 years. 39.9 % participants were medical students, 25.7% were from Science stream and 28.1% belonged to Arts stream. The mean BMI of the study group was 20.39 (Kg/m2). Using BMI, the students were categorized in four categories: normal weight(63.8%), underweight (26.6%, overweight (8.7%) and obese (0.9%). (Table 1)

3.2. Prevalence of orthorexia nervosa

In our study, mean score of the research group using ORTO-15 test (Table II) is 36.92 ± 4.88 (cut off value taken as 40, in males and … in females. 75.2% of students scored less than 40 on the ORTO-15 scale (Table 2). As observed in Table 3, ON tendency was more prominent in males (80.9%) as compared to females (71.6%). The prevalence of ON was more in normal weight students (79.3%) as compared to overweight (76.9%), underweight (64.7%) and obese (50%.) ON tendency in medical stream students was (83%), whereas the Science and Arts students were comparable in their scores (68%). The screening of the young student population revealed that most of the students in this age group are highly sensitive towards their dietary intake and maintaining ideal body weight.

4. Discussion

Bratman (1997) defined Orthorexia nervosa, an eating disorder as "maniacal obsession for healthy food" in a non-scientific journal named- "Health- Food junkies".[6] Orthorexia initially starts as a desire to improve one's diet, eating habits or general health (Bratman & Knight, 2000) but obsessive focus on dietary practices with inflexible dietary rules, recurrent and persistent preoccupation related to food ultimately leads to clinically significant medical or

Table 1: Socio-demographic sample characteristics

1. **Mean Age 19.25 years.**			
Variables		**Frequency (n)**	**%**
2. Gender	Males	173	38.6
	Females	275	61.4
3. BMI	≤ 18.5 (underweight)	119	26.6
	18.5-24.9 (Normal)	286	63.8
	25-29.9 (Overweight)	39	8.7
	≥ 30 (Obese)	4	0.9
4. Education streams	B.A.(Arts)	126	28.1
	BSc (Science)	115	25.7
	BSc (N) Paramedical	37	8.3
	M.B.B.S 1^{st} year	99	22.1
	M.B.B.S 2^{nd} year	71	15.8

Table 2: Overall prevalence of ON in study group mean ORTO- 15 score - 36.92± 4.88

ORTO-15 Score	**Frequency (n)**	**Percent (%)**
≤ 40 (with orthorexia)	337	75.2
≥ 40 (without orthorexia)	111	24.8

Table 3: Association of characteristics of study subjects with ORTO-15 Score

Variable		**Orthorexia Nervosa**		**P value**
		% with ON (≤ 40)	% without ON (≥ 40)	
1. Gender	Females	71.6 (n= 197)	28.4 (n= 78)	0.027*
	Males	80.9 (n=140)	19.1 (n=33)	
2. BMI	≤ 18.5 (underweight)	64.7 (n=77)	35.3 (n=42)	0.009**
	18.5-24.9 (Normal)	79.3 (n=228)	20.7 (n=58)	
	25-29.9 (Overweight)	76.9 (n=30)	23.1 (n=9)	
	≥ 30 (Obese)	50 (n=2)	50 (n=2)	
3. Educational streams	Arts	68.3 (n=86)	31.7 (n=40)	
	Science (BSc)	68.7 (n=79)	31.3 (n=36)	0.002**
	Medical (MBBS 1^{st} year, MBBS 2^{nd} year, BSc Nursing	83.1 (n=172)	16.9 (n=35)	

p value- (Pearson chi square)
* significant (statistical significance ≤ 0.05)
** highlysignificant (statistical significance ≤ 0.01)

psychological complications and distress.[7]

The paucity of the prevalence studies for ON could be due to it being a recently identified phenomenon and absence of well-established diagnostic criteria.[6] ORTO - 15 was originally developed in Italian by Donini et al., 2004 for diagnosis of ON and later translated, adapted and validated in many languages like Turkish, Polish, Hungarian, Spanish, German. Using this tool they reported a prevalence ranging from 6.9% among general population individuals with various occupational characteristics in Italy to 86% among ashtanga yoga practitioners in Spain (Valera et al., 2014). They further concluded that use of ORTO-15 questionnaire for the diagnosis of ON showed a good predictive capability at a threshold value of 40 (efficacy 73.8%, sensitivity 55.6% and specificity 75.8%). Therefore, ORTO-15 questionnaire is the most frequently used tool for the assessment of orthorexic symptoms in various populations, even though it is clearly not a diagnostic tool. In the present study, the orthorexic tendency in young Indian students was determined using English version of ORTO-15 questionnare.[8]

The mean ORTO-15 score in our study group of students was 36.92± 4.88. Our results are consistent with Korinth et al. who conducted a similar study involving 188 students and reported orthorexic prevalence in 76.6% students.[9] In the study of Donini et al. 71.2% of US college participants scored less than 40 on ORTO-15 scale. Similar high prevalence data has been reported among university and college students in various other studies conducted to explore the ON symptoms. High prevalence of orthorexia in young students could be attributed to result from complex interactions between personal, social and cultural factors. Orthorexic tendencies in young students may emerge because of various reasons like transition from

school to university level, low self-esteem and increased stress because of social pressure to maintain an aesthetic and healthy appearance.[6–9]

In our study we found that the prevalence rate of ON was higher in medical students (83%), whereas the prevalence rate was comparable in Science and Arts students (68%). These results are in accordance with Malmborg et al. who reported higher predilection of ON in exercise science students than business students (84.5% vs. 65.4%; p = 0.002).[10] A metanalysis involving eleven studies reported an average prevalence rate of orthorexia as 35-57.8 % in high-risk groups like healthcare professionals, artists and dieticians.[11,12] Bosi et al. has reported that a total of 45.5% of the residents and medical doctors involved in the study scored below 40 in the ORTO-15 test and suggested that it could be due to their better knowledge about the effect of nutrition on health.[13]

Gender variations affecting ON are still debatable with inconsistent results in different studies. Many studies have failed to report any significant gender difference.[12,14] In our study group, orthorexic tendency was more in males (80.9%) as compared to females (76.1%) which was statistically significant (p=0.027). Various researchers have reported (Donini, Aksodyan et al.) higher prevalence of ON in men.[6–12] The results of above studies are consistent with our findings. Eating disorders in men are often under-reported, underestimated and under-researched in epidemiological studies since decades due to preconceived notions across the globe.[15–18]

In our study we found that most orthorexics (79.3%) were in the normal weight range (BMI 18.5-24.9), closely followed by overweight (76.9%) and underweight subjects (64.7%) respectively. The obese group of subjects (BMI≥ 30) had the least number of orthorexics (50%). The association of ORTO-15 scores and BMI had a highly significant statistical difference (p=0.009). Oberle et al. in their study reported that the likelihood of ON increased with higher BMI values.[19] Some studies have not found any significant relationship of ON with BMI, while others have described an increase in trend of ON with increase in BMI values. However, no study has yet established a negative correlation between BMI and orthorexia. No clear conclusion can be drawn from a low score of ON or about its clinical relevance of this positive association. The observed result could be due to orthorexic tendency from a younger age itself which tends to maintain an optimal bodyweight.[18–22]

4.1. Limitations of the study

This study has few limitations that need to be acknowledged. ON being a recently diagnosed condition neither has a universal term of definition nor a nosologic classification and thus lacks a valid diagnostic criteria. Stoechel et al. did validation of the ORTO-15 questionnare and reported that it has a good repeatability and satisfactory reliability (Cronach, s alpha 0.7-0.9).32 Thus, despite some criticism, it is acknowledged that ORTO-15 is presently the only well accepted method of screening for symptoms of ON).[12]

4.2. Strengths of the study

This is a novel first study attempting to delineate the prevalence of ON in student population of India. The greatest strength of our study is that inspire of being the first study on Indian population, our results are comparable to other prevalence studies in western world using the same diagnostic tool (ORTO-15). Our study had a large sample size (n = 448) involving students of different stages, courses and cultural backgrounds. This heterogenecity in study group is likely to mirror the diversity of the students in the India.[12,14–17,20–22]

This study assumes relevance as it draws attention towards the oversensitive eating behavior in the Indian subcontinent particularly in the young population. A growing understanding and recognition of ON as eating disorder may help with early diagnosis and treatment in future. Since India is a large country with widespread cultural and socioeconomic diversity so further studies with additional inventories relevant to other eating disorders in conjunction with measures for ON are needed to understand the interplay of these factors and Orthorexia.

5. Source of Funding

None.

6. Conflict of Interest

None.

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Cite this article: Sethi J, Singh M, Garg M, Singh P, Sethi U. Preliminary screening for orthorexia nervosa in undergraduate student population of north India using ORTO-15 questionnaire. *J Prev Med Holistic Health* 2021;7(2):79-83.