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# Prevalence of depressive symptoms in Medicine students: the challenge of different methodologies

**Prevalência de sintomas depressivos em estudantes em estudantes de Medicina: o desafio das diferentes metodologias**

**Prevalencia de los síntomas depresivos en los estudiantes de Medicina: el reto de las diferentes metodologías**

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**Abstract**
Objective: Determine the prevalence of depressive symptoms among medical students in the state of Paraná, Brazil, and compare the prevalence of these symptoms among students that use traditional and active methodologies of teaching. Methodology: A cross-sectional study was conducted, with a quantitative approach, through data collection between August and September 2020. An online form was sent, through the Google Forms platform, containing 23 questions. Students from the first to the eighth period of medical school participated, with a minimum age, from all medical schools in Paraná. Results: 250 were included. From the total, 62% uses the PBL methodology, 32% the traditional methodology and 6% uses another method. When asked if the methodology could generate depressive symptoms, 70% of the participants believe that there is a relation between the methodology and depressive symptoms. Conclusion: Although depressive symptoms can be triggered by the teaching methodology and are prevalent among medical students, the results shows that there is no statistical difference between the methodologies.
**Keywords:** Depression; Methodology; Problem-based learning; Teaching.

**Resumo**
Objetivo: Conhecer a prevalência de sintomas depressivos entre estudantes de medicina no estado do Paraná, e comparar o predomínio destes sintomas entre estudantes que utilizam as metodologias tradicional e ativa. Metodologia: Realizou-se um estudo descritivo transversal, com uma abordagem quantitativa, por meio de levantamento de dados entre agosto e setembro de 2020. Foi enviado um formulário *online*, pela plataforma *Google Forms*, contendo vinte e três perguntas. Participaram estudantes do primeiro ao oitavo período de medicina, com idade mínima de dezoito anos, de todas as faculdades de medicina do Paraná. Resultados: Duzentos e cinquenta participantes foram incluídos. Do total, 62% utilizavam a metodologia *Problem-based learning*, 32% a metodologia tradicional e 6% outro método. Quando questionados se a metodologia poderia gerar sintomas depressivos, 70% dos participantes acreditam haver relação entre

a metodologia e os sintomas depressivos. Conclusão: Apesar de os sintomas depressivos poderem ser desencadeados pela metodologia de ensino e serem prevalentes entre os estudantes de medicina, o resultado obtido mostra que não existe diferença estatística entre as metodologias.
**Palavras-chave:** Depressão; Metodologia; Aprendizagem baseada em problemas; Ensino.

**Resumen**
Objetivo: Determinar la prevalencia de síntomas depresivos entre los estudiantes de medicina del estado de Paraná y comparar la prevalencia de estos síntomas entre los estudiantes que utilizan metodologías tradicionales y activas. Metodología: Se realizó un estudio descriptivo transversal, con un enfoque cuantitativo, mediante una encuesta de datos entre agosto y septiembre de 2020. Se envió un formulario online, a través de la plataforma Google Forms, que contenía veintitrés preguntas. Los participantes fueron estudiantes del primer al octavo período de la escuela de medicina, con una edad mínima de dieciocho años, de todas las escuelas de medicina de Paraná. Resultados: Se incluyeron 250 participantes. Del total, el 62% utilizó la metodología de aprendizaje basado en problemas, el 32% la metodología tradicional y el 6% otro método. Cuando se les preguntó si la metodología podía generar síntomas depresivos, el 70% de los participantes creía que había una relación entre la metodología y los síntomas depresivos. Conclusión: Aunque los síntomas depresivos pueden ser desencadenados por la metodología de enseñanza y son prevalentes entre los estudiantes de medicina, los resultados obtenidos muestran que no hay diferencia estadística entre las metodologías.
**Palabras clave:** Depresión; Metodología; Aprendizaje basado en problemas; Enseñanza.

## 1. Introduction

Depressive syndromes, from a psychopathological perspective, include sad and discouraged moods as their main characteristics. Additionally, there are many mood symptoms such as anhedonia, anguish, apathy, easy crying, hopelessness and irritability. Depression impact quality of life, physical and mental health, being one of the main causes of what the WHO (World Health Organization) calls “years lived with disability,” YLDs (Dalgalarrondo, n.d.; Olum et al., 2020).

According to the WHO, depression is the fifth-largest public health problem in the world and is expected to become the most common disease in the next 20 years, affecting more people than cancer and heart disease. (Lopes Marinho et al., 2020). Worldwide, mental disorders affect about 350 million people (Nóbrega et al., 2020).

Regarding the cognitive sphere, according to Dalgalarrondo, alterations such as attention and concentration deficiency, secondary memory deficit and difficulty in making decisions may be present in depression (Dalgalarrondo, n.d.). These symptoms are especially important to students as they have a direct impact on their performance. Additionally, psychological stress may be related to a decline in professionalism and empathy with patients (Hope & Henderson, 2014).

The prevalence of depressive symptoms among health professionals is growing worldwide, including among medical students (Farid F. Y 2016). It is estimated that 15 to 25% of students experience some form of psychiatric disorder and, among this percentage, 8 to 17% have some depressive symptom (Mahroon et al., 2018). Worldwide, among the various emotional and behavioral symptoms, depression is the most prevalent syndrome (Alkhamees et al., 2020).

As the graduation progresses, medical students face different challenges, including pressure during exams, fear of failing, intense competition among colleagues, lack of free time and exposure to suffering and death of patients. In addition, insecurity concerning entering the job market generates anguish in the first years of college (Lopes Marinho et al., 2020). All these concerns can affect mental health and also professional performance, compromising the future patient care. Undergraduate courses, especially those in the health area, have a more rigid character and an exhausting routine, directly impacting the mental health of students (Nóbrega et al., 2020).

Medical education is been suffering a transformation and there is a worldwide concern about the mental health of students and medical professionals. A methodology that has received attention is the one based on learning actively, with Problem-Based-Learning (PBL) being the most used in medical education institutions (Aragão et al., 2018). In this methodology, students are responsible for constructing knowledge and search for information, unlike the traditional methodology, in which it is the teacher who provides information (Lucchetti et al., 2018).

In this context of changes in teaching and adaptations of students to the course, the existence of depression, especially among medical students, has already been proven. The research question that guided this investigation was the following: "What is the prevalence of depressive symptoms among students whose courses use different teaching-learning methodologies?"

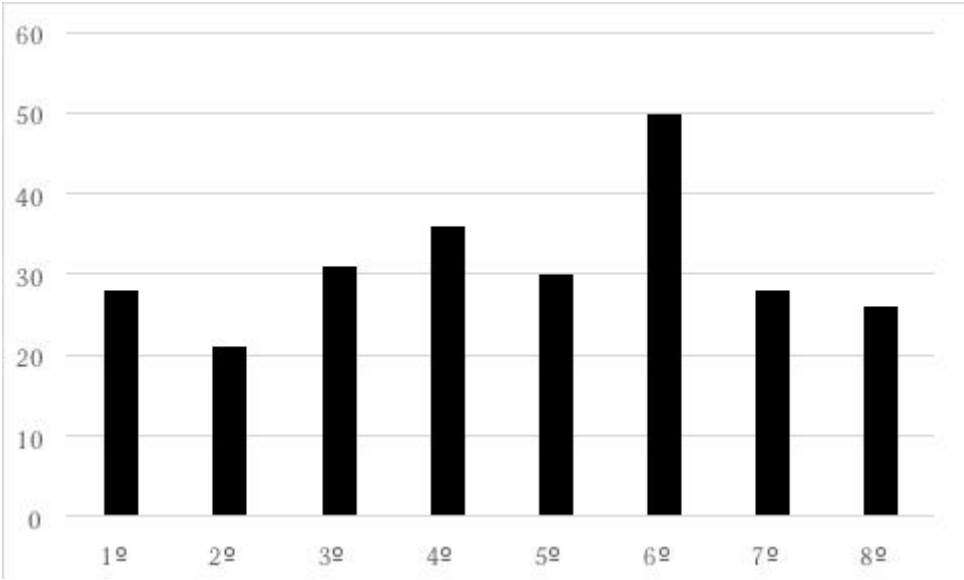
## 2. Methodology

A cross-sectional descriptive study was conducted, with a quantitative approach, through data collection between August and September 2020. According to Richardson (1985) and Diehl (2004), quantitative research is characterized by the use of quantification in all stages of the study through statistical techniques. In this way, it allows a greater margin of safety and precision, as it aims at results that avoid possible distortions of analysis and interpretation. Therefore, the present work was carried out following this approach. The quantitative approach was chosen because it is broader, and agreater number of students to be reached throughout the state of Paraná. An online form was sent, prepared through the Google Forms platform, containing 23 questions regarding the perception of medical students about depressive symptoms. The questions that composed the questionnaire were designed based on the literature review, and through a meeting between the authors with a careful analysis of possibilities that could answer the research question. In addition, the questionnaire was submitted to the Research Ethics Committee and approved for application (CAAE:35620020.4.0000.5580). The distribution of the questionnaire was ensured through at least one contact, by electronic means of communication, from all Higher Education Institutions of Medicine in the state of Paraná. That way, all who participated in the research were within the proposed territorial extension. All participants were informed about the objectives of the study and security about confidentiality and guarantee of anonymity through the Free and Informed Consent Term. Participants were free to answer closed questions, with a multiple-choice option, and open questions with free completion. For data analysis, the answers obtained in the questionnaire were exported to Microsoft Excel program. Respondents who did not meet the inclusion following criteria were excluded: medical students enrolled in medical schools in the state of Paraná, studying between the first to the eighth period, of both sexes, of all races and religions and with a minimum age of 18 years. Therefore, students under 18 years of age and students who were attending medical internship, which corresponds to the ninth to the twelfth period, were excluded from the research. Then, descriptive statistics were performed, namely, the calculation of frequencies and averages for numerical variables. In questions where there was a possibility, the free statistical program PAST was used to perform the chi-square test, with a confidence interval of 95%, which compares frequencies that are observed in a given population based on frequencies that should be expected/with what was expected to happen theoretically. In the analysis of the result, it should be considered that a value of $p < 0.05$ indicates that the alternative hypothesis should be accepted and the null hypothesis rejected, as opposed to $p > 0, 05$, which suggests that the null hypothesis should not be rejected. It can be defined that the null hypothesis predicts homogeneity or equality, and the alternative hypothesis predicts differences, that is, what the objective is to demonstrate in a study. Microsoft Excel program was used to obtain the calculations of percentages and proportions for the categorical variables.

## 3. Results

252 responses were obtained, but 2 forms were excluded, one because it did not contain all the responses and the other because the participant was younger than 18 years old, totaling 250 participants. A total of 45 forms were filled out by men and 205 by women. As for the age group, 43 years old was the maximum age found and 18 years old was the minimum age. Among survey participants, the most frequent age and the average age was 22 years old. About the period studied, 20% of the participants were in the sixth period, being the period with the greatest representation, with a total of 49 students. The distribution of students by period is shown in Figure 1.

**Figure 1 -** Distribution of students according to the period studied.




Source: Authors (2021).

The study aimed to address all colleges in the state of Paraná and the distribution of students by college is shown in table 1.

**Table 1.** Distribution of responses according to Educational Institution.

| Institution | Answers |
|---|---|
| UFPR – Curitiba | 22 |
| FPP | 50 |
| REAL FIELD | 19 |
| UNINGÁ | 3 |
| PUCPR | 22 |
| UEL | 21 |
| FUNDAÇÃO ASSIS GURGACZ | 8 |
| UP | 9 |
| EMU | 1 |
| FADEP | 24 |
| Others | 14 |
| FEMPAR | 15 |
| UNICESUMAR | 27 |
| UNIOESTE - Francisco Beltrão | 4 |
| UNIOESTE – Cascavel | 4 |
| UEPG | 5 |
| UFPR - Toledo | two |
| TOTAL | 250 |

Source: Authors (2021).

Of the 250 study participants, 62% answered that they use the PBL methodology in their graduation, 32% answered

that their medical school uses the traditional methodology and 6% use another method. These data are represented in table 2. Of the total number of participants, 79% considered the teaching methodology appropriate for their learning profile.

**Table 2.** Distribution of responses according to the teaching methodology used in the course.

| Methodology | Number of participants | percentage representation |
|---|---|---|
| PBL (Problem-Based Learning) | 155 | 62% |
| Traditional | 80 | 32% |
| Other | 15 | 6% |
| TOTAL | 250 | 100% |

Source: Authors (2021).

When asked if they believed that the methodology used could generate depressive symptoms, 70% of the participants believed that there was a relation between the methodology and the presence of depressive symptoms. 198 students considered the methodology adequate to their profile, and of these, 26% stated that they had a predominance of negative feelings.

When comparing the methodology used with the most predominant feelings (positive or negative), 63% of the 155 medical students who use the PBL teaching methodology have a predominance of positive feelings and 68% of the 80 students who use the traditional teaching methodology have a predominance of positive feelings.

When asked about 2 negative feelings that the course methodology could generate, the feelings that stood out the most were anxiety, insufficiency and incapacity, and the word anxiety was present in 85 responses. Among teaching methodologies, 37% of PBL students and 28% of traditional education students wrote that anxiety is the feeling that the methodology can cause. Of the students who use the PBL teaching methodology, 26% reported feeling insufficiency or incapacity and the students with the traditional methodology added up to 14% with these feelings.

Of the students who answered the questionnaire, 80% said they feel pressured and, of these, 86% said that the reason is self-pressure. In the question “Do you relate the feeling of pressure to the occurrence of depressive symptoms?” 82% understood that there is a relation between feeling pressured and depressive symptoms.

Of the 250 participants in the study, 165 had depressive symptoms at some point in their lives. Of these 165, 54% believe that depressive symptoms are related to the course. 115 participants said that depressive feelings arose before entering college and 50 of them said that the symptoms started during college.

For 71% of the participants, the answer is affirmative to the question: “Do you think you charge more because of the teaching methodology used in your college?”. Of the total number of participants, 36% said that they had already thought about leaving the course.

When relating the type of methodology to the presence of some depressive symptoms during life, 154 responses were obtained. Data distribution is shown in table 3. The lifetime prevalence of depressive symptoms was 68% for students using the PBL methodology and 60% for students using the traditional methodology.

**Table 3.** Prevalence of depressive symptoms by methodology.

| | Have you ever had depressive symptoms? | Total by methodology | Prevalence of depressive symptoms |
|---|---|---|---|
| PBL (Problem-Based Learning) | 106 | 155 | 68% |
| Traditional | 48 | 80 | 60% |
| TOTAL | 154 | 235 | |

Source: Authors (2021).

Using the free statistical program PAST, the p-value was calculated using the chi-square test to analyze the question of whether the emergence of depressive feelings is related to the course or not. As a result, a $p > 0.01$ was obtained, which demonstrated a relation between the onset of depressive symptoms and the course.

It was also calculated through this same program, through the chi-square test, the questioning if students believe that depressive symptoms can be generated by the type of methodology used in the course. As a result, a $p < 0.01$ was obtained, showing that there is no difference between the methodologies.

## 4. Discussion

Mood disorders manifest within a wide clinical spectrum, also being called affective disorders. According to Stahl, affect is the external expression of mood, an "emotion experienced from within" (Stahl, 2014). Sadock defines humor as a pervasive and persistent tone of feeling that influences a person's behavior and colors their perception of being in the world (Sadock et al., n.d.). In a depressive episode, for example, symptoms such as depressed mood or loss of interest or pleasure, significant weight loss or gain, insomnia or hypersomnia, psychomotor agitation or retardation, fatigue, decreased ability to think or concentrate, indecisiveness, irritability and frequent thoughts of death (Sadock et al., n.d.).

According to Oliveira (2013), stress is a key factor in triggering depressive symptoms (Neves De Oliveira & Bahia, n.d.). It is well known that medical students worldwide exhibit high levels of stress. Chronic stress can precipitate sleep disturbances, risky behaviors and unhealthy lifestyles. In addition, there is a consensus that this population group suffers more from depressive symptoms than the general population. Worldwide studies have indicated that 10.2 to 71.2% of medical students tend to have depressive symptoms (Alkhamees et al., 2020). As a result, there is an impact on their cognitive functions, which are essential for effective learning.

There are several reasons for the higher incidence of psychiatric disorders among resident physicians and medical students, including adaptation to the medical course, exposure to death, personal events and curriculum issues such as new methodologies and exposure to patients. Additionally, the student starts to spend more time on studies, having less time for leisure, so he starts to realize that entering college also resulted in losses, in addition to the expected gains (Millan & Arruda, 2008). As they progress through college, students are faced with different challenges: the pressure of exams, fear of failure, intense competition among peers, exposure to patient suffering and death (Mahroon et al., 2018). This was also shown in the survey results, in which 80% reported feeling pressured during the course, and of these 86% reported that the pressure comes from themselves, that is, self-pressure.

An Italian study listed the possible causes of this high incidence of symptoms and divided them into sociodemographic causes, such as gender, social and cultural class, and academic causes, such as high workload, hospital internships, competitive environment and complex issues that must be understood. Another factor worth mentioning is the complex interaction existing in the doctor-patient relationship, which can increase psychological and emotional stress. Individual factors such as personality also influence the development of emotional stress and depressive symptoms (Bertani et al., 2020).

Damaso et al. (2019) identified as one of the biggest challenges in society the naturalization of psychic suffering, both by the university and the medical culture, including the students themselves. In the view of a community, the fact of being a student or professional in the health area implies more hours of study and dedication than other professions, which generates a feeling of guilt for not being able to meet expectations. The faculty often perpetuates this stigma, as they increasingly demand more from students, ignoring requests for help, leaving implicit prejudices leading to mental disorders (Damaso et al., 2019).

Depressive disorder directly impacts the physical and mental health and quality of life of patients. According to data obtained in 2010, it is estimated that worldwide, depression affects about 298 millions of people, more than half of the them women. In a national survey carried out in 2013 by the Brazilian Institute of Geography and Statistics (IBGE), of the nearly 500, 7.2% received, at some point in their lives, a clinical diagnosis of depressive disorder (Dalgalarrondo, n.d.). Among university students, a prevalence of around 15%-25% of some type of psychiatric disorder was estimated during graduation and, among the different courses, medical students are the ones with the most depressive symptoms. (Aragão et al., 2018). By literature data, in this study it was observed that 66% of respondents reported some depressive symptom during their lifetime.

Recently, greater importance has been given to mental illnesses, due to the increase in cases of these pathologies. Data from the Brazilian's National Health Survey carried out in 2019, by the Brazilian Institute of Geography and Statistics (IBGE), indicate that 6.3 million people over 18 years old suffer from depression, an increase of 34.2%, from 2013 to 2019(IBGE: Crescimento Da Depressão é Realidade No Brasil | VEJA RIO, n.d.). Even so, there are still barriers about the stigma of this disease. In Ancient Greece, stigma was a distinctive mark burned or cut into the skin of slaves or criminals so that others could know they were inferior members of society. At that time, the word stigma was not related to mental illness, but psychiatric disorders were already related to the concept of shame and humiliation (Rocha & Paprocki, 2015). In anthropology, this prejudice is seen in other moments of history, which reflects, even today, in the difficulty of approaching this theme, either in the community or in the scientific environment.

In psychiatric care services, prejudice contributes to the search for assistance occurring in more advanced stages of the disease, which implies difficulty in adhering to treatment and involuntary hospitalization. Additionally, prejudice also has even greater consequences when it comes from students and health professionals since they should be the first to have an empathic and humanized view of their patients, regardless of the origin or classification of their disease (Menezes Neto et al., 2021). To reduce this ingrained prejudice, the literature has shown that both education and contact with mental health topics from childhood have a positive impact on reducing stigma (Machado & Pereira, 2013).

In Brazil, the Family Health Strategy is responsible for attention to mental health, which, according to the Ministry of Health, must follow a model of care networks, with a territorial base and transversal action with other specific policies, aiming to seek the establishment of bonds and reception. This inclusion of mental health actions in Primary Health Care extends care beyond the most serious demands of psychological distress, such as those found in Psychosocial Care Centers, specialized outpatient clinics, day hospitals, among others, and is incorporated at the entrance door. of the health system, returning to the place of origin, that is, the community, the family, the daily relations of the subjects (Machado & Pereira, 2013).

Several studies suggest that the Medical School, as it is currently structured, may be a triggering factor for depressive symptoms (Moro et al., 2020). In 2001, through the National Curriculum Guidelines for the Medicine Course (DCN), proposals were developed in undergraduation for the implementation of active methodologies, which aimed to transform the doctor's profile. In 2014, the new curriculum guidelines valued a generalist and humanized professional training, in addition to having a student as a protagonist in the search for learning while the teacher acts as a facilitator in the teaching-learning process, to act from the primary care level to the urgent and emergency services (Brazil, 2014) However, the traditional methodology focuses more on the biological aspects of the human being in detriment of other aspects that permeate the health-disease process (Freitas

et al., 2020). However, despite the particularities of each methodology, both may be related to depressive disorders in their income.

In this study, although a standardized depression scale was not applied, the self-perception of depressive symptoms was analyzed, revealing a percentage of anxiety among students of 37% with the PBL methodology and 28% with the traditional methodology. As for feelings of insufficiency or incapacity, an equivalent of 26% was observed in the PBL methodology and 14% in the traditional one. These data become even more relevant when analyzing the data brought by the literature that shows its relation with substance abuse, suicidal ideation, in addition to promoting long-term consequences (Mahroon et al., 2018).

According to studies, rates of untreated depression remain high among medical students, being equivalent to 25% (Puthran et al., 2016). Corroborating the literature, in this study, although more than 80% of the students sought professional help, 62% from doctors and 20% from psychologists/therapists, 18% did not, referring to a self-diagnosis of depression. As the main reasons for this lack of demand, the literature brings fear of a negative impact on academic history, lack of time, stigmas associated with the use of psychiatric health services and fear of unwanted interventions (Puthran et al., 2016).

Comparing the prevalence of depressive symptoms with the methodology used by the course, the data obtained in our study were that 68% of the students that use PBL and 60% of those who use the traditional methodology had some depressive symptom throughout their lives. Among research participants who reported the emergence of depressive symptoms during the course, the prevalence in all methodologies studied was 20%. Aragon et al. (2018) observed that the prevalence of depression among students who use PBL was 29.73%, and among those who follow traditional methods, it was 22.12%, which may be due to the change in the way of teaching, from traditional to active search (Aragão et al., 2018).

## 5. Conclusion

Of the 250 participants in the study, 165 have had depressive symptoms at some point in their lives. According to this study and literature data, it is noted that depressive symptoms are prevalent among medical students, especially anxiety, insufficiency, disability and self-pressure. This study also revealed a relation between the emergence of these symptoms and the medical school.

Although depressive symptoms can be triggered by the teaching methodology, according to the participants' opinions, the result obtained shows that there is no statistical difference between the methodologies. However, more studies are needed, given the scarcity of literature found on the subject.

The limitations found by this study were the non-use of a validated depression scale for the correct diagnosis, the absence of questioning about the worsening of depressive symptoms during the medicine school, and the conducting of the research in a pandemic context, which may influence responses. There was no conflict of interest.

Future research is essential to better understand the influence of the methodology on the origin of depressive symptoms among medical students from different teaching-learning methodologies.

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