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Article

Academic stress and binge eating disorder in medicine students during the coronavirus pandemic

Estresse acadêmico e transtorno de compulsão alimentar em estudantes de medicina durante a pandemia do coronavírus

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ABSTRACT: Introduction: medical students have high levels of stress due to being exposed to intense responsibilities and direct contact with human suffering. These factors predispose to the occurrence of eating disorders, commonly binge eating disorder. Objective: to highlight academic stress factors and maladaptive eating behaviors in medical students at Faculdade Pernambucana de Saúde (FPS), as well as the influence of the experienced pandemic scenario. Method: this is a cross-sectional study. Medical students from all FPS periods were invited to participate in this research, which was approved by the Research Ethics Committee with CAAE: 53687821.6.0000.5569. Information was obtained through a sociodemographic questionnaire that included validated scales for assessing academic stress (NISESTE) and binge eating (ECAP/BES). Data were correlated by Kendall's correlation coefficient in addition to the Kolmogorov-Smirnov Normality test for quantitative variables. A value of $p < 0.05$ was considered. Results: data was obtained from 230 students and more than 90% of them had severe or moderate binge eating (AB), with half (50.9%) reporting the occurrence of compulsive eating episodes during the coronavirus pandemic. Difficulty concentrating in class/teacher and concern with internships (Factors 4 and 5) were the most common academic stress factors, and the perception of inferiority (factor 6) was statistically correlated ($P<0.05$) with the occurrence of HERE. Conclusion: it was identified that AC occurred in most medical students and was correlated with academic stress factors. It was also suggested that the social isolation imposed by the COVID-19 pandemic had an influence on the manifestation of episodes of compulsive eating.

KEY WORDS: Binge eating disorder; Eating behavior; Psychological stress; Emotional stress.

RESUMO: Introdução: estudantes de medicina tem altos níveis de estresse por serem expostos a intensas responsabilidades e contato direto com o sofrimento humano. Estes fatores podem predispor a ocorrência de transtornos alimentares, comumente, o transtorno de compulsão alimentar. Objetivo: evidenciar fatores de estresse acadêmico e comportamentos alimentares desadaptativos em estudantes de medicina da Faculdade Pernambucana de Saúde (FPS), bem como a influência do cenário pandêmico vivenciado. Método: trata-se de um estudo transversal. Estudantes de medicina de todos os períodos da FPS foram convidados a participar desta pesquisa que foi aprovada pelo Comitê de Ética em Pesquisa com CAAE: 53687821.6.0000.5569. As informações foram obtidas através de questionário sociodemográfico que contou com escalas validadas de avaliação de estresse acadêmico (NISESTE) e de compulsão alimentar (ECAP/BES). Os dados foram correlacionados pelo coeficiente de correlação de Kendall além do teste de Normalidade de *Kolmogorov-Smirnov* para variáveis quantitativas. Foi considerado o valor $p < 0,05$. Resultados: obteve-se dados de 230 estudantes e mais de 90% dos mesmos apresentaram compulsão alimentar (CA) grave ou moderada, sendo que metade (50,9%) referiram a ocorrência de episódios compulsivos alimentares durante a pandemia do coronavírus. Dificuldade de concentração na aula/professor e preocupação com estágios (Fatores 4 e 5) foram os fatores de estresse acadêmico mais encontrados, sendo que a percepção de inferioridade (fator 6) esteve correlacionada estatisticamente ($P<0,05$) com a ocorrência de CA. Conclusão: identificou-se que a CA, bem como elevado nível de estresse, ocorreu na maioria dos estudantes de medicina.

DESCRITORES: Transtorno de compulsão alimentar; Comportamento alimentar; Estresse psicológico; Estresse emocional.

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INTRODUCTION

Stress is a set of mental, chemical and physical reactions of a person to undesirable environmental stimuli, characterized as stressors[1]. It can be experienced in a positive way, as a challenge, or in a negative way, as a paralyzing and destabilizing feeling. These disparate reactions are influenced by internal factors, such as the individual's personality and behavior in the face of daily pressures, as well as cultural and social aspects[2].

On mean, 90% of the world's population is affected by stress. According to a survey by the International Stress Control Association (ISMA), Brazil is second in the ranking of countries with the most stressed population[3].

Among medical students, up to 49.9% of them are affected by stress[4], which seems to be mobilized by the excessive demands and waivers experienced[5-78]. In addition to requiring technical skills, medical graduation requires psychosocial skills, which are not acquired by traditional technical training most of the time[8]. The sum of these stressors can harm students' academic performance and health[9], compromising their biopsychosocial well-being.

As a way of dealing with and facing this reality, many students adopt compensatory habits. Among these, emotional eating, which raises an increasingly broad debate, can be defined as exaggerated food intake in response to negative emotions[10-15]. It can also be accompanied by other maladaptive dietary modifications, such as "disordered eating"[16], encompassing pathologically restrictive diets, and induction of vomiting, fasting, food replacement and episodes of compulsive eating[17-19]. Such dysfunctional eating patterns can be determinant for the development of eating disorders, which occur in 14 to 46% of the general population[20].

A study carried out with university students in Rio de Janeiro (Brazil) found higher rates of eating behavior at risk for the development of eating disorders, especially binge eating disorder (BED)[21], among medical students, when compared to students of physical education, nutrition and psychology courses[22].

According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5), BED is characterized by recurrent binge eating episodes (BE), in which there is an intake of more food than would normally be ingested in a given period. These episodes occur at least once a week for at least three months and are not associated with compensatory measures aimed at weight loss (such as vigorous physical activity and/or induction of vomiting). In addition, they are related to eating faster than normal or even feeling uncomfortably full, eating large amounts of food in the absence of the physical sensation of hunger, eating alone out of shame of how much one is eating or feeling disgusted with oneself, depressed or very guilty afterwards[23].

Medical students, when compared to the general population, are more affected by mood, anxiety and substance use disorders, which are classically associated with BED and BE[24,25]. This situation is aggravated by the delay in seeking specialized professional help by students, only 8 to 15% of whom seek psychiatric care during graduation[26], resulting in a more severe and persistent presentation of BED at diagnosis[8,25].

In addition to the stressors normally experienced by medical students, the social restrictions experienced during the pandemic of the disease caused by the coronavirus (COVID-19), associated with the continuous threat of contamination by the virus, the fear of losing loved ones and the intensification of the academic journey significantly impacted the mental health of this group. Representative data show an overall increase in anxiety, depression, substance use, and eating disorders during the pandemic shortly after the COVID-19 outbreak in the general population[27-29].

An American study showed that the most cited factor associated with the deterioration of eating disorder symptoms was the greater global life stress reported as a result of COVID-19 and subsequent use of food to regulate negative emotions[30]. In addition, a study carried out with university students in France, at the beginning of the social isolation imposed by the pandemic, found that participants who scored higher levels of stress were associated with a higher level of BE[31].

Thus, the present study analyzed the association between academic stress and the influence of social repercussions during the COVID-19 pandemic with maladaptive eating patterns that predispose the occurrence of BE in medical students at a private college located in the city of Recife, Pernambuco (Brazil). It also sought to raise reflections that can restructure the medical curriculum, in order to contribute to the promotion of the students' mental health.

METHODS

This was a cross-sectional study with a quantitative approach conducted with the population consisting of all medical students regularly enrolled in the Pernambuco College of Health (FPS) and who were over 18 years old. FPS is a private Higher Education Institution (HEI) and currently has eight undergraduate health courses (medicine, nursing, pharmacy, physical therapy, nutrition, dentistry, physical education and psychology). Regarding the medical course, about 800 physicians have already graduated from the institution since its first class, in 2011.

The sample was for convenience (non-probabilistic) and data collection was carried out between March and June 2022 through a semi-structured questionnaire that included the analysis variables, namely:

A. Sociodemographic variables: therefore, the following parameters were evaluated: sex, ethnicity, marital status, religion, family income, change of place of origin to go to college, time of academic training modified each semester;
B. Symptoms of binge eating: therefore, the periodic binge eating scale (PBES/BES) was used – an instrument translated and validated for Brazilian Portuguese. It evaluates, through the Likert scale, a list consisting of 16 items and 62 statements, from

which the one that best represents the individual's response must be selected in each item. Each statement corresponds to a number of points from 0 to 3, ranging from the absence ("0") to the maximum severity ("3") of the PBE. The final score is the result of the sum of the points of each item. The classification of individuals is given according to the following scores: individuals with a score less than or equal to 17 are considered without PBE; with a score between 18 and 26 are considered with moderate PBE; and those with a score greater than or equal to 27, with severe PBE. As for its psychometric properties, the PBES showed moderately high internal consistency: Cronbach's alpha = 0.85[32].

C. Academic stress: therefore, the Student Stress Level Scale (S.S.L.S.) was used. This instrument consists of 29 items separated into three major dimensions related to stress: biological symptoms (5 items), psychological symptoms (16 items) and social problems (8 items), distributed into seven factors: Factor 1 - Preoccupation with exams (items 1, 4, 5, 14, 15, 16, 17, 18, 29); Factor 2 - Disability (items 9, 11, 12, 13); Factor 3 - Difficulty in the teacher/student relationship (items 22, 23, 24, 25); Factor 4 - Difficulty concentrating class/teachers (items 2, 3, 7); Factor 5 - Preoccupation with exams (items 6, 10); Factor 6 – Preoccupation with internships (items 19, 20) and Factor 7 – Feeling of inferiority (items 8, 21, 26, 27, 28). In the present study, it was chosen to unite Factors 1 and 5 into a single Factor 1 (items 1, 4, 5, 6, 10, 14, 15, 16, 17, 18, 29) in the presence of contents within the same sphere. The assertions are answered on a Likert scale ranging from 1 (I do not agree) to 5 (I totally agree). Based on the responses of the items, the mean obtained in each factor was calculated and, through this, the highest means were scored, identifying the contribution of each academic factor related to stress. The consistency coefficient was satisfactory (above .70)[33].

D. Stress during the COVID-19 pandemic, evidenced in questions on a Likert scale ranging from 1 (I do not agree) to 5 (I totally agree) about the interference with eating behavior due to social isolation, imposed by the COVID-19 pandemic; change in satiety during the social isolation imposed by the COVID-19 pandemic; presentation of some episode of binge eating during the COVID-19 pandemic.

The form in question was made available through Google Forms, a virtual, secure and free database, and students were invited to participate in the survey through the FPS Virtual Learning Environment (VLE).

A database was built with the study variables typed into an Excel spreadsheet, with double entry and validated in Epi Info 7.2.4. SPSS 13.0 (Statistical Package for the Social Sciences) software was used for Windows and Excel 365 to perform the analysis. Categorical variables were presented in absolute and relative numbers by calculating the results, only with valid answers and all tests were applied with 95% confidence. Correlations were tested using Pearson's (linear) or Spearman's (non-linear) or Kendall's correlation coefficient. For statistical purposes, $p < 0.05$ was considered. Numerical variables are represented by measures of central tendency and measures of dispersion and the Kolmogorov-Smirnov Normality test for quantitative variables. The results are presented in the form of tables or graphs with their respective absolute and relative frequencies. The data were interpreted by comparing more than two groups: ANOVA (Normal Distribution) and Kruskal-Wallis (Non-Normal) between the main factors of academic stress and the episodes of binge eating obtained by the questionnaires in a reality related to the COVID-19 pandemic.

The project was submitted for analysis by the Human Research Ethics Committee of FPS considering the prerogatives of resolution 510/16 of the National Health Council and was approved under CAAE number: 53687821.6.0000.5569. Finally, all participants were informed about the study objectives, duration and non-mandatory participation. Those who accepted virtually signed an Informed Consent Form (ICF) containing the relevant research data.

RESULTS

Data were obtained from 230 students (most of the first period, followed by the 9th period - 37% and 24.8%, respectively), with a mean of 22 years, with the majority being female (62.6%), white (74.3%), with an income of more than 12 minimum wages (42.2%), as shown in table 1. The majority (88.7%) of the sample was composed of single people, compared to 10.4% of married or in a common-law marriage. Half of the participants declared themselves Catholic, and 19.1% ignored this data. Of the participants, 35.2% moved from the city recently with the objective of taking the university course.

Data regarding the BE scale are shown in table 1, with BE classified as moderate prevailing in 54.4% of students, followed by severe BE (41.7%) and absent BE (3.9%). Among women, severe BE was evidenced in 45.8%, moderate in 51.4% and absent in only 2.8%. Among men, 34.9% were classified as having severe BE, 59.3% as moderate BE, and 5.8% as absent BE (p=0.179). There was a higher prevalence of severe BE among students who had to leave the municipality of origin to attend college (50%) compared to students who did not have to move (37.2%).

Also in Table 1, there are data related to the pandemic and isolation. It was evidenced that 50.9% of the students totally or partially agreed to have presented episodes of BE during the pandemic. Among students who fully agreed, 75.8% had severe BE, and among those who partially agreed, 45.1% had severe BE.

In line with these data, 79.5% of the participants agreed, in whole or in part, that the social isolation experienced during the pandemic interfered with their eating behavior, and 59.8% of those who fully agreed were classified as having severe BE. In addition, 57.3% of the students fully or partially agreed with

the increase in the perception of hunger in the pandemic period. Among those who fully agreed, 64.5% had severe BE.

Regarding academic stress, a higher prevalence of factor 4 (difficulty concentrating in class/teacher) was observed among students, followed by factor 5 (concern about internships), factor 2 (feelings of disability), factor 1 (concern about exams) and, finally, factor 6 (feelings of inferiority), as can be seen in Table 2.

Table 1 – Variables related to eating behavior during the COVID-19 pandemic (development of compulsive eating, dietary changes due to social isolation, increased hunger in this period) and degree of periodic binge eating (PBE) among medical students of Pernambuco College of Health (Recife, PE – 2022)

Variables	N	%
Occurrence of BE during the pandemic		
I agree	117	50.9
I disagree	113	49.1
Changes in eating behavior due to isolation		
I agree	183	79.6
I disagree	47	20.4
Increased desire to eat		
I agree	130	57.3
I disagree	97	42.7
PBES/BES		
Severe BE	96	41.7
Moderate BE	125	54.4
Absent BE	9	3.9

Table 2 – Mean of factors responsible for the high academic stress index according to the academic stress scale (S.S.L.S.) Among medical students of Pernambuco College of Health (Recife, PE – 2022)

Factors	Mean	SD
1. Preoccupation with exams	2.964	0.83
2. Feeling of incapacity	2.713	0.94
3. Difficulty in the relationship between teacher and student	2.6	0.93
4. Difficulty concentrating	3.11	0.82
5. Concern about internships	3.022	1.12
6. A feeling of inferiority	2.083	0.69

In turn, Table 3 depicts the crossing between those students who scored for BE and the stress factors of the S.S.L.S. scale. Among students with severe BE, factor 4 (mean 3.3) predominated, followed by factor 5 (mean 3.0) and factor 6 was the least present in this group (mean 2.2). In the group identified with moderate BE, there was a predominance of factor 1 (mean 3.0) and factors 4 and 5 (both with a mean of 3.0), with factor 6 being the least identified (median 2.0). Finally, in the group with absent BE, factor 4 predominated (median 2.7), with factor 6 being the least found (median 1.6). Of these factors, only 6 showed a statistically significant correlation with PBE.

Table 3 – Relationship between the degree of binge eating (be) according to the pbe scale and the mean of the main stress factors measured by the academic stress level scale among medical students of Pernambuco College of Health (Recife, PE – 2022)

Variables	PBES/BES			p-value
	Severe BE	Moderate BE	Absent BE	
	Mean ± SD	Mean ± SD	Mean ± SD	
Factor 1	2.96 ± 0.91	3.01 ± 0.75	2.40 ± 0.98	0.108 *
Factor 2	2.82 ± 0.96	2.64 ± 0.92	2.52 ± 0.84	0.304 *
Factor 3	2.73 ± 0.95	2.50 ± 0.90	2.56 ± 0.99	0.184 *
	Median (P_{25}; P_{75})	Median (P_{25}; P_{75})	Median (P_{25}; P_{75})	
Factor 4	3.30 (2.55; 3.70)	3.00 (2.70; 3.70)	2.70 (1.80, 2.70)	0.322 **
Factor 5	3.00 (2.13; 4.00)	3.00 (2.00; 4.00)	2.50 (1.50, 2.50)	0.551 **
Factor 6	2.20 (1.60; 2.80)	2.00 (1.50; 2.40)	1.60 (1.30; 1.60)	**0.032** **

(*) ANOVA (**) Kruskal-Wallis

In table 3, there was a statistically significant relationship between "factor 6" in relation to "PBES/BES".

DISCUSSION

The present study identified the frequency of BE episodes, which may predispose to the occurrence of BED and the experience of academic stress in medical students from a private college in the state of Pernambuco. There was a high frequency of BE episodes and high levels of academic stress weighted in their main factors. No statistically significant associations were found between BED and factors 1, 2, 3, 4 and 5 of academic stress. Only factor 6, related to feelings of inferiority, showed a significant association with BED.

A study carried out among medical students in Bangladesh, using the EAT-26 scale, identified that 37.6% were at risk for an eating disorder[34]. This datum highlights the relationship between stress in the university environment and eating disorders. Another publication with a similar sample showed a combination of stress and selection of unhealthy foods, which is related to an increased risk of eating disorders [35]. In contrast, a survey of 263 medical students at a private institution in Malaysia found no significant association between stress and the risk of eating disorder[36].

It was also observed that the academic factors with the greatest influences for high repercussions of stress in this environment, according to the means obtained, were: difficulty concentrating in classes and in teachers, concern with internships, concern with exams, feeling of disability, difficulty in the teacher-student relationship and feeling of inferiority, in this order. A study carried out with Brazilian nursing undergraduates, a course with a national curriculum guideline similar to that of the present sample, raised concerns about exams and internships as the main factors influencing stress in the group[37]. This underscores how much health graduation still denotes a teaching environment of high psychic tension having repercussions on the mental health of students[38].

The population of this study was composed mainly of people who are in the course of the pre-clinical course (initial two years). Despite this, the stressors presented divergences in order, with the focus on classes and the practical function being the main factors identified in the analysis of these data, to the detriment of the theoretical function demonstrated by the results of another comparative analysis[37] Regarding the value of the means, it was noticed that the results scored very high in all subdivisions.

The high incidence of BED symptoms found in this study surpasses what the literature points out. It was observed, in a publication with 221 university students from UK health courses, that the majority of its participants were not compulsive eaters (71.04%)[39]. In the present study, it was also noticed that the prevalence of BE was higher in females. In the meantime, an American publication showed that 15% of female medical students had a history of eating disorders[40].

In the present study, there was no significant association between sociodemographic data (age, ethnicity, marital status, religion, income and need to change the place of origin) with the risk of developing eating disorder, data consistent with a study carried out in Malaysia with a similar universe of participants that also did not demonstrate this correlation[35]. In contrast, there is evidence that in the general population, people living with partners had greater symptoms of food maladaptation[39].

When analyzing the implications imposed by the COVID-19 pandemic and symptoms of BED, it was identified in the present study that most students experienced increased desire to eat during the period of social isolation. When asked about the occurrence of at least one episode of binge eating throughout the pandemic, there was a positive response in almost half of the participants. Concordant data in the literature show that the higher levels of stress experienced during the pandemic resulted in the use of food in an attempt to regulate negative emotions[8,29].

Approximately 80% of the students surveyed reported changes in eating behavior and, of these, the presence of moderate or severe BE predominated. A survey conducted in France with 5,738 university students during the COVID-19 pandemic found that participants with higher levels of stress had more symptoms of binge eating[31]. Another study carried out with 946 Brazilian students, reported an increase in the fractionation and volume of meals, an increase in the consumption of fast-foods, ultra-processed foods and delivery foods, in addition to changes in food consumption mainly due to anxiety[41].

Some factors should be suggested as limitations of the present study. First, it was carried out in a single university center, restricted to a small sample size, a fact that undermines the comparison with other studies. In addition, because this is a cross-sectional study, it is not possible to establish a causal relationship between higher levels of academic stress and high prevalence of binge eating. In addition, memory bias should be evidenced as a limiting factor in obtaining the data, together with subjectivity in interpreting the answers, which hinders a more accurate analysis of the facts.

CONCLUSION

It was identified that BE is a reality in the daily lives of most medical students. Along with this, a high level of academic stress was observed due to factors such as difficulties in concentrating in classes and teachers and concern with clinical practice in curricular internships. Moreover, the social isolation established by the COVID-19 pandemic seems to have influenced the occurrence of binge eating episodes and perceived stress among medical students.

Participation of each author: Nathallya Thamyres dos Santos Melo: Project administration; Investigation; Writing – first draft; Validation. Luiza Freire de Almeida Barros dos Santos: Project administration; Investigation; Writing – first draft; Validation. Maria Eduarda Barbosa Abrantes Santos: Project administration; Investigation; Writing – first draft; Validation. Tânia Flaiane de Santana: Project administration; Investigation; Writing – first draft; Validation. Thawane Maria Pereira de Morais: Project administration; Investigation; Writing – first draft; Validation. Alberto Gorayeb de Carvalho Ferreira: Project administration; Formal analysis; Conceptualization; Writing – review and editing.

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