

RELATIONSHIP OF NUTRITIONAL STATUS, RISK FOR EATING DISORDERS AND STRESS LEVELS OF UNIVERSITY STUDENTS

RELAÇÃO DO ESTADO NUTRICIONAL, RISCO PARA TRANSTORNOS ALIMENTARES E NÍVEIS DE ESTRESSE DE ESTUDANTES UNIVERSITÁRIOS

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ABSTRACT

Introduction: Students tend to trigger problems related to the presence of stress and consequently the development of eating disorders (ED), reflecting on their nutritional status. **Objective:** To evaluate the relationship between nutritional status, risk for eating disorders and stress levels of university students. **Methodology:** Quantitative cross-sectional study carried out with university students aged over 18 years, enrolled in undergraduate courses at a Higher Education Institution. Using the *Google Forms*® tool, the *Eating Attitudes Test* (EAT-26) questionnaire was applied, which assesses the risk of developing ED and the *Perceived Stress Scale* (PSS-10) to assess perceived stress, in addition to weight and height data for nutritional status assessment, classified according to World Health Organization (WHO, 1998) for adults and PAHO (2002) for the elderly. The results were considered significant at a maximum level of significance of 5% ($p < 0.05$). **Results:** Of the 82 university students, 92.7% were female, with a mean age of 23.7 ± 7.3 years, and 70.7% were classified as eutrophic. There was no relationship between nutritional status and risk for ED, however 77.1% of eutrophic university students presented risk for ED. Students with a high-risk stress level were associated with the presence of ED risk ($p < 0.05$). **Conclusion:** The high-risk stress level was associated with the presence of ED risk and most of the participants in eutrophy presented a higher level of perceived stress.

Keywords: Food attitudes; Emotional stress; Students; University students.

RESUMO

Introdução: Estudantes tendem a desencadear problemas relacionados à presença do estresse e consequentemente o desenvolvimento de transtornos alimentares (TA), refletindo no seu estado nutricional. **Objetivo:** Avaliar a relação do estado nutricional, risco para transtornos alimentares e níveis de estresse de estudantes universitários. **Metodologia:** Estudo transversal quantitativo realizado com universitários com idade superior a 18 anos, matriculados nos cursos de graduação de uma Instituição de Ensino Superior. A partir da ferramenta *Google Forms*®, foi aplicado o questionário *Eating Attitudes Test* (EAT-26), o qual avalia o risco de desenvolvimento de TA e a *Escala de Percepção de Estresse* (PSS-10) para avaliar o estresse percebido, além dos dados de peso e altura para avaliação do estado nutricional, classificado conforme Organização Mundial da Saúde (OMS, 1998) para adultos e OPAS (2002) para idosos. Os resultados foram considerados significativos a um nível de significância máximo de 5% ($p < 0,05$). **Resultados:** Dos 82 universitários, 92,7% eram do sexo feminino, com idade média de $23,7 \pm 7,3$ anos, sendo 70,7% classificados em eutrofia. Não houve relação do estado nutricional com o risco para TA, porém 77,1% dos universitários eutróficos apresentaram risco para TA. Alunos com nível de estresse de alto risco foram associados à presença

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de risco TA ($p < 0,05$). Conclusão: O nível de estresse de alto risco foi associado à presença de risco para TA e a maioria dos participantes em eutrofia apresentaram maior nível de estresse percebido.

Palavras-chaves: Comportamento alimentar; Estresse emocional; Estudantes; Universitários.

INTRODUCTION

For most individuals, entering university takes place during a transitional phase from adolescence to adulthood, a period characterized by uncertainty and fear. This phase necessitates a period of adaptation and lifestyle changes (Ferreira *et al.*, 2017). The high demand for study hours, extracurricular activities, and the lack of regular physical exercise lead to changes in eating habits and, consequently an increased risk of health issues due to the high consumption of processed foods, rich in calories, sodium, and refined sugars (Costa, 2017).

In addition, university students often have a demanding routine due to different activities related to work, personal tasks, and study, which can trigger stress-related problems, such as irritability, impatience, lack of motivation, and reduced productivity (Torquato, 2021). In this context, psychological factors rather than physiological ones often primarily influence students' food intake, which affects their overall eating behavior (Aldão *et al.*, 2010; Pinto, Mariano and Sampaio, 2019).

Eating behavior (EB) encompasses all actions related to food before and during its ingestion, while eating attitudes define the EB, which can be influenced by several factors, such as psychological, emotional, social, religious and environmental (Ferreira *et al.*, 2018). EB actions can be classified as eating postures, from which there are three dimensions used, especially, by research: emotional, when an individual eats in response to negative emotions, restrictive, when food intake is consciously restricted with the aim of modulating body weight; and external, which occurs when ingestion is triggered by external aspects of food (Santos *et al.*, 2021). Eating disorders (ED) are recognized as psychiatric illnesses that cause emotional and social damage, with consequences for the metabolic and endocrine systems. They can affect the nutritional status (NS) individuals with the disorder and lead to an unbalanced CA (Bento *et al.*, 2016). The presence of overweight and obesity may be related to CA based on environmental, social and psychological factors, among others. In pursuit of societal beauty standards, focused on a thin body, established by society, individuals may engage in behaviors harmful to their health, such as extreme dieting, excessive physical exercise and compensatory actions like induced vomiting, excessive use of laxatives and diuretics (Catão *et al.*, 2020).

Therefore, this study aims to evaluate the nutritional status, the risk of eating disorders and their relationship with the stress levels of university students.

MATERIALS AND METHODS

A quantitative, cross-sectional, exploratory-descriptive study was conducted with university students of both sexes, aged of 18 or older, from a Higher Education Institution in the interior of Rio Grande do Sul, from September to October 2023. The invitation to participate was sent to students via a university protocol, where emails were sent to students of all undergraduate courses. The research was approved by the Research Ethics Committee, under opinion number 5,833,619.

Data collection was carried out online, using the Google Forms® tool. After digitally signing the free and informed consent form (TCLE), participants had access to the Eating Attitudes Test (EAT-26) questionnaire, the Stress Perception Scale (PSS-10) and data collected related to age, date of birth, sex, course, semester, self-reported weight and height.

The EAT-26 questionnaire was used to assess eating attitudes, validated in Brazil by Bighetti (2003). It is a self-report instrument designed to assess and identify abnormal eating patterns, and is also useful for monitoring clinical cases. The EAT-26 consists of 26 questions, grouped into different aspects of eating attitudes (diet scale, bulimia scale, concern with food and oral control scale), with six response options, namely: always, very often, frequently, sometimes, rarely and never, scoring from zero to three points. The final score of the questionnaire ranges from 0 to 78, with individuals scoring 21 points or more being at risk for developing ED (Garner *et al.*, 1982). The PSS-10 was used to assess the individual's perception of how unpredictable and uncontrollable the life events experienced in the last month seem to them (Cohen *et al.*, 1988), in addition to providing a subjective assessment of stress. The instrument consists of 10 items presented on a Likert scale: never (0), almost never (1), sometimes (2), infrequent (3) and very frequent (4), multiple choice, with the score obtained by summing the points of each question. For the analysis of the PSS-10, the positively worded questions (4, 5, 6, 7, 9, 10, 13) had their scores added reversed as follows: 0=4, 1=3, 2=2, 3=1 and 4=0. The negatively worded questions were scored directly. The total score of the scale is the sum of the scores of these 14 items and the scores can range from zero (minimum) to 56 (maximum). The questions on this scale are about your feelings and thoughts over the last 30 days. To interpret the results of the PSS-10, it is understood that perceived stress (PS) is understood as a continuous variable, which should be analyzed as such, with higher scores indicating higher Stress Levels (LE). However, to assess the association between stress and CA, students were classified into two groups based on the average proposed by Cohen's cutoff points (1984): Group with lower stress levels (below average) and group with higher stress levels (above average).

To assess the students' NE, self-reported weight and height data were collected to calculate the Body Mass Index (BMI), which was obtained by dividing weight (in kg) by height (in meters) squared. NE was classified according to the recommendations of the World Health Organization (WHO, 1998) for adults and PAHO (2002) for the elderly.

The data were analyzed through simple tables, cross-tabulations, percentages and association tests (Fisher's exact test), mean comparison tests (Student's t-test) and analysis of variance. The results were considered significant at a maximum significance level of 5% ($p < 0.05$).

RESULTS

A total of 82 university students were evaluated, with a mean age of 23.7 ± 7.3 years, the majority were female, with a higher proportion of students enrolled in the nutrition program, followed by the psychology program, and more than half of the course had been completed. Regarding BMI, an average of 24.0 ± 4.2 kg/m² was obtained and most of the university students did not present a risk for ED (Table 1).

Table 1 - Characterization of 82 university students from a Higher Education Institution in Rio Grande do Sul.

Variável	Resposta	Nº cases	%
Sex	Feminine	76	92,7
	Masculine	6	7,3
Course	Biomedicine	5	6,1
	Design	1	1,2
	Law	2	2,4
	Nursing	7	8,5
	Pharmacy	4	4,9
	Physiotherapy	5	6,1
	Medicine	11	13,4
	Nutrition	28	34,1
	Dentistry	4	4,9
	Psychology	14	17,1
	Administrative technician	1	1,2
Nutritional status	Eutrophy	58	70,7
	Overweight	16	19,5
	Obesity	8	9,8
Risk of ED	No risk	47	57,3
	With risk	35	42,7

ED: eating disorder; N: sample number; %: relative frequency.

Regarding the characterization of the items on the EAT-26 scale, most of the individuals assessed reported never presenting most of the behaviors assessed, with the exception of the items "I am afraid of becoming overweight", "I try not to eat when I am hungry!", "I spend a lot of time thinking about food", "I think a lot about eating", "I think a lot about wanting to be thinner", "I pay attention to the amount of calories (energy) in the food I eat", "I am worried about having fat on my body", "When I exercise, I think about burning calories (energy)", "I try not to eat foods that contain sugar", whose highest scores were revealed by choosing the options always, almost always, sometimes (Table 2).

Table 2 - Characterization of the items on the EAT-26 scale of 82 university students from a Higher Education Institution in Rio Grande do Sul.

Scale Items	Never		Almost never		Few Times		Sometimes/ Infrequently/ Very Frequently	
	n	%	n	%	N	%	n	%
I'm afraid of becoming overweight	7	8,5	12	14,6	6	7,3	57	69,5
I try not to eat when I'm hungry	28	34,1	9	11,0	19	23,2	26	31,7
I spend a lot of time thinking about food	2	2,4	6	7,3	22	26,8	52	63,4
I ate so much that I thought I wouldn't be able to stop.	30	36,6	14	17,1	18	22,0	20	24,4
I cut my food into small pieces	4	4,9	10	12,2	9	11,0	70	85,3
I pay attention to the number of calories (energy) in the foods I eat.	15	18,3	11	13,4	9	11,0	47	57,3
I try not to eat certain foods like bread, potatoes and rice.	26	31,7	21	25,6	13	15,9	22	26,9
Eu sinto que as outras pessoas gostariam que eu comesse mais	38	46,3	16	19,5	5	6,1	23	28
Eu vomito depois de comer	78	95,1	3	3,7	-	-	1	1,2
I feel guilty after eating	18	22,0	9	11,0	15	18,3	40	48,7
I think a lot about wanting to be thinner	14	17,1	12	14,6	7	8,5	49	59,8
When I exercise, I think about burning calories (energy)	9	11,0	9	11,0	13	15,9	48	58,5
Other people think I'm too thin.	33	40,2	10	12,2	8	9,8	59	71,9
I'm worried about having fat on my body	6	7,3	11	13,4	10	12,2	86	104,6
It takes me longer than other people to finish eating my meals	6	7,3	17	20,7	5	6,1	54	65,8
I try not to eat foods that contain sugar	12	14,6	15	18,3	16	19,5	39	47,6
I eat diet or light foods	15	18,3	20	24,4	17	20,7	30	36,5
I think food controls my life	26	31,7	16	19,5	13	15,9	27	32,9
I demonstrate self-care around food	1	1,2	2	2,4	13	15,9	66	80,4
I feel like other people pressure me to eat	36	43,9	20	24,4	8	9,8	18	22
I think a lot about eating	7	8,5	10	12,2	15	18,3	50	61
I feel sick after eating sweets	12	14,6	15	18,3	11	13,4	44	53,7
I've been on diets to lose weight	28	34,1	5	6,1	11	13,4	38	46,3
I like to feel my stomach empty	46	56,1	18	22,0	5	6,1	13	15,8
I like to try new foods that are high in calories (energy)	5	6,1	12	14,6	11	13,4	54	65,9
I feel like vomiting after eating	69	84,1	9	11,0	2	2,4	2	2,4

N: sample number; %: relative frequency.

Regarding the PSS-10, it can be observed that most of the individuals evaluated reported experiencing almost all of the behaviors analyzed, with the highest percentages, in decreasing order, for the items, “How often have you been upset because of something that happened unexpectedly?”, “How often have you been nervous or stressed?”, and “How often have you been angry because of things that were beyond your control?” (Table 3).

Table 3 - Characterization of the PSS-10 items of 82 university students from a Higher Education Institution in Rio Grande do Sul.

Variable	Never		Almost never		Sometimes/ Infrequently/ Very Frequently	
	n	%	n	%	n	%
How often have you been upset because of something that happened unexpectedly?	-	-	4	4,9	78	95,1
How often have you felt that you were unable to control important things in your life?	5	6,1	10	12,2	67	81,7
How often have you been nervous or stressed?	-	-	6	7,3	76	92,6
How often have you been confident in your ability to deal with your personal problems?	-	-	15	18,3	67	81,7
How often have you felt that things turned out the way you expected?	1	1,2	8	9,8	73	89,1
How often have you felt like you couldn't handle all the things you had to do?	3	3,7	7	8,5	72	87,8
How often have you been able to control irritations in your life?	1	1,2	10	12,2	71	86,7
How often have you felt that every aspect of your life was under control?	8	9,8	20	24,4	54	65,8
How often have you been angry because of things that were beyond your control?	1	1,2	6	7,3	75	91,5
How often have you felt that problems had piled up so high that you couldn't solve them?	7	8,5	17	20,7	58	70,8

N: sample number; %: relative frequency.

It was observed that students with normal weight were at risk for eating disorders, as were most female university students (Table 4).

Table 4 - Comparisons between the variables nutritional status and gender with the risk of eating disorders among 82 university students from a higher education institution in Rio Grande do Sul.

Variable	Response	Risk ED				p
		No risk		With risk		
		n	%	n	%	
Nutritional Status	Eutrophy	27	66,0%	31	77,1%	0,594
	Overweight	11	23,4%	5	14,3%	
	Obesity	5	10,6%	3	8,6%	
Nutritional Status	Female	46	97,9%	30	85,7%	0,079
	Male	1	2,1%	5	14,3%	

Fisher's exact association test. N: sample number; %: relative frequency.

Based on the data obtained, it was found that the variable risk for eating disorders had a significant association with nutritional status (NS). Students with high-risk NE were associated with the presence of risk for eating disorders ($p < 0.044$). In addition, it was found that the high level of OW was higher among younger university students, as well as among a significant percentage of overweight/obese NE (Table 5).

Table 5 - Comparisons between the variables age, nutritional status, sex, semester and risk of eating disorders with the stress level of 82 university students from a Higher Education Institution in Rio Grande do Sul.

Variable	Response	Stress level				p
		Low		High		
		n	%	n	%	
Age	≤ 25	35	83,3%	32	80,0%	0,779
	>25	7	16,7%	8	20,0%	
Nutritional Status	Eutrophy	28	66,7%	30	75,0%	0,471
	Overweight/Obesity	14	33,3%	10	25,0%	
Sex	Female	41	97,6%	35	87,5%	0,105
	Male	1	2,4%	5	12,5%	
Semester	2nd week to 4th week	18	42,9%	14	35,0%	0,787
	5th week to 7th week	12	28,6%	14	35,0%	
	8th week to 10th week	12	28,6%	12	30,0%	
Risk of ED	No risk	29	69,0%	18	45,0%	0,044
	With risk	13	31,0%	22	55,0%	

Fisher's exact association test. ED: eating disorder; N: sample number.

DISCUSSION

Most of the university students analyzed in this study were normal weight, corroborating the study by Santos *et al.* (2021) carried out at four universities in a capital city in the Brazilian Northeast, two private and two public, where it was found that 63.6% of the students, with the majority of the sample being 24 years old, had a BMI classified as eutrophic. A study carried out in Rio de Janeiro showed similar results: of the 157 university students evaluated, 69% had a BMI in eutrophic (Caram and Lazarine, 2019).

When analyzing the association between BMI and risk for ED, most university students classified as eutrophic were at risk for ED. In the study by Caram (2013), the risk for ED was also present in the students evaluated, even though the sample had an average eutrophic BMI (22.75 kg/m²). Another study evaluated 189 medical students found that 19% of the participants were at risk for ED, with 85.9% being eutrophic, according to the EAT-26 (Silva *et al.*, 2022).

Many eutrophic individuals are dissatisfied with their weight and may exhibit risk behaviors for ED, such as food restriction, binge eating, use of laxatives or diuretics, among others (Catão *et al.*, 2020). These behaviors can affect the physical and mental health of university students, who are a group vulnerable to these problems due to life transition, academic stress, and the influence of the media and aesthetic standards, leading to damage to students' health (Moraes *et al.*, 2016). This study found that 42.7% of the university students evaluated were at risk for ED. Similar results were found in a study with 210 university students from the city of São Paulo, where the authors found that 48.3% of the sample was at risk for developing ED (O'Hara, Schulte and Thomas, 2016). Recent studies show that the incidence of ED has increased in the university population, especially in the health field (Silva *et al.*, 2022).

Most of the students in this study had high perceived EL. In the study by Dias *et al.* (2015), carried out based on the analysis of the PSS-10 application with 1,080 university students, a prevalence of 60% of high EL was found, similar to the study by Raulino (2021) and Kam *et al.* (2019), which found 57% and 51% of high perceived EL in the sample, respectively. The level of stress during academic life can be triggered by several factors that reflect on the student's performance, such as addictions, eating habits and responsibilities, altering the young person's reasoning, memorization and capacity for engagement in the evolutionary learning process found in the studies of Torquato (2021).

In this study, most university students at risk for ED also had high perceived NE, showing a significant association. In the study by Gonzaga (2021), university students who fell into the group with the highest perceived NE had a risk of moderate and severe ED, with results similar to those found in this study. In the study by Silva *et al.* (2022), similar to the one carried out here, the relationship between the presence of ED and NE in university students was investigated. The results showed that 15% had some form of ED related to perceived NE, with higher frequencies among women. The relationship between the presence of ED and high NE in university students can be mediated by factors such as dissatisfaction with body image, high BMI, year of graduation, and changes in eating habits (Santos, 2020). Therefore, it is necessary to implement measures to prevent and promote mental and nutritional health in this population, aiming to build a positive self-image, develop critical thinking about image standards and media and social impositions, and adopt a balanced and healthy diet (Santos, 2020).

College students are prone to developing stress as they enter a new phase of life, form new habits and plan their professional future. In addition, entering academic life is identified as one of the causes of the development of ED, especially due to changes in routine, pressure related to body image, alterations in eating behavior and the pursuit of beauty standards imposed by society (Oliveira and Collaborators, 2021).

It is important to mention that the results of this study have some limitations that should be taken into account, such as the low participation of males and the limited participation in certain courses. In addition, weight and height measurements were self-reported; however, they are valid and common in epidemiological studies.

CONCLUSION

This study found that most college students had high levels of perceived stress, and that students with high-risk stress levels may be concurrently at risk for eating disorders concomitantly associated with the presence of a risk of eating disorders.

Therefore, it is necessary to develop strategies to minimize the pressure that academic life exerts on college students, acting as a way of preventing the development of eating disorders, and promoting a better quality of life for these students and future health professionals.

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