









PREVALENCE AND FACTORS ASSOCIATED WITH COMMON MENTAL DISORDERS AMONG MEDICAL STUDENTS AT A PUBLIC UNIVERSITY

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ABSTRACT

INTRODUCTION: Previous studies have reported a high prevalence of common mental disorders (CMD) among medical students in Brazil. With this in mind, this study aimed to develop a model to explain the prevalence of CMD among medical students at a public higher education institution (HEI). **METHODOLOGY:** 163 medical students at a public HEI answered the Self-Reporting Questionnaire (SRQ-20) and the Sociodemographic Questionnaire. Data were analyzed using logistic regression.

RESULTS: 53.8% of participants in this study presented signs of CMD. The model indicated a lower likelihood of CMD among students in the clinical cycle or internship (OR = -0.618; p = 0.015), males (OR = -0.592; p = 0.027), those without a family history of CMD (OR = -0.821; p = 0.000), and those reporting a good relationship with their father (OR = -0.135; p = 0.040). Conversely, students who did not engage in physical activity or did so only once a week had increased odds of CMD (OR = 2.763; p = 0.012). The quality of the relationship with the mother was not significantly associated with CMD (OR = -0.123; p = 0.278).

CONCLUSION: The high prevalence of CMD among future physicians underscores the practical relevance of the proposed predictive model, which may inform targeted mental health interventions in academic settings.

KEYWORDS: Mental Disorders; Sociodemographic Factors; Students; Medical; Logistic Models.

INTRODUÇÃO

The incidence of common mental disorders (CMD) among medical students in Brazil has already been demonstrated in other studies¹. Such evidence reveals higher prevalence rates of CMD than those found in studies conducted with students from other courses^{2,3}, or even from other countries⁴. It is estimated that this high incidence is due to an academic context, more common in medical courses, with extensive workloads and content, competitiveness among colleagues and self-demand for good grades, in addition to other curricular and institutional issues, in interaction with the individual characteristics and psychosocial experiences of each student^{1,4,5,6}.

CMDs are described as mental disorders that manifest as changes in thinking and mood as well as behaviors associated with either distress or deterioration of psychological functioning. Those conditions affect individuals of all genders and ages and cause suffering in their families and the community in general^{7,8,9}. Therefore, when considering the target audience of this study, we understand that the incidence of CMD in an educational environment interferes not only in the teaching-learning process but also in relationships with teachers and peers, moreover in the quality of the professional who will be entering the job market^{1,4}. In the meantime, few studies have been carried out to investigate the original cause of this problem and even fewer measure the degree to which certain factors impact its prevalence⁴. Despite the growing evidence of CMD's prevalence among medical students, there is a lack of analytical models that quantify the relative impact of individual, academic, and psychosocial factors on this phenomenon, limiting the development of targeted mental health interventions.

Therefore, the authors' objective with this study was to develop a model to explain the prevalence of CMD among medical students at a public education institution (HEI). To this end, based on previous research, the following possible predictive factors were analyzed: course cycle^{10,11,12,13,14}, gender^{4,13,15}, the existence of a family diagnosis of CMD^{16,17,18}, the frequency of physical activity (1,13), and the quality of the relationship with parents^{19,20,21,22}. We believe that this model can be used to identify students with a greater chance of developing some type of CMD, as well as to support the implementation of effective interventions to promote the mental health of these future doctors. Therefore, this study is justified by the social, institutional, and even political importance that this theme can permeate.

METODOLOGIA

The study included 163 students regularly enrolled in the 2024.1 semester of Medical School at XXX University State. Considering that there were 330 students signed up in total, this sample is representative at a 95% confidence level with a margin of error of 6%²³, and includes participants from all semesters of the course. They were recruited through institutional communication channels, such as email, academic groups, and classroom announcements. It is important to emphasize that this research was carried out in accordance with the recommendations of the National Health Council Resolution nº 466/12²⁴ and approved by the Human Research Ethics Committee of XXX (CAAE: 78214624.7.0000.5294).

A non-probability convenience sampling was used to include the largest possible number of eligible students within the data collection period. Although this approach limits generalizability, it was considered appropriate given the exploratory nature of the study and the logistical constraints of accessing the entire student population. Furthermore, students who were absent from the course or had their enrollment suspended at the time of data collection, those who refused to participate in the study, as well as those who did not complete the research instruments were excluded from the sample.

Two instruments were used to collect data: the Self-Reporting Questionnaire (SRQ-20) and a sociodemographic questionnaire. The SRQ-20 was used to measure the dependent variable. As its name suggests, this instrument consists of 20 questions and was developed by the World Health Organization (WHO) and validated in Brazil to identify quickly those who have a common mental disorder. In it, participants were asked to answer (yes or no) whether specific neurotic symptoms had bothered them in the last 30 days^{25,26,27,28}. The authors of this study developed the sociodemographic questionnaire to identify the independent variables. To this end, participants were asked to respond about 1) semester in the course (from 1st to 12th), 2) gender (male, female, or other), 3) frequency of weekly physical activity (none, once, twice or three times or more), 4) whether anyone in their primary family (parents and siblings) has ever received a diagnosis of CMD (yes or no), 5) quality of the relationship with their father (from 0, not applicable, to 10, very good), and 6) quality of the relationship with their mother (from 0, not applicable, to 10, very good).

The instruments were applied in June and July 2024, face-to-face at the XXX Medical School with students in the primary and clinical cycles and online with students in the internship cycle, through a Google Forms link sent to their respective e-mails by the school's management. This second strategy was applied due to the difficulty of making a meeting with the internship students who were spread across different cities and states. Based on the face-to-face collection, the average response time was five minutes.

The collected data were coded and analyzed using the IBM Statistical Package for the Social Sciences (SPSS), version 27. Initial, preliminary and exploratory analyses were conducted to select the variables to be included in the model. A broader set of variables was considered, including factors such as living alone and social class, among others. Each of these variables was individually tested using correlation and chi-square analyses to assess their association with the outcome variable (CMD indicator). Only those that showed statistically significant associations were retained for inclusion in the regression model.

This procedure ensured that the final model focused on the most relevant predictors of CMD. Furthermore, given the observational nature of the study, special attention was paid to the potential influence of confounding variables. Although this model does not aim to establish causality, efforts were made to include variables that are theoretically and empirically supported in the literature as relevant predictors of CMD. The simultaneous inclusion of variables in the regression model, using the enter method, aimed to control for potential confounding effects and to provide a more comprehensive understanding of the relationships among the variables.

Considering that the dependent variable of this study is binary (with an indication of CMD, coded as 1, or without an indication of CMD, coded as 0), logistic regression is shown to be an appropriate technique to model the variation of this variable as a function of a set of independent variables (in the case of this study: course cycle, gender, frequency of physical activity, diagnosis of CMD in the primary family, quality of the relationship with the father and mother). Through this analysis, it is possible to measure the probability and significance of the occurrence of CMD indicators²⁹. Thus, the proposed model predicts that depending on the cycle, gender, frequency of weekly physical activity, existence of family diagnosis, and quality of the relationship with the father and mother, the probability of a student receiving the CMD indicator increases or decreases. For this study, regarding the dependent variable, a total of eight symptoms marked as "yes" or greater in the SRQ-20 was used as the cutoff point to classify students as with an indication of CMD^{27,30}.

It is important to note that the technical requirements for conducting a logistic regression analysis were met. No multicollinearity problems were identified among the independent variables. However, three atypical observations (outliers) were observed, which were excluded from the model estimation. Thus, the relationship between the sample size (160 participants, after removing the outliers) and the number of independent variables included in the model (6 variables) is more than 26 cases, well beyond what was suggested. Furthermore, to provide a better fit for the proposed model, all categorical or nominal independent variables were transformed into binary variables²⁹.

The course periods were grouped into three cycles: primary (from the 1st to the 4th semester), clinical (from the 5th to the 8th semester), and internship (from the 9th to the 12th semester). However, after the results of the chi-square test indicated that the basic cycle had the most considerable number of students with indicative of CMD and due to the low frequency of responses from internship students (only 18), we decided to group the students from the clinical and internship cycles. Thus, for analysis, the cycle variable was left with two categories: 'basic cycle', coded as 1, and 'clinical and internship cycles', coded as 0. For the gender variable, as only one person selected the 'other' option, this response category was removed from the analysis, leaving two categories, 'female' and 'male', coded respectively as 1 and 0. Regarding the frequency of weekly physical activity, after preliminary analyses, we decided to group the responses 'none' or 'once' into a category coded as 1 and the responses 'twice' or 'three times or more' into another category coded as 0. Regarding the family diagnosis of the CMD variable, the initial response categories were maintained, which were coded as 1 for 'yes' and 0 for 'no'.

Based on the results of previous studies and the exploratory analysis of the data from this study, the following hypotheses (H) were established that the chances of having CMD are higher among students: H₁. who are in the primary cycle; H₂. are female; H₃. have a family diagnosis of CMD; H₄. do not perform physical activity or do so only once a week; H₅. do not have a good relationship with their father; H₆. do not have a good relationship with their mother.

RESULTADOS

Based on the hypotheses formulated, statistical procedures were carried out to assess their validity within the context of the sample studied. The following section presents the results obtained, highlighting the prevalence of cases indicative of CMD among students and the analysis of the explanatory variables included in the statistical model.

Of the 160 cases analyzed, 86 were classified as indicative of CMD. This means that 53.8% of the students participating in this study are experiencing some type of psychological distress. It is important to note that several attempts were made to identify possible explanatory variables for this occurrence (CMD indicator) until the proposed model was reached. Furthermore, after

defining the explanatory variables, we decided to test them simultaneously using the enter method. Table 1 presents the coding adopted for each of the variables inserted in the model.

Table 1. Coding of variables inserted in the model

Variables	Codification
CMD indicator	0 – No 1 – With
Course cycle	0 – Clinical and internship 1 – Basic
Gender	0 – Male 1 – Female
Frequency of weekly physical activity	0 – Twice or three times or more 1 – None or once
Diagnosis of CMD in the family	0 – No 1 – Yes
Quality of relationship with father	Continuous variable 0–10
Quality of relationship with mother	Continuous variable 0–10

Source: Prepared by the author.

To verify the quality of the proposed model's adjustment, the null model (only intercept) was compared with the model that incorporates the independent variables. This comparison showed a statistically significant difference. The results of the Hosmer and Lemeshow tests ($\chi^2 = 11.658$; $p = 0.167$) and the Omnibus test of the model's coefficients ($\chi^2 = 57.756$; $p < 0.000$) suggest that the proposed model is better than the null model. This means that the explanatory variables used in the model (course cycle, gender, frequency of weekly physical activity, diagnosis of CMD in the family, quality of the relationship with the father and mother) help to predict the occurrence of the dependent variable (CMD indicator).

Given that these values ensure the adjustment of the proposed model, we proceeded with the interpretation of the results. The estimated coefficients of the logistic regression model (β), the odds ratios (ORs), and their statistical significance (p-values), indicating the likelihood of CMD prevalence for each independent variable, are summarized in Table 2.

In the logistic regression model, the β coefficients represent both the direction and the strength of the association between each explanatory variable and the likelihood of presenting CMD. A positive β indicates an increased likelihood, while a negative β suggests a decreased likelihood. The ORs, calculated as the exponentials of the β coefficients, indicate how much more (or less) likely the outcome is to occur for each category of a variable compared to the reference group. The 95% confidence intervals (CIs) for the ORs provide a range within which the true OR is expected to fall with 95% certainty. If the CI does not include value 1, the association is considered statistically significant.

Table 2. Coefficients of the logistic regression model

	β	Standard Error	Z(Wald)	p	Exp(β)	OR
Gender (1)	-0.898	0.405	4.909	0.027	0.408	- 0.592
Frequency of physical activity (1)	1.325	0.525	6.367	0.012	3.763	2.763
CMD diagnosis in primary family (1)	-1.722	0.390	19.500	0.000	0.179	- 0.821
Quality of relationship with the Father	-0.145	0.070	4.235	0.040	0.865	- 0.135
Quality of relationship with Mother	-0.131	0.121	1.175	0.278	0.877	- 0.123
(Intercept)	3.944	1.162	11.524	0.001	51.633	

Source: Research data (2024).

Considering the signs of the estimates, these coefficients can be interpreted as follows: decreases the chance of having CMD for those who are in the clinical cycle or internship (61.8%), are male (59.2%), have no family diagnosis of CMD (82.1%) and have a good relationship with their father (13.5%), and increases the chance of having CMD for those who do not perform physical activity or do so only once a week (276.3%). On the other hand, considering the p-value, there is no significant effect of the variable quality of the relationship with the mother on the chance of having CMD.

According to the values of Cox and Snell R^2 and Nagelkerke R^2 extracted, the predictive power of this model is 0.305 and 0.407, respectively. With a sensitivity of more than 72%, they refer to the number of students with indicative CMD that the model correctly predicted.

DISCUSSÃO

More than 50% of the students who participated in this study received the indication of CMD. Higher than that found in other studies with medical students¹, this percentage reveals the need for effective interventions, both preventive and curative. Furthermore, with these results, we can observe that five of the six previously established hypotheses were corroborated. Therefore, they can guide the development and implementation of these interventions.

The finding that the chances of having CMD decrease for those in the clinical cycle or internship confirms that the medical course cycle also influences the prevalence of CMD. Given that exposure to risk factors for the prevalence of CMD does not occur uniformly throughout the undergraduate course, there are particularities associated with each cycle, with different attenuating and amplifying factors^{10,11,12,14}.

One possible explanation for this finding is the fact that entering higher education is widely described in literature as a significant source of stressors for the individual, especially for medical students^{13,14}. Furthermore, students in this initial phase tend to feel that expectations have been broken regarding the subjects taught in the primary cycle^{6,10,31}. Although other stressors permeate the clinical and internship cycle^{4,6}, we believe that students in the most advanced years have resources in their profile that may be protective against CMD, such as a better response to pressure and maturity in the face of possible sources of disturbance¹². Students in their final year may be better supported or feel more fulfilled with their professional choice, or, in the worst-case scenario, students with a higher prevalence of CMD have already dropped out of the course and do not appear in the data collected¹.

More specifically, when analyzing students in the preclinical (primary), clinical, and internship years separately, we observed that the former had more mental health symptoms than the latter^{4,13}. In contrast, this finding does not confirm those found in two other studies, which highlighted the clinical cycle as the most prone to the development of CMD^{1,10}.

In turn, the discovery that the chances of having CMD decrease for men confirms studies that indicate that there is a significant difference in the prevalence of CMD between genders. In this sense, we observed that women are more susceptible to the occurrence of depressive and anxious symptoms, reaching almost double the prevalence found in men^{32,33,34}. This is reproduced in cases of CMD, being amplified in female medical students, who present higher values in relation to the general population^{4,13,15,35,36}.

This difference in prevalence between genders can be attributed to biological factors^{32,33,37}. It is believed that genetic load is favorable to the emergence of mental disorders, being catalyzed by monthly hormonal variation, considering that the hypothalamus-pituitary-ovaries axis acts in a pulsatile manner, providing more remarkable emotional lability when compared to men³⁷. In depression, as in all mental disorders, there is a certain amount of genetic and environmental responsibility for the development of depressive symptoms. Preclinical studies suggest that stress in early life causes sustained hyperactivity of corticotropin-releasing factor cells in the hypothalamus, which leads to increased responses to stressful events and, consequently, greater predisposition to the development of mental disorders in general^{32,33}.

Furthermore, we also noted that sociocultural factors function as predisposing agents for the development of CMD^{1,5,38}. The correlation between the Gender Inequality Index and depression is significantly positive for females but not for males¹. Mistreatment in the academic environment acts as a potential for the onset of depression and anxiety, with women being the preferred target for at least one episode of discrimination, verbal abuse, or even sexual harassment³⁸. Thus, socialization and the construction of gender roles impact the etiology of disorders and female psychological distress³⁹.

The confirmation that the chances of having CMD are higher among students who reported a family diagnosis of CMD complements the results found in other studies^{16,17,18}. In this sense, we can infer that the presence of a family history of mental disorders may be a significant risk factor for the development of CMD in medical students. This means that the combination of genetic predisposition and the stressful environment of medical school may increase the vulnerability of students to the development of CMD^{13,18,40}.

This statement is supported by evidence that children and adolescents with a family history of mental disorders have a greater predisposition and a worse prognosis for the development and treatment of CMD. This is due to the compromised support network, poor adherence to treatment, risk of recurrence, and greater intensity of symptoms^{17,18}. More specifically, correlations were observed between a family history of mental disorders with indications of depression and suicidal ideation in medical students at a public HEI in Rio de Janeiro¹⁶.

As confirmation of the fourth hypothesis, this study also shows that the chances of having CMD are much higher for those who do not perform physical activity or do so only once a week. This same result was found in two other studies conducted with medical students, which found an association between a sedentary lifestyle and the prevalence of mental disorders^{1,13}.

In recent times, the relationship between adequate and frequent physical exercise and mental health has been gaining more space in the scientific field, with positive studies and results arising from this association^{41,42,43,44}. Regular physical activity contributes significantly to the reduction of symptoms of depression, anxiety, and stress^{41,43}. This is because regular physical activity promotes improvements in cognitive and mental functions and increases self-esteem and resilience to deal with stressful situations^{42,43}.

Scientific explanations, supported by biological knowledge of the human body, can demonstrate such benefits brought to people through the practice of regular physical activity. Physical exercise contributes to improving mental health since it stimulates cerebral blood flow, releases endorphins, causes changes in neurotransmitters, and stimulates the production of brain-derived neurotrophic factors. This, in turn, can reduce allostatic load and promote emotional well-being⁴³.

Interestingly, even with empirical evidence and scientific explanations, physical exercise is underestimated and underused as a prescription for the promotion and treatment of mental disorders. Pharmacological intervention is still considered the first-line treatment for psychiatric patients, even though its short-term benefits are modest and it brings side effects such as cardiometabolic and cardiovascular diseases. However, even if prescribing physical activity is not within their competence, it is the role of all health professionals, especially those in mental health, from a multidisciplinary perspective, to encourage a healthier lifestyle⁴⁴.

Finally, the findings that there is a significant relationship between CMD and the quality of the relationship with the father, but not with the mother, can be explained based on academic studies and psychological theories. In literature, there is a consensus that the quality of family relationships, especially with parents, plays a crucial role in the mental health of students. Positive, supportive, and affectionate relationships are associated with a lower incidence of CMD, while conflictual and violent relationships can exacerbate symptoms of depression and anxiety^{19,20,21,22}.

Therefore, scholars highlight the importance of family support for emotional well-being and, consequently, as a protective factor in the development of mental disorders^{20,21,22}. Especially for those who are physically far from their parents, social interaction and coexistence should be encouraged, even through digital means. This contact, even virtual, can help to reduce feelings of loneliness and maintain closeness with parents⁴⁵.

However, few studies assess the relationship between quality of life with father and mother separately and the prevalence of CMD. One of the few studies was conducted only with women. In this study, the results showed that quality of life and mental health differed in the relationship between mother and daughter and father and daughter, despite the similarity in the experience of the relationships. Furthermore, this relationship impacts how this woman will exercise her role as wife and mother¹⁹.

The relationship with the father, which is generally more limited, may be related to psychoanalytic issues involving the resolution of the Oedipus complex and the representation of the paternal authority figure¹⁹, which is still present in Brazilian culture. In addition to the different roles of parents in the socialization of their sons and daughters, the authority figure, especially on the part of the parent or the person who performs the role of authority, as well as the difference in expectations regarding the academic performance and professional future of children, can impact the relationship established between parents and children and its effects^{19,39}. Such expectations can be perceived as pressure, which can be more intense in demanding courses such as medicine, where academic success is highly valued. Furthermore, training in these courses requires a significant financial outlay, either by keeping the child in another city or state or by paying for a private higher education institution. In this sense, a relationship of pressure on the part of the father, often the provider, can be a significant source of stress and anxiety, contributing to the development of CMD¹⁹.

In addition, it is worth noting that the student's relationship with the father may be partially or totally absent, such as in cases of separation and divorce, in which children are often placed in the background to the detriment of new relationships and children

resulting from this relationship⁴⁶. The absence of a father has negative implications and contributes to psychological suffering, especially in children and adolescents, but this does not dissipate in adult life^{47,48}.

In other words, the emotional impact of paternal relationships, particularly when marked by absence, authoritarianism, or pressure for academic success, may be more directly linked to psychological distress in young adults, especially in high-demand academic environments such as medical school. This, in turn, reinforces the result found.

On the other hand, the absence of statistical significance regarding the quality of the relationship with the mother warrants a more nuanced interpretation. Maternal relationships are often perceived as more stable and emotionally supportive, which may lead to reduced variability in participants' responses and, consequently, lower statistical power to detect associations⁴⁹. Moreover, cultural expectations surrounding maternal roles—where mothers are typically expected to embody care, kindness, and emotional availability—may contribute to underreporting of conflict or dissatisfaction in these relationships, introducing potential response biases^{39,50}.

Thus, the lack of statistical significance in this variable does not necessarily indicate an absence of influence. Rather, it reflects the complexity and subtlety of relational dynamics that may not be fully captured by quantitative instruments alone. In this context, the parent-child relationship, whether with the mother or the father, is inherently multifaceted and shaped by sociocultural, emotional, and psychological factors. These nuances may help explain the findings observed in this study.

CONCLUSÃO

The observed prevalence of common mental disorders among future physicians reinforces the practical implications of this predictive model. The findings of this study allow the identification of students who are at greater risk of developing mental health complications. Therefore, the demand for early interventions before neurotic symptoms are aggravated emerges as a critical need for attention to the well-being and mental health of this student population.

Furthermore, these interventions can be personalized, with the promotion of psychosocial support, especially for those who are in the primary cycle and have a family history of mental disorders, as well as counseling that helps improve communication between students and their families so that they receive the necessary emotional support. In addition, HEIs can encourage and provide conditions for the regular practice of physical activity through programs and adequate infrastructure such as courts and swimming pools.

Moreover, HEIs can readjust their curricula and develop institutional policies, with the inclusion of rest periods, well-being activities and the creation of safe spaces for awareness and discussions about mental health within the academic community. Therefore, we expect that the results of this study will serve as subsidies to transform HEIs into a healthier environment that is more favorable to emotional support, thus contributing to the training of healthier, more resilient, and humanized professionals.

More broadly, these findings have important implications for public health and clinical practice. Identifying psychosocial and behavioral risk factors—such as poor family relationships and lack of physical activity—can guide the development of mental health strategies in educational settings. Clinically, the results highlight the importance of considering students' social and family contexts in early detection and intervention efforts.

In summary, this study contributes to a deeper understanding of the factors associated with CMDs, particularly the role of family relationships—an often-overlooked aspect. Its originality lies in incorporating these social variables into the analytical model, offering valuable insights for more comprehensive and human-centered approaches to student mental health.

Despite its contributions, this study's main limitation is the low response rate of internship students. We believe that these students experience a variety of contexts, which would justify a specific study with students in this cycle. This underrepresentation may have compromised the generalizability of the findings, particularly those related to the cycle variable. It is important to consider that internship students are typically allocated to various clinical settings, often located outside the university campus and, in some cases, in other cities. This geographical dispersion, combined with the intense workload and practical demands of the internship, may reduce their availability and engagement with institutional activities, including participation in research. Furthermore, their limited physical presence at the university may contribute to a diminished sense of connection or commitment to academic initiatives, which could partially explain their low response rate.

Given that internship students are exposed to distinct contexts and stressors, future studies should consider conducting specific investigations focused on this subgroup. Additionally, it would be pertinent to explore the relationship between CMDs, and other

variables not addressed in this study, such as the quality of relationships with peers and faculty members, or to compare students from public and private higher education institutions. These approaches could provide a more comprehensive understanding of the factors influencing the mental health of medical students.

CONFLITOS DE INTERESSE

Os pesquisadores afirmam que não há conflitos de interesse nesta pesquisa.

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