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Symptoms of anxiety and depression among medical students: study of prevalence and associated factors

Sintomas de ansiedade e depressão entre estudantes de medicina: estudo de prevalência e fatores associados

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ABSTRACT

Introduction: Common Mental Disorders (CMDs) imply psychological distress, interfering with daily activities, interpersonal relationships and quality of life. It is estimated that CMDs affect 9% to 12% of the world's population and 12% to 15% of the Brazilian population in all age groups. Among different social groups, university students are more vulnerable to the development of anxiety and depression disorders.

Objective: Therefore, this study proposed to estimate the prevalence rates and factors associated with symptoms of anxiety and depression in medical students in a capital city of northeast Brazil.

Methods: This is a prevalence study, with a probabilistic sample of 1,339 students who regularly attended the 12 semesters of medical school in January 2018. Data were collected by applying a socioeconomic, behavioral and demographic survey and Beck Anxiety and Depression Inventories. The chi-square test was used to check for differences between anxiety and depression symptoms and socioeconomic and behavioral variables. The prevalence rates (total and by level of severity) and the crude and adjusted prevalence ratio (PR) were used as an association measure. Linear trend analysis was used to verify the existence of an association between anxiety and depression symptoms and semesters of the medical school. The variables that showed a crude PR with $p < 0.20$ were incorporated into the multivariate analysis, using the robust Poisson regression model, to determine the adjusted PR.

Results: The prevalence of symptoms of anxiety was 30.8%, whereas depression was 36.0%. The crude and adjusted PR for anxiety symptoms showed a statistically significant association with gender, age and sexual orientation. The crude and adjusted PR for symptoms of depression showed a statistically significant association with gender, ethnicity/skin color and sexual orientation. The correlation analyses between the semesters of the course and the presence of anxiety and depression symptoms indicated a weak coefficient of determination, with a descending characteristic and without statistical significance.

Conclusions: As this is a prevalence study, this investigation does not allow conclusions on causality. Additional follow-up studies are needed to elucidate the course of anxiety and depression throughout the school semesters.

Keywords: Anxiety; Depression; Medical Students; Medical Education.

RESUMO

Introdução: *Os transtornos mentais comuns (TMC) implicam sofrimento psíquico e interferem nas atividades diárias, nos relacionamentos interpessoais e na qualidade de vida. Estima-se que os TMC atinjam de 9% a 12% da população mundial e de 12% a 15% da brasileira em todas as faixas etárias. Dentre os diferentes grupos sociais, os estudantes universitários possuem maior vulnerabilidade para desenvolver transtornos de ansiedade e depressão.*

Objetivo: *Diante disso, este estudo se propôs a estimar a prevalência e os fatores associados a sintomas de ansiedade e depressão em estudantes de Medicina de uma capital do Nordeste brasileiro.*

Métodos: *Trata-se de um estudo de prevalência, com uma amostra probabilística dos 1.339 alunos que frequentavam regularmente os 12 semestres do curso de Medicina em janeiro de 2018. Os dados foram coletados por meio da aplicação de questionário socioeconômico, comportamental e demográfico e dos Inventários de Ansiedade e de Depressão de Beck. Utilizou-se o teste de qui-quadrado para verificação de diferenças entre sintomas de ansiedade e depressão e variáveis socioeconômicas e comportamentais e as prevalências (total e por nível de gravidade) e a razão de prevalência (RP) bruta e ajustada como medida de associação. A análise de tendência linear foi empregada para verificar a existência de relação entre sintomas de ansiedade e depressão e semestres do curso. As variáveis que apresentaram RP bruta com $p < 0,20$ foram incorporadas na análise multivaridada, no modelo de regressão de Poisson robusto, para determinação da RP ajustada.*

Resultados: *Quanto à prevalência de sintomas, constatou-se o seguinte: 30,8% para ansiedade e 36,0% para depressão. A RP bruta e ajustada para sintomas de ansiedade teve associação estatisticamente significante para sexo, idade e orientação sexual. A RP bruta e ajustada para sintomas de depressão teve associação estatisticamente significante para sexo, raça/cor da pele e orientação sexual. As análises de correlação entre os semestres do curso e a presença de sintomas de ansiedade e depressão indicaram fraco coeficiente de determinação, caráter descendente e sem significância estatística.*

Conclusões: *Por se tratar de um estudo de prevalência, esta investigação não possibilita conclusões sobre causalidade. Estudos de acompanhamento adicionais são necessários para elucidar o curso da ansiedade e depressão ao longo dos semestres letivos.*

Palavras-chave: *Ansiedade; Depressão; Estudantes de Medicina; Ensino Médico.*

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INTRODUCTION

Common Mental Disorders (CMD) correspond to clinical conditions in which the individual has symptoms of anxiety, depression, sadness, fatigue, insomnia, stress, irritability, and somatic complaints, such as anorexia, dyspnea, and headache, among others[1-3]. However, these manifestations do not meet enough criteria for a formal psychological diagnosis of depression and / or anxiety according to the DSM-V (Diagnostic and Statistical Manual of Mental Disorders - 5th edition) and ICD-11 (International Classification of Diseases - 11th revision) classifications[4,5], although they show an intensity and frequency capable of resulting in psychological distress for individuals, interfering in their daily activities, their interpersonal relationships and quality of life[1,2,6,7].

It is estimated that CMDs affect 9% to 12% of the world's population and 12% to 15% of the Brazilian population in all age groups[8]. According to the World Health Organization (WHO), this number has been increasing worldwide, especially in low-income countries, in females, the poorest and the unemployed, precisely those in which the symptoms of anxiety and depression are more frequent[9-11]. In Brazil, the prevalence of CMDs, according to several authors, ranges from 19.7% to 43.7%, which represents a significant portion of the population that may require specialized care[12,13].

Among the different social groups, university students are more vulnerable to the development of anxiety and depression disorders, and there have been studies that used different instruments, such as the Self-Reporting Questionnaire (SRQ-20)[14], the Beck Anxiety Inventory (BAI)[15], and the Beck Depression Inventory (BDI)[16], which demonstrated its high prevalence, especially among medical students in several continents[16,17]. In economically developing countries, such as Egypt, a study carried out with 700 medical students in the year 2017 reported a high prevalence of anxiety, of 73%, and a prevalence of depression of 65%[18]. In Turkey, they found a prevalence rate of 35.8% for symptoms of medium and moderate anxiety and 30.5% for medium and moderate depression and 8.5% for severe depression[19].

In turn, in Brazil in 2015, studies carried out with medical students from the state of Santa Catarina disclosed a prevalence of 35.5% and 32.8%, respectively for anxiety and depression[21]. At *Faculdade Pernambucana de Saúde* (FPS), in 2014, the prevalence was 19.7% for anxiety and 5.6% for depression[21].

Considering this scenario of high CMD frequency in university students, the aim of this study was to estimate the prevalence rate and factors associated with symptoms of anxiety and depression in medical students in a capital city in northeastern Brazil in 2018.

METHODS

This is a prevalence study, with a probabilistic sample of 1,339 students who regularly attended all 12 semesters of the medical course in January 2018 and who signed the Free and Informed Consent Form / Term of Assent. For the sample size calculation, we considered as parameters an expected mean prevalence of anxiety and depression symptoms in university students of 35%[20,22,23], an acceptable alpha error of 5% ($\alpha = 5\%$), an effect of design of 1.5 and a 95% confidence level. The sample size was estimated at 417 students, which after adding 10% for losses and refusals, totaled 457, divided proportionately, resulting in an average of 35 students per semester, which were selected by simple random drawing.

Data were collected by applying the following instruments: a) a structured questionnaire to record social, demographic, economic and behavioral information; b) Beck Anxiety Inventory (BAI) developed by Beck et al. (1988)[15] and translated into Brazilian Portuguese and validated in Brazil in university students by Quintão et al. (2012)[24] and c) Beck Depression Inventory (BDI) also developed by Beck et al. (1961)[16] and validated in the Brazilian Portuguese language, in Brazil, by Gorenstein and Andrade (1996)[25] and Gomes-Oliveira (2012)[26]. According to the cutoff points established by BAI, a score <10 was considered as absence or symptoms of minimal anxiety; 11-19, mild; 20-30, moderate; and 30-63 points as severe anxiety, whereas in the BDI for symptoms of depression, a score <10 was considered as absent or minimal; 10-18, mild; 19-29, moderate; and 30-63 points, as severe depression. For this study, a score >10 was considered as the presence of anxiety and depression symptoms.

Descriptive analyses were carried out by distributing the absolute (n) and relative (%) frequencies of the strata of the variables of interest. To check for possible differences between anxiety and depression symptoms and social, economic and behavioral variables, Pearson's chi-square test ($\chi 2$) was used. The prevalence rates (total and by level of severity) and the crude and adjusted (Adj) prevalence ratio (PR) were used as a measure of association. The Kruskal-Wallis test was used to verify the difference between the prevalence rates, considering $p < 0.05$ as statistical significance.

The variables that showed a crude PR with $p < 0.20$ were incorporated into the multivariate analysis using the robust Poisson regression model, to determine the Adj PR. The data were processed and analyzed using the SPSS software, version 22 and STATA version 15.1. The study project was approved by the EBMSP Research Ethics Committee, under N. 2,519,431 on February 28, 2018 and N. 2,572,959 on April 1, 2018.

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RESULTS

Of the 458 medical students (34.2% of the total) included in the study, 62.7% were females and 60.0% were aged <22 years old. The median age for both genders was 22.0 years. A total of 92.6% of the students self-declared as heterosexual, 56.7% of white ethnicity/ skin color, 60.3% had a stable boyfriend/girlfriend and 48.1% were catholics. Regarding the monthly family income, 50.1% reported their income as being <R$ 8,000.00. Students from the state where the medical school was located were 94.3%, with the vast majority, 61.3%, from the capital city. A total of 81.1% lived with family members (Table 1). Of the total number of students in the sample, 11.1% were in the first and tenth semesters of the medical course.

The prevalence of anxiety symptoms was 30.8%, ranging from mild, in 91 (19.9%), to moderate, in 39 (8.5%) and severe in 11 (2.4%) students. Minimal symptoms were identified in 289 (63.1%) and absent in 28 (6.1%) students. The prevalence of depression was 36.0%, ranging from mild, in 132 (28.8%), moderate, in 27 (5.9%) and severe, in 6 (1.3%) students. Symptoms were minimal in 259 (56.6%) and absent in 34 (7.4%) students (Chart 1).

Table 1. Prevalence of anxiety and depression symptoms in medical students according to demographic, social, economic and behavioral variables. Salvador BA. 2018.

Variable	Anxiety					Depression				
	Yes		No			Yes		No		
	n	%	n	%		n	%	n	%	
Gender										
Female	107	37.3	180	62.7	0.000*	123	42.9	164	57.1	0.000*
Male	34	19.9	137	80.1		42	24.6	129	75.4	
Age (years)										
≤22	97	35.4	178	64.6	0.011*	100	36.5	174	63.5	0.798
>22	44	24.0	139	76.0		65	35.3	118	64.7	
Sexual orientation										
Homo/bisexual	20	60.6	13	39.4	0.000*	21	63.6	12	36.4	0.001*
Heterosexual	121	28.5	303	71.5		144	34.0	280	66.0	
Ethnicity/skin color										
Others	58	29.4	139	70.6	0.592	82	41.6	115	58.4	0.030*
White	82	31.8	176	68.2		82	31.8	176	68.2	
Affective status										
With stable partner	78	28.4	197	71.6	0.182	96	34.9	179	65.1	0.533
No stable partner	62	34.3	119	65.7		68	37.8	112	62.2	
Religion										
Catholic	62	28.3	157	71.7	0.274	70	32.0	149	68.0	0.081
Others	78	33.1	158	66.9		94	39.8	142	60.2	
Family income (R$)										
≤12,000,00	60	34.1	116	65.9	0.111	74	42.0	102	58.0	0.016*
>12,000,00	46	26.3	129	73.7		52	29.7	123	70.3	
Origin										
Other states	54	30.5	123	69.5	0.963	67	37.9	110	62.1	0.486
Salvador	86	30.7	194	69.3		97	34.6	183	65.4	
Lives with										
Others	25	29.1	61	70.9	0.680	41	47.7	45	52.3	0.012*
Family members	116	31.4	254	68.6		123	33.2	247	66.8	

*statistically significant

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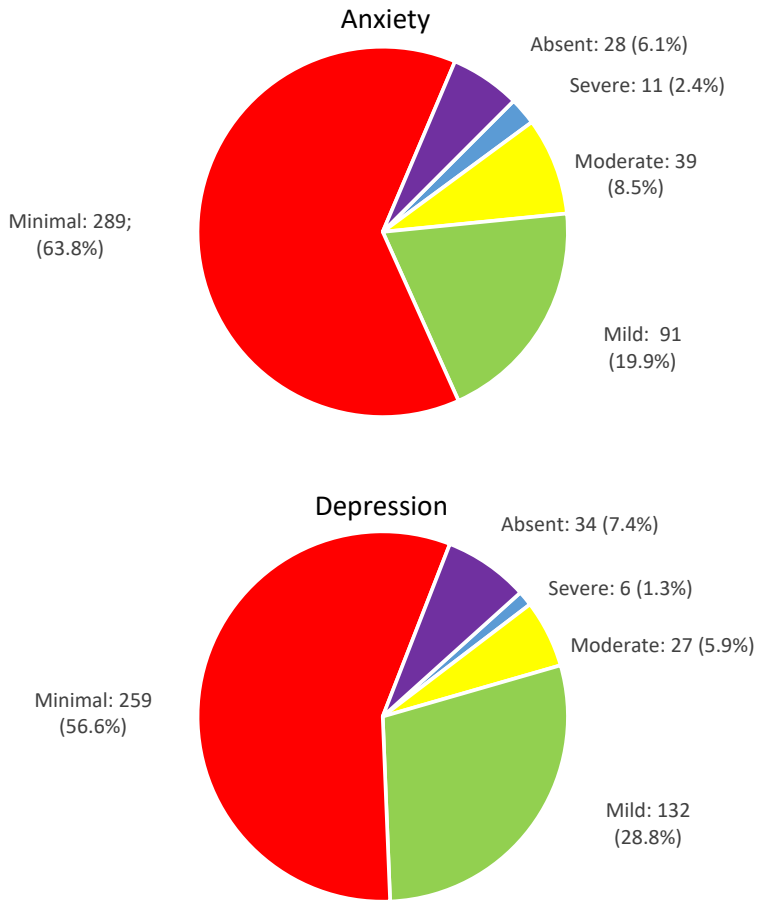
Chart 1. Prevalence of anxiety and depression symptoms in medical students. Salvador BA. 2018.



The crude PR of the association of anxiety symptoms and female gender, age <22 years and homo / bisexual sexual orientation, as well as the crude PR of the association of depression symptoms and female gender, homo / bisexual sexual orientation, other ethnicity / skin color (black/ brown), family income (<R$ 8,000.00) and living with others (colleagues/friend, hotel/boarding house / off-campus student residence) and alone showed a p value <0.005. In the robust Poisson model, the adjusted PR for anxiety symptoms retained a statistically significant association for gender (Adj. PR = 1.31; 95%CI [1.17-1.47]), age (Adj PR = 1.15; 95%CI [1.02-1.29]) and sexual orientation (Adj. PR = 1.90; 95%CI [1.26-2.86]) (Table 2). The adjusted PR for depression symptoms remained statistically significant for gender (Adj. PR = 1.36; 95%CI [1.20-1.55]), ethnicity / skin color (Adj. PR = 1.96; 95%CI [1.29-3.04]) and sexual orientation (Adj PR = 1.19; 95%CI [1.03-1.36]) (Table 3). The prevalence rate of symptoms of anxiety and depression between the basic, intermediate and internship cycles did not show a statistically significant difference, respectively, p = 0.101 and p = 0.601.

Table 2. Prevalence rate, prevalence ratio and crude and adjusted confidence interval for anxiety symptoms in medical students according to demographic, social, economic and behavioral variables. Salvador, Bahia. 2018.

Variable	crude Odds Ratio	Confidence Interval	adjusted Odds Ratio	Confidence Interval
Gender: Female	2.39	1.53 – 3.74	2.99	1.76 – 5.10
Age: <22 years	1.72	1.13 – 2.62	1.74	1.06 – 2.85
Sexual Orientation: homo/bisexual	3.85	1.86 – 7.99	3.94	1.74 – 8.91
Affective status	0.76	0.51 – 1.14	-	-
Family income	1.45	0.92 – 2.29	-	-

Table 3. Prevalence rate, prevalence ratio and crude and adjusted confidence interval for depression symptoms in medical students according to demographic, social, economic and behavioral variables. Salvador, Bahia. 2018.

Variable	crude Odds Ratio	Confidence Interval	adjusted Odds Ratio	Confidence Interval
Gender: female	2.30	1.51 – 3.50	2.86	1.82 – 4.51
Sexual Orientation: homo/bisexual	3.40	1.63 – 7.11	5.08	2.30 – 11.22
Ethnicity/skin color: white	1.53	1.04 – 2.25	1.58	1.05 – 2.37
Religion	0.71	0.48 – 1.04	-	-
Family income	1.72	1.10 – 2.67	-	-
Lives with: family members	1.83	1.14 – 2.94	1.94	1.17 – 3.21

DISCUSSION

The prevalence of anxiety symptoms among medical students observed in the present study (30.8%) was lower than those found by some other authors, which varied between 33.8% and 41.4%, according to Ribeiro et al. (2020)[27], Moutinho et al. (2017)[28], Tabalipa et al. (2015)[20], Ediz et al (2017)[19] and Costa et al. (2020)[23]. However, these same authors indicated a prevalence of symptoms of depression between 8.2% and 34.6%, therefore, lower than that of the present investigation (36.0%). It has been established that symptoms of anxiety and depression are present in the daily lives of millions of individuals worldwide, affecting both their physical and mental health, especially university students and those in the health care field.

The disagreements regarding the prevalence rates found in the literature may have occurred due to regional and cultural differences among the student population, the used methodologies and types of questionnaires used to collect the data. However, it is a consensus that the medical course is seen as one of the most difficult courses that requires the students to concentrate their efforts on dedication to the studies and that there is high competitiveness among students[29]. The medical student's academic trajectory implies a long and arduous daily journey of activities, which implies in exhausting commuting that occupy even their time for social activities, leisure and even sleep hours[30,31]. Another extremely important factor is the contact with the patient's suffering, pain and even death, events that also cause tension and stress for medical students. This entire situation of physical and emotional exhaustion makes it difficult to take care of one's own health, whether due to the students' lack of time or negligence by the students and the school, increasing the risk of anxiety / depression symptoms and the development of burnout syndrome[32,33].

The higher prevalence of anxiety and depression in female students was similar to that found in other studies[20,21,34], which is consistent with the Mental Health Information, according to which anxiety disorders were present in 23.4% of female individuals and in 14.3% of males[35], as well as with the WHO statement, which states that worldwide, depression is more prevalent in women (5.1%) than in men (3.6%)[1]. Such differences, according to the WHO, are a direct consequence of gender violence, socioeconomic disadvantage, income inequality, low or subordinate social status, social demands and responsibility for the care of other individuals, such as their offspring[36]. Other factors may also explain, in part, this higher prevalence, such as hormonal influences, considering that testosterone can have protective benefits against anxiety and depression[37].

Individuals with homo/bisexual sexual orientation showed a higher prevalence of anxiety and depression symptoms when compared with heterosexuals also associated with these outcomes. Anguish, denial, doubt and even rejection, sometimes from the family itself are problems faced by this group of individuals, since the discovery and acceptance of their sexual orientation. Therefore, there is an increase in feelings of insecurity and psychosocial problems and a reduction in self-esteem, resulting in greater vulnerability to psychosocial problems such as drug use, depression and suicide attempts[38,39]. Similarly, a higher prevalence of depression symptoms was verified in students who declared themselves to be of non-white ethnicity/skin color (brown and black). This corroborates what was observed in a study with university students in the city of Rio de Janeiro[40]. Studies indicate that historical factors such as the lack of opportunities, both educational and socioeconomic, in addition to the stress associated with social roles and experiences such as racism and discrimination are considered important for the higher prevalence among black individuals than in white ones[41,42].

The findings by Tabalipa et al. (2015)[20], Baldassin et al (2006)[43] and Bastos et al. (2016)[40], of a higher frequency of anxiety symptoms in students from the first to the third years of medical school, precisely the younger ones, was similar to those of our study, explained by the better adaptation of the student to the course and the strengthening of interpersonal relationships with classmates, forming groups that share similar

activities, such as study, leisure, travel, etc.

Although no association was found between symptoms of anxiety and depression and living with family members, support from one's parents is a source of strength for medical students to face difficulties during their studies and, at the same time, it also strengthens their self-confidence[17,33,44].

Consistent with the literature, anxiety and depression symptoms were more frequent among students in the 3rd, 5th and 9th semesters of medical school. Considering the course cycles, the basic one showed a higher prevalence than the other cycles, similar to that found by Costa et al. (2020)[23]. Upon entering the university, students are faced with an environment that is completely different from what they had been experiencing in the previous years of study[45,46]. In the first years of college, during the period of the basic course, there is an urgent need for integration with the new colleagues and adaptation to the new teaching methodology, with an excessive amount of theoretical content, tests, seminars and other pedagogical demands, which end up stressing the students, resulting in the exacerbation of anxiety and depression symptoms[44]. This new teaching modality requires the student to develop cognitive and emotional capacity capable of meeting this new demand, which has a great impact on quality of life, with scarcity of free time and fatigue being mentioned by the students as the main factors that affect their quality of life[47,48]. In this study, the prevalence rates, both of anxiety and depression, also showed high values in the last cycle, the internship. It is believed that a closer contact with patients, often incorporating their worries, fears, anxieties and depression, makes the students into an extension of these patients, which, added to the expectation of finishing medical school, tests for medical residency programs and entering the labor market, collaborate to the increase in anxiety and depression symptoms[48].

CONCLUSION

It is worth mentioning that some caution must be taken regarding the interpretation of some results of this study, as some questions involved aspects of "intimate nature", such as sexual orientation and family income. These aspects may have influenced the authenticity of the students' responses. Even though, as this is a prevalence study, this investigation does not allow conclusions about causality, its results represent an overview of the magnitude of the symptoms of anxiety and depression and their association with demographic, social, economic and behavioral factors. Additional follow-up studies are required to elucidate the course of anxiety and depression in this population group throughout the academic semesters, aiming to present a better understanding of the factors that influence these students' mental health and to aid in planning interventions to help them deal with the challenges they face.

AUTHORS' CONTRIBUTION

Bartira Oliveira Sacramento and Tassiana Lima dos Anjos: planning, collection, analysis and interpretation of data, writing and final review of the manuscript. Ana Gabriela Lopes Barbosa and Camila Fagundes Tavares: planning, collection and analysis of data. Juarez Pereira Dias: planning, analysis and interpretation of data, writing and final review of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest related to this study.

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