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Relationship between risk behaviors for orthorexia nervosa, social media and diets in nutrition students

Relação entre comportamentos de risco para ortorexia nervosa, mídias sociais e dietas em estudantes de nutrição

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ABSTRACT
The study aimed to identify risk behaviors for orthorexia nervosa and their relationship with social media, fad diets and academic term in nutrition students at a higher education institution in São Paulo. The method used was a cross-sectional study involving 285 students. ORTO-15 questionnaire assessed risk behaviors for orthorexia nervosa and was associated with the Frequency and Use of Social Media Questionnaire, applied through internet. ANOVA *one-way* analysis of variance was used with Fisher's post hoc and Student's t-test, adopting a significance level of 0.05. The orthorexic behavior was found in 72% of the sample, however, a decline was observed over the course. Those who have already dieted and frequently used social media had a significantly lower score, favoring the development of the practice. Nutrition students demonstrated to be a group susceptible to orthorexic behaviors and those behaviors are related to the semesters they are attending, fad diets and social media. Awareness of this practice and prevention are necessary, avoiding biopsychosocial losses.

Keywords: Feeding and eating disorders. Feeding behavior. Social media. Students of health sciences.

RESUMO
O estudo visou identificar comportamentos de risco para ortorexia nervosa e sua relação com as mídias sociais, dietas da moda e período letivo em estudantes de Nutrição de uma Instituição de Ensino Superior em São Paulo. Trata-se de pesquisa transversal envolvendo 285 alunos. O questionário ORTO-15 avaliou comportamentos de risco para ortorexia nervosa e foi associado ao Questionário de Frequência e Uso de Mídias Sociais, aplicados via internet. Utilizou-se a análise de variância ANOVA *one-way* com *post hoc* de Fisher e teste t Student independente, adotando nível de significância de 0,05. Constatou-se tal comportamento em 72% da amostra, porém observou-se um declínio ao longo do curso. Aqueles que já fizeram dieta e usavam frequentemente mídias sociais digitais apresentaram escore significativamente menor, favorecendo o desenvolvimento da prática. Estudantes de nutrição revelaram-se um grupo suscetível a comportamentos ortoréxicos, que estão relacionados aos semestres cursados, à prática de realizar dietas e ao uso de mídias sociais. A conscientização dessa prática e a prevenção são necessárias devido aos riscos biopsicossociais.

Palavras-chaves: Comportamento alimentar. Estudantes de ciências da saúde. Mídias sociais. Transtornos da alimentação e da ingestão de alimentos.

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INTRODUCTION

Healthy eating is based on the consumption of a variety of natural foods that are related to the cultural and local context in which the individual is inserted. In addition, it must be in accordance with the biological needs of each subject and aims to protect against the vast majority of diseases. All food groups must be included, such as fruits, vegetables, legumes and whole grains, in addition to avoiding the consumption of those with excess sugars, sodium and saturated fat[1].

However, a new pathological obsessive behavior concerning food has been evident in recent years and is called orthorexia nervosa (ON). The term is derived from the Greek ortho, which means "correct", and rexia, which corresponds to "appetite". It is an extreme attitude towards "healthy" eating, food quality and diet purity[2]. There are some signs that help in the diagnosis, such as excessive concern with food, which can generate restrictions in relation to dyes, preservatives, pesticides, salt, sugar, fat and transgenics[3].

Orthorexia Nervosa can trigger several health complications, including malnutrition, as well as anemia, hypovitaminosis, depression, hypochondria and anxiety[2,4]. Furthermore, orthorexic characteristics can impact the individual's social environment, as a result of the need to maintain extremely strict eating routines[5].

The average prevalence of ON is 6.9% for the general population, and health professionals and artists make up the high-risk group[2,6]. Students and professionals, both in the health field, are more predisposed to develop excessive dietary concerns, as a result of the great pressure and demands suffered in their collective relationships, in addition to the high knowledge about food and health[2,5]. Currently, social media disseminate a lot of information regarding food, which leads to both external and personal judgments, when it is not possible to follow the established healthy pattern[7].

Nutritional education work at universities should be preventive, aiming to provide information about eating disorders, their risks and consequences, as well as psychological support to students since the beginning of degree, which can be effective in reducing the prevalence of obsessive behaviors in future health professionals[8].

Over the years, with the increase in the use of social media, there is an increasing concern with body image and health[9]. Although there are several accounts and profiles, Instagram is known as a "narcissistic" network, in which the users' body image, the interesting places they go to and the high-quality photos are part of its attractive features[10].

This digital social network has great importance in the "healthy eating movement", in which celebrities influence users' diet through posts of diets and body images. This can trigger a social comparison and a disorderly diet for internet users, as in the case of ON, because there is an "ideal" body pattern and a "healthy lifestyle" encouraged by accounts with a large number of followers, as these are difficult patterns to be achieved[9,11]. Thus, about 90% of people who access social media and who spend, on average, between 15 and 30 minutes a day on Instagram, are at increased risk for the development of orthorexic symptoms[9].

In this sense, the objective of the present study was to identify risky behaviors for ON and its relationship with social media, the practice of fad diets and the academic term in students of the Nutrition degree. Due to the possible health consequences that this practice can generate, the discovery of ON behavior among students in this field will allow to plan actions to raise awareness about its risks - which involve dietary restrictions and the ideal of purity -, which lead to malnutrition, anemia, hypovitaminosis, anxiety, emotional instability and social isolation, given the need to maintain strict eating routines [2,4,5].

METHODOLOGY

It is a cross-sectional field survey, carried out with undergraduate students in Nutrition, enrolled between the first and the sixth semesters in the two units of a Higher Education Institution (HEI) in the city of São Paulo in 2019. This study was approved by the HEI Ethics Committee under CAAE 02504818.3.0000.0063 and No. 3.056.069.

Visits to the classrooms were scheduled - after authorization from the responsible professor – in order to clarify the study objectives and invite students to participate in the research. Those who agreed to take part in the study signed the Informed Consent Form (ICF). The project was approved by the Research Committee (CPQ) and by the Research Ethics Committee of the university center (COE). The students received a link (via Google Forms) with two online questionnaires (ORTO-15 and Questionnaire on the Use and Frequency of Social Media) that were available for 20 days.

As for the selection of the sample, students who were previously enrolled and who regularly attended the HEI were considered eligible, after consenting and signing the informed consent form. Those under the age of 18 (because they were minors) and those who were in the seventh and eighth semesters (because they were in the curricular internship period outside the campus) were excluded. Considering these criteria, the sample had 285 participants.

To assess the characteristics of the research population and the frequency of dieting, a form was prepared with the following variables: sex, age, semester attended at the time of collection, term,

family income and occupation, in addition to the history or habit of dieting with an aesthetic aim of losing weight or gaining muscle mass.

To know the nutritional status (NS) of the volunteers, data on weight (kg) and height (m) were self-reported, using the research form. The classification of the body mass index (BMI) followed the criteria of the World Health Organization (WHO)[12]: for individuals aged between 18 and 19 years and 11 months, it proposes the classification in severe thinness, thinness, eutrophy, overweight, obesity and severe obesity, according to the z score, obtained by applying weight and height in the ANTHRO Plus software; for those aged 20 years or over, the criterion of the same international organization[13] was used, in which <18.5 = underweight, ≥ 18.5 and <25 = adequate weight, ≥ 25 and <30 = overweight, and ≥ 30 = obesity.

The analysis of orthorhexic behaviors was performed using the original and translated ORTO-15 questionnaires, in which values <40 represent risky behavior for ON, with a specificity of 73.6% and sensitivity of 100%[14,15]. The original questionnaire is a tool used to identify ON characteristics and consists of 15 questions with answers on a gradual scale, which are answered with "always", "often", "sometimes" and "never". The result was obtained by the sum of gradual points (1-4), where "1" indicates ON, and "4" indicates individuals without orthorexic characteristics[14]. It was translated and culturally adapted to Portuguese according to the methodology recommended by the WHO, in which contact with the author and the translation of the Italian questionnaire was established. After being translated, the test was applied to 20 students of the Nutrition and Dietetics Technician and Secretarial Technician courses in Distrito Federal[15].

After applying the instrument, the scores obtained in each topic were added and computed for each person evaluated. If the total obtained was less than or equal to 40, the orthorexic characteristics were considered positive, confirming the presence of unhealthy eating attitudes and the risk for the development of ON; the score above 40 was considered risk free. The data were transferred to Excel and later to the statistical program Statistica® version 6.0 for Windows.

For the analysis of the influence and use of social media and orthorexic behaviors, the Frequency and Use of Social Media Questionnaire[16] was used, which, in its original article, consisted of a tool aimed at verifying the influence and use of social media (Facebook, Instagram, Twitter and Snapchat) on body image; it consists of nine questions with answers on a gradual scale, which can be answered with "never", "rarely or sometimes" and "often or always". This instrument has no validation, since its objective is limited to addressing common issues involving the use of social media in order to seek health and weight loss.

Data were presented using measures of central tendency (mean and median) and dispersion (standard deviation, minimum and maximum), as well as frequency (%). To compare the scores of the questionnaire according to the academic semester, ANOVA one-way analysis of variance with Fisher's post hoc was performed. For comparison between two groups - whether dieting or not and on the use of social networks - the independent Student t test was used. The statistical examination was conducted from the data processing using the software Statistica® version 6.0 for Windows and the significance level was set at 0.05.

RESULTS

It was observed that 80% of the sample was represented by individuals aged between 18 and 23 years, with a greater predominance of females (91.6%), the vast majority of whom were students without employment (72.3%) and income above five minimum wages (37.9%). As for NS, there was a higher prevalence of eutrophic participants (72.6%), followed by those with overweight (17.5%), underweight (7%) and obesity (2.8%) (data not reported in the table).

Based on the analysis carried out using ORTO-15, 72% of the participants showed eating behavior with a tendency to ON. In the first semester, the highest prevalence of orthorexic characteristics (34.8 ± 4.7) (81.4%) was observed, when compared to the sixth semester (37.6 ± 4.5) (71.4%). In the fourth semester, there was a decrease in the score (34.8 ± 5.2), which resulted in a higher prevalence of orthorexic characteristics (79.3%) in relation to the other semesters analyzed (second, third and fifth, with prevalence of 57.1%, 67.5% and 73.4%, respectively) (Tables 1 and 2).

Table 1. Prevalence of orthorexic characteristics in nutrition students from an HEI, attending the second academic semester. São Paulo, 2019

Semester (n = 285)	At risk (n = 206) %	No risk (n = 79) %
1º (n = 59)	81.4	18.6
2º (n = 28)	57.1	42.9
3º (n = 77)	67.5	32.5
4º (n = 29)	79.3	20.7
5º (n = 64)	73.4	26.6
6º (n = 28)	71.4	28.6

Source: Research data.

Table 2. Scoring of orthorexic characteristics in nutrition students from an HEI, attending the second academic semester. São Paulo, 2019

Semester	ORTO-15 score	Mean ± SD
1°	34.8	4.7 ∇
2°	37.6	4.5
3°	36.6	4.5 γ
4°	34.8	5.2 β
5°	37.3	3.7 Δ
6°	37.6	4.5 ∝

Note: (∇ = 1° X 2°. p < 0.008; γ = 3° X 1°. p = 0.02; β = 4° X 2°. p < 0.02; Δ = 5° X 1°. p < 0.003, 5° X 4°. p = 0.01; ∝ = 6° X 1°. p < 0.007, 6° X 4°. p < 0.02).
One-way ANOVA test with Fisher's post hoc. Significance level adopted at p <0.05.
Source: Research data.

Table 2 represents the average score obtained among students according to the academic term (semester) using the ORTO-15 questionnaire. From the comparison between the first and the sixth semesters, the orthorexic characteristics in the students decreased significantly (p = 0.007), with the exception of the fourth semester, in which a significant drop in the score was noticed, representing a greater risk of orthorexic behaviors during this academic term.

The data show that 77% of individuals who have already adhered to fad diets are at risk of presenting orthorexic behavior at some point in their lives. In addition, among those who have never dieted, only 63% are at risk. What is more, those who have already dieted had significantly lower scores compared to those who never did (35.5 ± 4.5 and 37.9 ± 4.2; p = 0.000) (Table 3).

Table 3. ORTO-15 score in nutrition students from an HEI, according to the practice of going on diets. São Paulo, 2019

Have you ever gone on a diet?	n	ORTO-15 score (x ± SD)	p
Yes	104	35.5 ± 4.5	0.000*
No	121	37.9 ± 4.2	

* Student's t test for independent variables. Significance level adopted at p <0.05.
Source: Research data

Regarding the influence of social media, students who showed orthorexic behavior predominantly answered "frequently or always" to questions 1, 3, 4

and 8 of the Frequency and Use of Social Media Questionnaire[16], which correspond to the following questions: “Do you follow social networks that talk about “healthy” diet and food?”; "Do you agree that "strength, focus and faith" are necessary in order to lose weight?"; "Have you ever felt influenced to 'cut off' ‘unhealthy' foods from your diet?"; and "Do social networks influence your perception and relationship with your body?" (Tables 4 and 5).

Table 4. Frequency of answers on the use of digital social networks in nutrition students from an HEI, according to the presence of orthorexic characteristics. São Paulo, 2019

		Never	Rarely or sometimes	Often or always	Total
	Questions		**n (%)**		**206 (100%)**
1	Do you follow social networks that talk about “healthy” diet and food?	13 (6)	65 (32)	128 (62)	
2	Do you follow social networks that talk about physical activity?	28 (14)	83 (40)	95 (46)	
3	Do you agree that “strength, focus and faith” are necessary in order to lose weight?	63 (31)	68 (33)	75 (36)	
4	Have you ever felt influenced to “cut off” “unhealthy” food from your diet?	32 (16)	87 (42)	87 (42)	
5	Are social networks sources of information about food and diet for you?	70 (34)	105 (51)	31 (15)	
6	Are social networks sources of information about what is a healthy body for you?	93 (45)	81 (39)	32 (16)	
7	Have you ever had a diet or other recommendation on food made by social networks?	114 (55)	79 (39)	13 (6)	
8	Do social networks influence your perception and relationship with your body?	33 (16)	83 (40)	90 (44)	
9	Do social networks influence your daily food choices?	90 (44)	100 (48)	16 (8)	

Source: Research data.

Table 5. Frequency of answers on the use of digital social networks in nutrition students from an HEI, according to the absence of orthorexic characteristics. São Paulo, 2019

		Never	Rarely or sometimes	Often or always	Total
	Questions		**n (%)**		**79 (100%)**
1	Do you follow social networks that talk about "healthy" diet and food?	5 (6)	38 (48)	36 (46)	
2	Do you follow social networks that talk about physical activity?	27 (34)	37 (47)	15 (19)	
3	Do you agree that "strength, focus and faith" are necessary in order to lose weight?	28 (35)	33 (42)	18 (23)	
4	Have you ever felt influenced to "cut off" "unhealthy" food from your diet?	14 (18)	50 (63)	15 (19)	
5	Are social networks sources of information about food and diet for you?	32 (41)	43 (54)	4 (5)	
6	Are social networks sources of information about what is a healthy body for you?	36 (45)	33 (42)	10 (13)	
7	Have you ever had a diet or other recommendation on food made by social networks?	50 (63)	28 (36)	1 (1)	
8	Do social networks influence your perception and relationship with your body?	18 (23)	32 (40)	29 (37)	
9	Do social networks influence your daily food choices?	37 (47)	40 (51)	2 (2)	

Source: Research data

In contrast, students without orthorexic behaviors predominated in the answer "never", mainly in questions 6 and 7, which address respectively: "Are social networks sources of information about what is a healthy body for you?"; and "Have you ever had a diet or other recommendation on food made by social networks?".

The frequent or always use of digital social networks related to diet and healthy eating was higher among individuals with orthorexic behavior (62%), compared to those who are not at risk (46%). In addition, the influence of these media on body perception is relevant among those with characteristics of behavior (44%), as well as those without them (37%) (Tables 4 and 5).

DISCUSSION

The present study identified the relationship between risk behaviors for orthorexia nervosa (ON), social media and fad diets in Nutrition students. Orthorexia nervosa can be triggered from the beginning of diets with a focus on the treatment of

pathologies linked to food. Furthermore, restrictive diets for weight loss are directly related to the development of eating disorders, which leads to choices that promote uncontrolled food consumption or prolonged fasts that significantly compromise the individual's physical and psychosocial health[17,18]. This was also observed based on the score obtained by the ORTO-15 questionnaire, in which students who had already gone on a diet achieved a significantly lower result than those who never did, indicating greater practice of orthorexic behaviors.

What is more, the influence of digital social media on orthorexic behavior was verified, as the findings showed a higher prevalence in the frequency and use of these among the population at risk of developing orthorexia. In addition, approximately half of the individuals who had orthorexic characteristics mentioned that digital social networks influenced perception and the relationship with the body. It is worth mentioning that, according to recent literature, the use of social media is directly related to body dissatisfaction, and the time spent on the internet is a significantly relevant factor for the internalization of the ideal of thinness, body surveillance and the desire to lose weight[9,19,20].

The data obtained in the present study reinforce the results of a similar survey with 113 Nutrition students in the year 2017, who pointed out that 94.69% had traits of orthorexic behavior[21]. In another study, carried out in 2019 with 1,120 university students from seven universities in Poland, it was shown that those in the health field have a greater tendency to develop orthorexic characteristics, when compared to those from other courses. The research showed that students in this area obtained a lower average score (35.9 ± 4.1) compared to other degrees (37.2 ± 4.2) regarding the dietary pattern[18].

Corroborating these data, a study carried out in 2018, with 176 undergraduate students of Nutrition and Dietetics in Greece, revealed that 68.2% had orthorexic characteristics. The authors point out that Nutrition students have healthier eating habits when related to students from other fields. The fact that they are constantly in contact with information and guidance on food and nutrition favors the idea of responsibility regarding their food choices, which can lead to obsessive behavior[22].

The knowledge acquired about the science of Nutrition may be associated with the development of orthorexic characteristics in health students, and it is commonly observed that dietary restriction is a common habit among this population[23]. The food restriction in ON differs from that related to other eating disorders, such as anorexia nervosa and bulimia nervosa - since the problem is in quality and quantity, respectively; the observed in ON refers to the consumption of foods considered healthy with a focus on quality, with the exclusion of sugars, pesticides, dyes,

preservatives, fat, transgenics and excess salt[3,24].

When assessing the prevalence of risk of developing ON among students, according to the academic semesters of the course, the present research showed a higher prevalence in the first semester. These findings indicate that the undergraduates of this term, being in the initial stage of degree, are part of the group with the highest prevalence in relation to other terms. The orthorexic characteristics decreased significantly when comparing the first with the sixth semester in which there was a significant increase in the score, indicating a reduction in the orthorexic characteristics. The higher prevalence of orthorexic behaviors in this period may be related to the motivation for pursuing the degree and the lack of knowledge about the science of Nutrition. The literature points out that part of those starting university is already more concerned with food and body image[3,25,26].

The score for the fourth semester also proved to be significantly lower compared to the others, reflecting a higher risk of ON. Knowledge about the nutritional composition and caloric value of foods can lead to obsessive behavior in relation to food[3]. The subject Dietetics, in which the application of nutritional calculations is addressed, as well as the planning and preparation of meal plans, take place in the fourth semester of this Higher Education Institution, which reaffirms the relationship established in the study on ON and the concern with the amount of nutrients that individuals intake during the day[3,26]. In addition, the literature points out that people who care about food, image and body mass tend to seek courses in the health area, more specifically in Nutrition[25]. This fact indicates the importance of monitoring and preventing such behavior among university students in all terms.

Conversely, a survey conducted at an HEI in Paraná in 2018, with 82 Nutrition students from all academic years, showed that those who were in the first and second years had less orthorexic characteristics when compared with the later ones[27]. The results found in this study showed a relationship between the occurrence of ON and the semester attended, which was not observed in another study[3].

It was observed that most participants agreed that to lose weight, “strength, focus and faith” are necessary, a phrase commonly used by internet users in order to “motivate” people to exercise and have eating discipline. This belief reinforces that, in order to achieve a certain aesthetic standard, it is only necessary to “wish” and “make an effort”, which can lead to feelings of guilt and frustration, ignoring the fact that being overweight, as well as the weight loss process, involves a multifactorial and complex metabolic context[16].

The words used by the fitness community are directly related to the appearance of the body and weight loss. Although this influence can be seen as

adequate for promoting a healthy lifestyle, there are some characteristics associated with dysfunctional behavior. This reflects the finding that posts from this community on Instagram increase the risk of eating disorders when compared to those made in another type of material or publication used as a control[9,11,19,20,28]. A study highlighted that Instagram was the network that most correlated with orthorexic behavior[9].

In contrast, the population of students without orthorexic behaviors showed less frequency and use of digital social media, pointing to their possible influences for the development of ON characteristics. With similar results, a study carried out to assess the use of digital social media, eating behaviors and the presence of ON symptoms in users who followed accounts related to healthy eating indicated an inversely proportional relationship between the use of digital social media and the ORTO-15[9] score.

A possible relationship between the influence of digital social media on the development of ON is the selective exposure of content based on the choices of users. In this way, accounts about "healthy eating", which are increasingly popular and with many followers, trigger social pressures to adapt to this "lifestyle", possibly leading to obsessive behavior[9].

Nutritionists, being considered risk groups, can be propagators of obsessive behaviors related to ON in their professional practice. In a study conducted in 2018 in the United States, the ORTO-15 questionnaire with 636 nutritionists was applied and it was found that 49.5% are at high risk of developing ON[29]. The social demand imposed on this professional and the knowledge acquired - both on body composition and on the food composition - contribute to the emergence of orthorexic characteristics[2,3,5].

The awareness of Nutrition students must be carried out with the deconstruction of mistaken beliefs about food. Thus, food and nutrition education at the university must cover not only food in an organic way, but also address the importance of a good relationship with food, emphasizing eating behavior[8,30].

The Cognitive-Behavioral Therapy can be a promising strategy, as it aims to identify and decrease harmful thoughts and beliefs, in addition to encouraging balanced thoughts about food and nutrition. The nutritionist must be prepared for the correct application, together with other healthcare professionals, such as psychologists and psychiatrists[8,30].

Some studies suggest the creation of campaigns and programs that can contribute to body acceptance, healthier behavioral and eating habits, as well as better use of digital social networks[30]. There is a need for more intervention research in the academic environment focusing on prevention[8]; however, there is a scarcity of information in the literature about possible intervention actions to raise public awareness.

The results of the present study should be interpreted with caution, since

there are some pertinent limitations to it. This includes the fact that it did not have a longitudinal characteristic, as it was not possible to accompany the same students from the start of the degree until its completion. Even so, this research is innovative, as it identified the relationship between orthorexic behaviors with the use of social media and dietary practices, according to the academic semester among Nutrition students from a HEI.

CONCLUSION

The findings of the present study confirm that Nutrition students are part of a group of potential risk for the development of orthorexic characteristics, related to the term studied and the practice of dieting. In addition, they point out that digital social media are likely to be related to orthorexic behavior and a higher prevalence in their frequency and use among the population at risk, when compared to the population without risk.

Thus, the results reveal the need for more research addressing the role and prevalence of risk behaviors through variables associated with orthorexic characteristics, in order to bring new data to the literature. Due to the possible health consequences that this practice can generate, the early identification of ON signs among Nutrition students and nutritionists, who will be important references and disseminators of information about food to the population, will allow the idealization of action plans of public health aimed at raising awareness about the risks involved, such as psychological support, campaigns, programs that can contribute to body acceptance, healthier behavioral and eating habits, and the conscious use of digital social networks since students start university.

INDIVIDUAL CONTRIBUTIONS

All authors contributed substantially to the analysis and interpretation of the data. In addition, they wrote the article, critically reviewed it for important intellectual content and gave final approval to the version to be published.

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