

ORIGINAL RESEARCH

Orthorexia nervosa and obsessive-compulsive behavior among college students in the United States

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ABSTRACT

Background/Objective: Orthorexia nervosa (ON) is a disordered eating pattern and obsessive-compulsive disorder (OCD) is an anxiety condition. Although ON shares many similarities with OCD, their relationship remains unclear. The objective of this study was to investigate the prevalence of both ON behaviors and OCD behaviors and whether or not an association between ON behaviors and OCD behaviors exist among college/university students in the United States.

Methods: Using a cross-sectional, descriptive research design, a convenience sample of 270 college undergraduate students provided data using self-administered questionnaires: ORTO-15 to detect orthorexia behaviors and Obsessive-Compulsive Inventory-Revised (OCI-R) to detect obsessive-compulsive behaviors. Additionally, the participants completed a demographic questionnaire designed by the authors. Chi square, Pearson's correlation coefficient and analysis of variance evaluated the variables of interest using a significance level of .05.

Results: The prevalence rate for orthorexia nervosa behaviors was 37% and for obsessive-compulsive behaviors was 38.5%. There was a strong negative correlation ($p < .001$) between the scores of the ORTO-15 and the scores of the OCI-R. As orthorexia behaviors increased, obsessive-compulsive behaviors like-wise increased.

Conclusions: It was concluded that college/university students are a high-risk group for orthorexia nervosa and obsessive-compulsive behaviors. Mental health professionals who encounter clients with orthorexic tendencies are encouraged to also screen for obsessive compulsive symptomology as a comorbid problem.

Key Words: Orthorexia nervosa, ORTO-15, Disordered eating, Obsessive-compulsive, Obsessive-Compulsive Inventory-Revised (OCI-R)

1. INTRODUCTION

The unusual eating behaviors associated with the phenomenon of orthorexia nervosa (ON) were first reported by clinicians in 1996 and have since been described in the scientific literature.^[1] There has been ongoing debate regarding whether ON should formally be recognized as a separate psychiatric diagnosis or assimilated into the spectrum of an already established psychiatric diagnosis. A lack of consensus exists regarding acceptable definitions and diagnostic criteria for Orthorexia nervosa. ON has been variously

defined as disordered eating behaviors characterized by excessive preoccupation with clean, healthy foods; an obsessive fixation on healthy eating;^[2] healthy eating that transforms into an unhealthy obsession with extensive time spent to plan, purchase, prepare and eat healthy foods;^[3] a pathological approach to food related to healthiness concerns and purity of foods accompanied by intrusive food-related thoughts and unique, self-imposed food restrictions.^[4] Excessive preoccupation with healthy food choices can lead to unhealthy consequences, such as anxiety about whether or not a given

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food is truly healthy.^[5]

ON has been associated with severe distress, impairment in social situations as well as maladjustments in school and work.^[4] The core symptomatology of ON centers on the perceived purity of food, the perceived healthiness of diet, and an over-concern about contamination.^[4] As a result, people with ON behaviors suffer the risk of being singled out in society by their own anxious, irreproachable beliefs about their food choices and food preparations. Frequently, orthorexic individuals will engage in self-praise for resisting temptation and will consider their clean, pure eating styles to be virtuous, wholesome, and a symbol of moral superiority. However, social attitudes toward this type of eating are ambiguous at best and can easily result in social repercussions, such as stigma.^[3,6] In other cases, these disordered eating behaviors may lead to an unwillingness to participate in social activities creating isolation, loneliness, and a diminished quality of life.^[3] People with ON tendencies, oftentimes, may not feel their food choices meet a preconceived health standard which can result in an increasingly narrow range of foods to consume and can also result in some degree of malnutrition depending on the severity of acquired restrictions.^[7,8] Preoccupation with developing an even more restrictive and healthier plan for themselves can begin to dominate their lives.^[7] People experiencing ON tendencies may be more likely to develop other mental disorders, such as obsessive-compulsive disorder, bipolar disorder, anxiety, anger and depression.^[3,7]

Prevalence estimates of orthorexia nervosa in the general population have been reported to be as low as 1%^[9] to as high as 57.6%.^[10] This wide range in prevalence is reflective, in part, of a variation of measuring instruments used by researchers. Disordered eating behaviors are reported to be prevalent among college students and college-age populations.^[1,3,4,9,11] The dietary intake among college students tends to be deficient in several ways. In general, consumption of fruits, vegetables, whole grains and fiber is low while consumption of sugar, sodium, and fat tend to be high.^[11] The transition to college life can involve higher stress, lower physical activity, monetary budgeting challenges, and new social pressures. An increasing prevalence of ON behaviors among young adults in college has been observed.^[4]

ON shares some symptoms with other established disorders thus creating an overlap which can potentially obscure ON as a recognized psychiatric diagnosis. Anorexia nervosa (AN), bulimia nervosa (BN), and ON share abnormal eating habits, malnutrition, an exaggerated need for self-care, self-protection, and a preoccupation with food.^[1] However, a significant distinction among individuals who suffer from

anorexia or bulimia is that, ON individuals are more concerned about food qualities, while the former are more concerned about food quantities.^[8]

1.1 ON and obsessive-compulsive disorder (OCD) symptom overlap

ON also shares some of the symptoms of OCD such as, high anxiety traits, a need to control, preoccupation with contamination, repetitive thoughts and behaviors, and perfectionism.^[4,8] OCD, on the other hand, is a mental disorder in which people feel like they need to perform regularly, certain, ritualistic or routine behaviors or have certain repetitive thoughts.^[12] Increase in the number of repetitive behavior and thoughts can lead to a loss of personal productivity. OCD has been positively correlated with other disorders, such as depression, anxiety, tic disorders, eating disorders, obsessive-compulsive personality disorder, bipolar disorder and even suicidal thoughts.^[12] Moroze et al.^[13] have postulated that obsession may even be the root of orthorexia, i.e. a continuum from obsessive preoccupation with health to the distress brought on by obsessional thoughts and beliefs about food and healthy eating.^[4,13]

Although significant advancements have been made in diagnosing and treating people with tendencies of both Orthorexia and OCD, there has been limited evidence regarding whether a relationship exists between the two disorders.^[14] Possible biochemical similarities have been observed that can influence thought patterns and behaviors in both ON and OCD. In a study by Murphy et al.^[14] it was determined that patients with OCD and eating disorders had higher cerebral glucose metabolism which did not allow them to effectively complete a task which required the work of the prefrontal cortex and caudate nucleus of the brain. They implied that similar neurophysiological similarities exist in OCD and orthorexia.^[14] Koven et al.^[8] suggested that a potential relationship between ON symptoms and OCD may exist when repetitive and ritualistic behaviors are focused on food. When an individual with OC tendencies gravitates towards a ritualistic checking of nutritional information and has repetitive thoughts about achieving ever-increasing healthier eating, ON symptomatology may be present.^[8]

Considering that OCD and ON behaviors may exhibit similar behavioral and thinking patterns, it may be problematic to determine which is more prevalent. It has been reported that people with eating disorders, including those with orthorexia tendencies, have between an 11% to 69% higher rate of also having OCD. Additionally, those with OCD have a 10% to 17% higher rate of having eating disorders. These findings suggest that 64% of patients with symptomatic eating disorders have, at least, one more co-existing anxiety

disorder which is frequently (41%) OCD.^[15] Based on these investigations, it can be reasonably speculated that eating disorders, including ON, could potentially be a part of the OCD spectrum.

Brytek-Matera^[16] noted that while healthy diets and lifestyles are good and desirable, in some individuals these health habits can reach a point beyond normalcy and turn into obsession and preoccupation, thus clearly resembling the signs of obsessive-compulsive disorder. Accordingly, people with orthorexia tendencies can try to become so efficient with providing their bodies with what they consider is the right amount of healthy nutrients they may start to experience excess worries, stress and preoccupation with the very quality of foods. Since orthorexia symptomatology is treated similarly to obsessive-compulsive disorder, it might be closely linked to OCD.^[16] The OCD Center of LA^[5] has suggested that orthorexia can be viewed as a hybrid between an eating disorder and OCD since it shares characteristics of both disorders. As an example, similar to OCD, orthorexia comprises obsessive thoughts and behaviors, but focuses on specific diets and foods. Likewise, orthorexia has compulsive behaviors that the patient possesses in order to minimize his/her anxiety caused by the obsessive thoughts.^[5]

Poyraz et al.^[17] pointed out some additional observations of how orthorexia nervosa, despite being viewed by some as a separate disordered eating behavior, shares common features in its clinical presentation with obsessive-compulsive disorder and other eating disorders. In their study among 130 patients diagnosed with different disorders, only a few had significantly different mean scores on various diagnostic related, screening tests (Padua Inventory Washington State University Revision [PI-WSUR], the ORTO-11 and the Eating Attitudes Test-40 [EAT-40]). The authors suspected that while orthorexia may share ritualistic signs with OCD, the worries that people with OCD have, may prompt them to develop “pure” diets and act as they would act if they had orthorexia tendencies.^[17]

Much of the limited research regarding a potential relationship between ON tendencies and OCD has been conducted in the United States. The findings from these few studies have frequently been generalized to other anxiety and food related disorders.^[18] Scarff^[19] suggested that even though individuals with ON symptoms share the ritualistic behaviors of those with OCD leading some to consider the symptomatology co-morbid, the underlying differences between them are more prevalent than the commonalities. Individuals with both diagnoses demonstrated a need to exert control and exhibit perfectionism. According to Scarff,^[19] the one common trait between OCD and ON tendencies is anxiety.

1.2 Objective of the study

The debate regarding whether orthorexia nervosa is a distinct eating disorder or just part of the obsessive-compulsive disorder spectrum continues in the literature. Given the observance of some common symptomatology between ON tendencies and OC symptomatology described in the literature, the goals of this study were to first, assess the prevalence of orthorexia nervosa symptomatology and the prevalence of obsessive-compulsive tendencies among a young adult, college population at risk for anxiety and, second to determine whether or not an association between orthorexia nervosa tendencies and obsessive-compulsive tendencies exists among this population.

2. METHODS

2.1 Study design

A cross-sectional, descriptive study design using self-reported, objective surveys was used to determine the presence or absence of orthorexia tendencies and/or obsessive-compulsive symptoms among a sample of university students in the United States.

2.2 Setting

This study was conducted at a large, public university campus in Southern California. The university has one of the most ethnically diverse students in California, offers bachelor, masters, and, doctoral degrees and attracts students from many different countries. Data were collected between June, 2016 and November 2016.

2.3 Participants

Participants in this study comprised a sample of convenience, verbally recruited from undergraduate classes. The student participants did not receive any incentives for participation. Inclusion criteria consisted of the following: fluent in comprehending, reading and, writing English, matriculating at the university either fulltime or part time, at least 18 years of age, ability to access, select, and prepare their own foods for consumption. Exclusion criteria for this study were as follows: younger than 18 years of age, participants with a prior or current diagnosis of anorexia nervosa, bulimia, binge eating disorder, or obsessive-compulsive disorder, a non-matriculating student at the university. Potential participants were given a general description of the study, given the opportunity to ask questions, informed that non-participation would not be penalized in any manner, and were asked to sign an informed consent approved by the Institutional Research Board if electing to participate. The number of participants recruited was 281. Only 270 of the questionnaire sets returned had complete responses. Eleven questionnaire sets were not complete and had to be removed from the data set.

2.4 Materials and procedures

Approval from the university's Institutional Review Board (IRB) was obtained. The questionnaires were self-administered with the exception measuring the participant's body weight. Weight was measured and recorded by a research assistant using a calibrated electronic scale. The researchers elected to measure weight because respondents have a tendency to either not know their exact weight, give a guess, or not accurately report their current weight. They were allowed to self-report height because respondents tend to know and report their accurate heights. Three student research assistants currently enrolled in an undergraduate research program at the university and one student assistant enrolled in a university food science program, were trained by the principal investigators and assisted in the data collection. Confidentiality was assured by close supervision of all phases of the study by the primary investigators, by securing all raw data in a locked drawer in the principle investigator's office and by reporting outcomes in aggregate form only. Participants were given the right to refuse to complete any question in the questionnaires. The two trained research assistants double-checked the participants' responses for completeness and then entered them into a SPSS data set.

2.5 Study measures

A sociodemographic survey and two test measures (one standardized and one still in the standardization process), ORTO-15 and Obsessive-Compulsive Inventory-Revised (OCI-R) were used in this investigation. The sociodemographic survey was created by the principle investigators to capture the characteristics of the sample. Questions were asked about the participant's age, height, gender, ethnicity, marital status, smoking habits, alcohol consumption, diet/diet preferences, allergies and, physical activity level. From the data, body mass index (BMI) was calculated using the equation: $BMI = \text{weight (kg)}/\text{height}^2 \text{ (m}^2\text{)}$.

2.5.1 ORTO-15

Orthorexia nervosa tendencies and prevalence of attitude and behavior related to consumption of eating healthy food was assessed using the ORTO-15 measure, with a cut-off score of 40. The ORTO-15 is the most widely accepted assessment measure utilized specifically to screen for orthorexic tendencies.^[16] Donini et al.^[20,21] is credited with developing the ORTO-15 consisting of 15 Likert scale questions (1 "never" to 4 "always") with a total scoring range of 15 to 60. A score below 40 indicates orthorexia behaviors; the lower the score, the greater the tendencies.^[22] It is important to note that at this time, the ORTO-15 is still a partially validated measurement tool^[3,23] which has some problems with internal consistency.^[3,8,23-25] However, the ORTO-15 is still the most

widely accepted measuring tool to assess ON tendencies and prevalence at this time and was therefore, used in this study.

2.5.2 OCI-R

The Obsessive-Compulsive Inventory Revised (OCI-R) assesses obsessive-compulsive disorder tendencies in an individual.^[26] Obsessions and compulsions, as well as, the severity of these symptoms are measured separately. The OCI-R consists of 18 questions divided equally into six subscales; checking, hoarding, neutralizing, obsessive behaviors, ordering, and washing. The OCI-R has an acceptable internal consistency (.88 to .92 and .57 to .93 for the subscales) in clinical and non-clinical populations.^[27,28] Responses are on a 5-point Likert scale (0 "not at all" to 4 "extremely"). The OCI-R total score ranges from 0 to 72. Using the cut off score of 20, higher scores indicate obsessive-compulsive disorder tendencies; the higher the score, the greater the tendencies.

2.5.3 Statistical analysis

The statistical level of significance was set at .05 and all statistical analyses were done using SPSS 24.0 IBM for Windows. Descriptive statistics were used to characterize the sample in this study. Chi square analyses were performed to determine if there was a significant association between subjects who scored less than 40 on the ON (indicating ON tendencies) and above 20 on the OCI-R (indicating OCD tendencies). Pearson's moment correlation coefficient (r) was used to determine from among those who scored less than 40 on the ON (indicating ON tendencies) and above 20 on the OCI-R (indicating OCD tendencies), whether or not a correlation exists between the scores on the ORTO-15 and those on the OCI-R and its sub-categories (checking, hoarding, neutralizing, obsessing, ordering, and washing). Analysis of variance was done to determine if any sub-categories of the OCI-R significantly contributed to ON tendencies detected by the ORTO-15.

3. RESULTS

Due to incomplete responses to various questions from 11 participants, only 270 of the 281 respondents were included in the statistical analyses.

As shown in Table 1. The sample was over 65% Asian or Hispanic, 14% Caucasian, 13% African American, with the remainder reported as "Other". Of the remaining 270 respondents, 58% ($N = 157$) were female and 42% ($N = 113$) were male, with a mean age of 20.2, and a SD of 1.7. The typical subject in this study was: an undergraduate female student, aged 18 to 21, unmarried, regularly exercised, and, had no religious dietary restrictions or food allergies.

Table 1. Demographic characteristics of participants by gender

Variable	Male (n = 113)	Female (n = 157)	Total (n = 270)	Cumulative Percentage	Mean	SD
Age						
18 to 21 years old	88	115	203	75.18		
22 to 25 years old	12	29	41	15.19	42.29	5.87
26 to 29 years old	7	10	17	6.30		
30 to 34 years old	4	3	7	2.59		
35 to 39 years old	2	0	2	0.74		
Race						
Black or African American	8	28	36			
Asian/Pacific Islanders	40	56	96	35.56		
White	20	19	39	14.44		
Hispanic or Latino	37	43	80	29.63		
Native American	0	0	0	0		
Other	8	11	19	7.04		
Current Marital Status						
Single, never married	106	153	259	95.93		
Married or domestic partnership	7	1	8	2.96		
Widowed	0	1	1	0.37		
Divorced	0	0	0	0		
Separated	0	2	2	0.74		
Degree Program						
Undergraduate	105	147	252	93.33		
Graduate	7	8	15	5.56		
Other	1	2	3	1.11		

As shown in Table 2, the body mass index (BMI) mean of the respondents was 24.50, a little over a third of the participants tended to follow no specific diet, while the rest followed several different dietary practices with the most frequent being high protein diets (16%). Alarming, 21% of the sample reported use of disturbing weight loss practices, i.e., vomiting, starvation, and laxatives (see Table 2). These behaviors can be seen as reflective of undiagnosed disordered eating practices.

The participants' majors in this study were spread over the University's various colleges; College of Business Administration (9.63%), College of Health and Human Services (30.37%), College of Liberal Arts (24.07%), College of Natural Sciences and Math (9.63%), College of Education (15.93%), and College of The Arts (7.78%). Seven participants (2.59%) declined to identify a college. There were no significant associations or correlations among the participants' habits of alcohol use, smoking, specific diet adherence, presence or lack of food allergies, whether or not they exercised, marital status, religious based diet restriction and prevalence of ON behaviors and/or OCD behaviors. Like-

wise, gender and BMI had no association or correlation with the prevalence of ON/OCD behaviors. However, it must be noted that the mean BMI of this entire sample was 24.5% without much variation (24.2 for males and 24.8 for females).

In this sample of college students, the prevalence rate of orthorexia behaviors was 37% while the prevalence rate of obsessive compulsive behaviors was 38.5%. The mean score on the ORTO-15 was 42.29 with a mean standard deviation of 5.8; 100 participants scored less than 40 on the ORTO-15. Nearly two thirds (65%) of these respondents who scored below 40 were female. In this study, the overall Cronbach Alpha for the ORTO-15 was 0.74; in an acceptable range. The mean score on OCI-R was 18.71, with a standard deviation of 12.6; 104 participants scored greater than 20 indicating obsessive compulsive behaviors. Nearly half (46%) of these respondents were male.

As illustrated in Table 3, a major focus of this study was on participants who scored less than 40 on ORTO-15 and \geq 20 on OCI-R. The percentage of respondents who met the criteria for having both ON and OC behaviors was 38.52% (N = 104).

Table 2. Health characteristics and practices of participants by gender

Variable	Male (N = 113)	Female (N = 157)	Total (N = 270)	Cumulative Percentage
Smoking status				
Yes	21	16	37	13.7
No	91	141	232	86.3
Alcohol				
Yes	57	89	146	54.07
No	55	68	123	45.93
Specific Diet				
No specific diet	49	51	100	37.00
High protein	26	18	44	14.8
Vegan	2	2	4	1.48
Vegetarian	3	15	18	6.66
Gluten Free	1	2	3	1.11
Low Sodium	6	14	20	7.41
Pescatarian	3	13	16	5.92
Low Calorie	6	13	19	7.03
Low Carbohydrate	9	19	28	10.57
Other	8	10	18	6.66
Food Allergy				
Yes	16	23	39	14.44
No	96	134	230	85.55
Dietary Restrictions (Religious)				
Yes	3	5	8	2.97
No	109	151	260	97.3
Exercise				
Yes	97	116	213	78.89
No	16	41	57	21.11
Weight Loss Practices				
Vomiting				
Yes	1	9	10	3.70
No	111	148	259	96.3
Starvation				
Yes	10	24	34	12.60
No	102	133	235	87.4
Use of Laxatives				
Yes	3	11	14	5.18
No	109	145	254	94.82
Body Mass Index (BMI) Mean				
	24.2	24.8	24.5	

Table 3. Participants with ORTO-15 scores < 40 and OCI-R scores > 20

OCI-R	ORTO-15		Total (N)	Total %
	No (N)	Yes (N)		
No (N)	124	42	166	61.48%
Yes (N)	46	58	104	38.32%
Total	170	100	270	100%

χ^2 : DF 1 Value 25.45; $p \leq .0001$

As shown in Table 4, Pearson’s *r* correlation showed a strong

negative correlation ($p < .001$) between ORTO-15 scores and the OCI-R subscale scores. As the scores on the OCI-R sub-categories went up (indicating more obsessive-compulsive behavior), the scores on the ORTO-15 went down (indicating more orthorexia nervosa behavior).

As illustrated in Table 5, the results of an analysis of variance (ANOVA) demonstrated that three sub-categories of the OCI-R (neutralizing, obsessing, and ordering) significantly contributed to the observed variance ($F = 14.69$; $p < .0001$)

on the ORTO-15. Participants with orthorexic tendencies, i.e., scoring below the cut off score of 40 on the ORTO-15, had greater odds to score ≥ 20 on the OCI-R than those

whose scores did not reflect orthorexic tendencies (point estimate 3.73, Wald 95% confidence limits: 2.209 to 6.27).

Table 4. Pearson's *r*: Correlations between ORTO-15 scores and OCI-R sub-category scores (N = 270)

OCI-R sub-scale	Checking	Hoarding	Neutralizing	Obsessing	Ordering	Washing
Correlation (<i>r</i>)	-0.318*	-0.235*	-0.313*	-0.299*	-0.298*	-0.293*

**p* < .001

Table 5. Sub-categories of the OCI-R contributing the most variance to the ORTO-15 score (N = 270)

OCI-R sub scale	Neutralizing	Obsessing	Ordering
F value	4.82	5.27	5.50
<i>p</i>	.029*	.022*	.019*

Note. ANOVA: DF 3; F value 14.69; *significant at the .05 level.

4. DISCUSSION AND CONCLUSION

This investigation was done to determine the prevalence of orthorexia behaviors and obsessive-compulsive behaviors among university students. Previous studies indicated this population was at risk for these behaviors.^[3,4,11] The prevalence rates from this study (ON behaviors 37% and OC behaviors 38%) are consistent with previous studies. While this prevalence is not as high as is found in some of the previous studies, it appears to be higher than would be expected among the general population.^[9] College/university students have increased stress and anxieties about life changes that occur with college matriculation and this could account for higher numbers and kinds of behavioral changes seen among this population. This study confirmed that college/university students are a high-risk population for orthorexic and obsessive behaviors. Perhaps as a preventative measure, colleges and universities could enrich their orientation programs to include information about recognizing early disordered eating behaviors and obsessive behaviors related to nutrition, including information about campus and community resources for students to obtain more information or early intervention services.

Interestingly, many of the previous studies regarding ON and OCD behaviors had a majority of Caucasian participants in their samples which lead them to speculate that race and culture might have had an impact on their findings. The sample in this study was 65% Asian or Hispanic and only 14% Caucasian, which by comparison, was unique. However, the findings were still consistent with those of previous studies in term of ON and OCD behavior prevalence. Similar to other studies, the sample in this study had more females (58%) than males (42%). Considering the fact that participants were volunteers without any incentivizing, females might

have found the subject matter of more interest to them than it was to males.

This study had the additional goal of determining whether or not a correlation existed between OCD and ON symptoms. It was determined that individuals with ON behaviors, were statistically higher than the participants without ON behaviors to also have OCD behaviors. However, individuals who had OCD symptoms were not as likely to also exhibit ON symptoms. In this study, a strong, negative correlation was found between the participants' scores on the ORTO-15 and their scores on the OCI-R thus, confirming that a correlation does exist. The finding is consistent with that of other studies.^[4,13]

The finding of a correlation between the scores on the ORTO-15 and the OCI-R among the participants of this study may mean that ON symptoms and OCD symptoms are co-morbid. Or perhaps it may mean that a person with ON tendencies, at some point of time, may evolve to include OCD symptomatology. This finding also supports the speculations of other researchers that ON shares similar patterns with OCD, that ON driven concerns for health may prompt a person to develop routine, repetitive behaviors/actions and, ON behaviors may ultimately lead to ODC.^[5,16,18]

However, it must be noted that those participants who were already obsessive (demonstrating hoarding, neutralizing, washing, checking, ordering behaviors) were not as likely to become obsessed with adding, yet, another thing (healthy, pure lifestyles and healthy, clean, pure foods) to their current repertoires. The findings in this study suggest that individuals who are expressing OCD behaviors are less likely to express ON behaviors. Using the information from the study, one can make a tentative, hypothetical statement that ON tendencies may provoke OCD tendencies.

4.1 Limitations

This study had various limitations. One limitation was the assumption that all participants responded honestly on the surveys. Another limitation was that there was no attempt to assess the influence of media, social norms, and peer influence on the participants' own definition of "clean", "pure",

“healthy” eating. The current study used a sample from a single university in California; a state where healthy eating is highly promoted and food varieties are relatively available during all seasons of the year. Finally, the results of this study cannot be generalized to the general population due to the fact that the participants were young adults.

4.2 Implications for practice, conclusion, and recommendations

Nurses can ask more detailed questions of patients who present with nutritional deficiencies or who describe an inability to tolerate changes to their eating behaviors. These questions can focus on the preparation of meals, the pattern of eating, and the feelings associated with eating including feelings of guilt, control, or isolation. Mental health nurses can utilize the therapeutic relationship to target the patient’s ability to identify and verbalize emotions surrounding eating patterns. In this way the psychoeducation of clients can help individuals to work through underlying conflicts, increase distress tolerance, and decrease isolation.^[29]

If mental health professionals who encounter clients with orthorexic tendencies are aware of the overlap and correlation with OCD behaviors, it could prompt additional screening and possible detection of co-morbid obsessive-compulsive disorder. Awareness that college/university students pose a high-risk group for ON tendencies may encourage colleges and universities to disseminate information regarding awareness, prevention, early symptom recognition as well as availability of assistance through student health centers on their campuses.

This can be in the form of student education pamphlets regarding eating disorders, perceptions of body image, and screening questions regarding eating behaviors. General questions regarding this type of information can also routinely be included in a general health questionnaire completed by patients. This would allow nurses to better recognize possible eating disorders in their patients.^[30]

Additionally, several studies including this one, have reported that ON behaviors are more prevalent in females than in males. Such gender differences might imply, through future research, that women’s ON patterns are somewhat influenced by society’s standards, or mass media, or perhaps such an idealized body image that women feel compelled to follow so-called healthy, but in reality, unhealthy eating. More research is needed to develop a better screening tool for orthorexia that can be validated and reliable to detect ON. Future research is needed to identify high risk groups other than college/university students and females and to add more data on orthorexia nervosa so that the debate can be resolved on whether ON is a separate eating disorder or just a variant of the OCD spectrum, or a variant of anorexia nervosa.

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CONFLICTS OF INTEREST DISCLOSURE

The authors declare that there is no conflict of interest.

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