

## Depression prevalence in medical students: a scoping review

### *Prevalência de depressão em estudantes de medicina: uma revisão de escopo*

Alice Lucindo de Souza<sup>1</sup>, Fernanda Venturini de Castro<sup>1</sup>, Karine Ferron<sup>1</sup>,  
Ana Letícia Zanon Chagas Rodrigues<sup>1</sup>, Ana Carolina Cau<sup>1</sup>,  
Marcos Sampaio Meireles<sup>1</sup>, Marcela Souza Lima Paulo<sup>1</sup>

Souza AL, Castro FV, Ferron K, Rodrigues ALZC, Cau AC, Meireles MS, Paulo MSL. Depression prevalence in medical students: a scoping review / Prevalência de depressão em estudantes de medicina: uma revisão de escopo. Rev Med (São Paulo). 2021 Nov-Dec;100(6):578-85.

**ABSTRACT:** *Introduction:* Depression is a common mental disorder that affects 322 million people worldwide. It is estimated that 15% to 25% of university students have some psychiatric disorder, depression and anxiety being the most recurrent. Among those affected, medical students can be mentioned as a group that frequently presents depressive symptoms. *Objective:* Knowing the scientific evidence about the prevalence of depression in medical students. *Methods:* Scoping Review with guiding question “What is the prevalence of depression in medical students?” to search for original articles, clinical cases, meta-analyses and guidelines published from 2010 to 2020. Searches were carried out in PubMed and in the Virtual Health Library (VHL), through searching terms such as “depression disorder” AND “students, medical” AND “schools, medical” AND “prevalence”. *Results:* The 12 articles found showed, for the most part, a prevalence of depression in medical students of approximately 30%. Higher prevalence values were found in female students, first year graduates, students who had doubts about the academic activities that will interfere with the choice of specialization and their professional future, those who gave up their leisure time, those who used legal and illegal drugs, students who lived alone, who did not practice physical activity and students who had a previous psychiatric diagnosis. *Conclusion:* The medical school is an environment that has a high prevalence of students with depression, which suggests that the medical course demands a great psychological, economic, disciplinary and social demand from the students.

**Keywords:** Prevalence; Depression; Medical students.

**RESUMO:** *Introdução:* Depressão é um transtorno mental comum que acomete 322 milhões de pessoas no mundo. Estima-se que 15% a 25% dos estudantes universitários apresentam algum transtorno psiquiátrico, sendo a depressão e ansiedade os mais recorrentes. Dentre os afetados, pode-se citar os estudantes de medicina como um grupo que frequentemente apresenta os sintomas depressivos. *Objetivo:* Conhecer as evidências científicas acerca da prevalência de depressão em estudantes de medicina. *Método:* Scoping Review que utilizou a pergunta norteadora “Qual a prevalência de depressão em estudantes de medicina?” para pesquisar artigos originais, casos clínicos, meta-análises e *guidelines* publicados de 2010 a 2020. As buscas foram realizadas no Pubmed e na Biblioteca Virtual em Saúde (BVS) através da combinação dos descritores “depression disorder” AND “students, medical” AND “schools, medical” AND “prevalence”. *Resultados:* Os 12 artigos encontrados mostraram, em sua maioria, uma prevalência de depressão em estudantes de medicina de, aproximadamente, 30%. Valores maiores de prevalência foram encontrados nos estudantes do sexo feminino, graduandos do primeiro ano, estudantes que apresentavam dúvidas em relação as atividades acadêmicas que irão interferir na escolha da especialização e no seu futuro profissional, alunos que abdicaram do seu tempo de lazer, acadêmicos que faziam uso de drogas lícitas e ilícitas, estudantes que moravam sozinhos, que não praticavam atividade física e estudantes que apresentavam um diagnóstico psiquiátrico prévio. *Conclusão:* A faculdade de medicina é um ambiente que apresenta uma elevada prevalência de estudantes com depressão, o que sugere que o curso médico exige uma demanda psíquica, econômica, disciplinar e social grande dos discentes.

**Palavras-chave:** Prevalência; Depressão; Estudantes de medicina.

Abstract published in 1st Espírito Santo Congress of Neurology, online, December 4th and 5th, 2020.

1. Escola Superior de Ciências da Santa Casa de Misericórdia de Vitória (EMESCAM). ORCID: Souza AL - <https://orcid.org/0000-0001-5313-4203>; Castro FV - <https://orcid.org/0000-0001-6757-3629>; Ferron K - <https://orcid.org/0000-0002-0067-8992>; Rodrigues ALZC - <https://orcid.org/0000-0002-3978-6472>; Cau AC - <https://orcid.org/0000-0002-2625-8830>; Meireles MS - <https://orcid.org/0000-0001-9869-1898>; Paulo MSL - <https://orcid.org/0000-0001-5713-709X>. E-mail: [alichelucindo3@gmail.com](mailto:alichelucindo3@gmail.com), [fernandaventurini31297@gmail.com](mailto:fernandaventurini31297@gmail.com), [ferronkarine@hotmail.com](mailto:ferronkarine@hotmail.com), [analeticiazanon@outlook.com](mailto:analeticiazanon@outlook.com), [carol@unitelases.com.br](mailto:carol@unitelases.com.br), [marcos.meireles@emescam.br](mailto:marcos.meireles@emescam.br), [marcela.paulo@emescam.br](mailto:marcela.paulo@emescam.br).

**Correspondence:** Alice Lucindo de Souza. Av. Nossa Sra. da Penha, 2190 - Bela Vista, Vitória, ES. CEP: 29027-502. E-mail: [alichelucindo3@gmail.com](mailto:alichelucindo3@gmail.com)

## INTRODUCTION

Depression is a common mental disorder that affects 322 million people worldwide<sup>1</sup>. It is characterized by persistent sadness and loss of interest in previously pleasurable activities accompanied by loss of energy, changes in appetite, increased or decreased sleep, anxiety, loss of concentration and even suicidal thoughts<sup>2</sup>.

Higher education students are constantly exposed to stressful situations that can result in depressive conditions. It is estimated that 15% to 25% of university students have some psychiatric disorder<sup>3</sup>, with depression and anxiety being the most recurrent<sup>4</sup>. Among those affected, medical students can be mentioned as a group that frequently presents depressive symptoms<sup>5,6,7</sup>.

Medical school education is demanding in order to train knowledgeable, skilled, and mentally healthy physicians in order to meet the physical and psychological health needs of their patients with empathy and professionalism. However, students in the initial phase of medical school already show a decline in mental health and a tendency to maintain this state throughout their academic training. The reasons for the anguish are multiple and include great academic pressure, excessive workload, financial difficulties and deprivation of sleep and leisure<sup>8</sup>.

In recent years, literature reviews<sup>8,9,10,11</sup> have been published with the aim of evaluating the prevalence of depression in medical students. However, most of them limited the research to a single country, which may lead to a misunderstanding of the global value of the prevalence of depression. Therefore, this study aimed to analyze articles published in North and South America, Asia, Europe and Africa in order to know the scientific evidence about the prevalence of depression in medical students.

## METHODS

This review was prepared according to the methodology of a scoping review recommended by the Joanna Briggs Institute (JB)<sup>12</sup>. The scope study aims to map the main concepts that support a certain area of knowledge, examine the extent, scope and nature of the investigation, summarize and disseminate the investigation data and identify existing research gaps<sup>12</sup>.

Scoping reviews differ from systematic reviews in that they do not aim to assess the quality of available evidence, but rather aim to quickly map the main concepts that support an area of research<sup>13</sup>. On the other hand, they differ from a traditional literature review in that they involve a more systematic procedure<sup>14</sup>.

To construct the research's guiding question, the Population, Concept and Context (PCC)<sup>12</sup> strategy was used. The following were defined: P - medical students,

C - prevalence of depression in medical students and C - medical school, and the established question was: "What is the prevalence of depression in medical students?"

In this sense, the data survey was carried out in PUBMED and in the Virtual Health Library (VHL) from May to July 2020 through the combination of the descriptors depression disorder AND students, medical AND schools, medical AND prevalence, defined by the Medical Subject Headings. The criteria for inclusion in this study were original articles involving medical students with depressive symptoms, clinical cases, meta-analyses and guidelines published between 2010 and 2020. Literature reviews, studies which full texts were not available in the databases, were excluded. and articles with students from other courses. The articles obtained were tabulated in Excel spreadsheet version 2010 and analyzed to compose the database of this research. By reading the title and abstract, studies that escaped the topic were excluded. The remaining articles were read in full and selected for their relevance and contribution to the topic.

## RESULTADOS

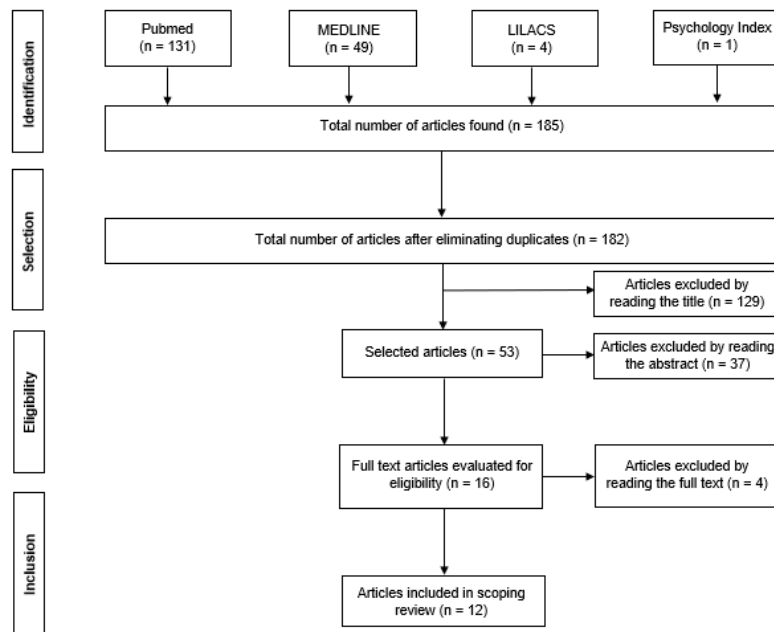
A total of 185 articles were found, 131 from PUBMED and 54 from VHL (49 from MEDLINE, four from LILACS and one from Index Psychology). Next, three duplicates were identified and excluded, leaving 182 articles. Of these, after reading the title and abstract, 166 were excluded for not presenting elements that met the objective of this review. After reading the full text, four articles were excluded for not having the full text available for reading, totaling a sample of 12 articles.

The search and selection process of the studies in this review is presented in the flowchart (Figure 1), according to the JBI recommendations, according to a checklist adapted from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)<sup>12</sup>.

Of the 12 publications included in this review, for the analysis of the full text, two (15.4%) were published in Brazil and one (7.7%) in each of the following countries: South Korea, United States, China, Ethiopia, Portugal, Nepal, Cameroon, Lebanon, Bosnia and Herzegovina and Italy (Chart 1).

The studies selected to compose the database of this research used the Beck Depression Inventory (BDI)<sup>27</sup>, Patient Health Questionnaire (PHQ)<sup>28</sup>, Mini International Neuropsychiatric Interview (MINI-PR)<sup>29</sup>, Self-Report Questionnaire (SRQ-20)<sup>30</sup> or the General Health Questionnaire (QSG-12)<sup>31</sup> to check the prevalence of depression.

Five studies used the BDI to analyze the prevalence of depression in medical students. The IDB and its main results are presented in Chart 2.



**Figure 1:** Flow diagram of article selection adapted from PRISMA.

**Chart 1:** Studies included in the scoping review classified according to title, reference, year of publication and country of study.

| Study | Title   | Authorship                                | Year | Country              |
|-------|---|---|------|----------------------|
| 1     | The prevalence and impact of depression among medical students: a nationwide cross-sectional study in South Korea.                          | Roh MS, et al. <sup>15</sup>              | 2010 | South Korea          |
| 2     | Assessing student mental health at the Vanderbilt University School of Medicine.  | Ghudasara SL, et al. <sup>16</sup>        | 2011 | United States        |
| 3     | Prevalence and factores associated with depression in medical students.   | Paula JA, et al. <sup>17</sup>            | 2014 | Brazil               |
| 4     | Depression and suicidal ideation in medical students in China: a call for wellness curricula.   | Sobowale K, et al. <sup>18</sup>          | 2014 | China                |
| 5     | Prevalence of mental distress and associated factors among Hawassa University medical students, Southern Ethiopia: a cross-sectional study. | Melese B, et al. <sup>19</sup>            | 2016 | Ehtiopia             |
| 6     | Assessment of depression and suicidal behaviour among medical students in Portugal.   | Coentre R, et al. <sup>20</sup>           | 2016 | Portugal             |
| 7     | Prevalence of poor mental health among medical students in Nepal: a cross-sectional study.  | Adhikari A, et al. <sup>21</sup>          | 2017 | Nepal                |
| 8     | Prevalence and factors associated with depression among medical students in Cameroon: a cross-sectional study.                              | Ngasa SN, et al. <sup>22</sup>            | 2017 | Cameroon             |
| 9     | Examining burnout, depression, and attitudes regarding drug use among lebanese medical students during the 4 years of medical school.       | Talih F, et al. <sup>23</sup>             | 2018 | Lebanon              |
| 10    | Depressive symptoms among Sarajevo University students: prevalence and socio-demographic correlations.                                      | Džubur A, et al. <sup>24</sup>            | 2018 | Bósnia e Herzegovina |
| 11    | Stressors, psychological distress, and mental health problems amongst Brazilian medical students.   | Castaldelli-Maia JM, et al. <sup>25</sup> | 2019 | Brazil               |
| 12    | Prevalence of depressive symptoms among Italian medical students: The multicentre cross-sectional “PRIMES” study.                           | Bert F, et al. <sup>26</sup>              | 2020 | Italy                |

**Chart 2:** Studies that used the BDI as a tool to analyze the prevalence of depression and its main results.

| Study | Main Results   |
|-------|--|
| 2     | The prevalence of depression was 25%, with 11.6% being mild depression, 9% moderate and 3% severe. 32% of participants were in the first year of graduation, 31% in the second and 37% in the third. Women were the majority (51%) in the sample and were more likely to become depressed. 23% of students did not engage in any physical activity and those who exercised one to three times a week were less likely to be severely depressed.  |
| 3     | The prevalence of depression was 28.8%, with 20.7% being mild depression, 16.6% moderate and 10.9% severe. The study sample consisted mainly of females (58.9%) and students from the first to fourth period of undergraduate medicine (44.3%). Among students in the first two years of graduation, the prevalence of depression was 31.1%, in the two intermediate years it was 27.8% and in the last two it was 25%. Students who were uncertain about their professional future were 2.97 times more likely to experience depression compared to those who were not uncertain about their future.              |
| 6     | The prevalence of depression was 7.9%, with 6.1% mild depression, 3.1% moderate and 0.7% severe. Women were the majority (66.7%) in the sample and were more susceptible to depression. 47.2% had low-medium economic status and 37% had some psychiatric family history, depression being greater in these groups.  |
| 10    | The prevalence of depression was 30.1%, with 22.6% mild depression, 15.8% moderate depression and 3.6% severe.   |
| 12    | The prevalence of depression was 29.5%, 14% being mild depression, 11.1% moderate and 4.5% severe. Women were the majority (61.3%) in the sample and were more susceptible to depression. The presence of depression was greater in students from the fourth to the sixth year of graduation. 57.2% exercised at least 90 minutes a week and depression was greater in those who exercised less time per week. 60.4% studied far from family life, 7.2% had a chronic disease and 20.6% judged the choice of medical school negatively/no opinion, with the prevalence of depression being higher in these groups. |

Four studies used the PHQ to analyze the prevalence of depression in medical students and its main results are shown in Table 3.

The remaining three studies used different instruments to analyze the prevalence of depression in medical students as shown in Table 4.

**Table 3:** Studies that used the PHQ as a tool to analyze the prevalence of depression and its main results.

| Study | Main Results   |
|-------|--|
| 4     | Prevalence of depression was 33.3%, with 35.1% being no and minimal depression, 51.4% mild and 13% moderate-severe. There were no significant differences between graduation levels in the depression score.   |
| 7     | The prevalence of depression was 29.2%, with mild depression being 35.9%, moderate 17.5%, moderate-severe 5.2% and severe 6.1%. The sample consisted mainly of males (51%); however, the prevalence of depression was significantly higher in females. 63.8% are first- and second-year students and the prevalence of depression was higher at the beginning of graduation.                       |
| 8     | The prevalence of depression was 30.6%, with mild depression 53.1%, moderate 40.4%, moderate-severe 5.2% and severe 1.3%. The majority of study participants consisted of men (53.7%); however, the prevalence of depression was significantly higher in women. 6.8% of the participants had a chronic disease and 14.2% regretted studying medicine, the prevalence being higher in these groups. |
| 9     | The prevalence of depression was 23.8%. Of the participants, 22.6% were from the first year, 17.4% from the second, 31.4% from the third and 28.4% from the fourth and the prevalence was, respectively, 28.2%, 26.7%, 22.2% and 20.4%. The sample consisted mainly of males (51%); however, the prevalence of depression was significantly higher in females (34.5%).                             |

**Table 4:** Studies that used the MINI-PR, SRQ-20 or QSG-12 as a tool to analyze the prevalence of depression and its main results.

| Study | Instruments | Main Results   |
|-------|-------------|--|
| 1     | MINI-PR     | The prevalence of depression was 2.9%. Females (3.6%) were more affected than males (2.6%). Low class, living alone and financial difficulties were reported as the groups most frequently affected by depression. |
| 5     | SRQ-20      | The prevalence of depression was 30%. The sample consisted mainly of men (74.2%) and students from the first two years of graduation (37.9%).  |
| 11    | QSG-12      | The prevalence of depression was 8.5%. The sample consisted mainly of females (76.7%) and third-year undergraduate students.   |

## DISCUSSION

Among the studies selected in this review, it was possible to verify that the majority had a prevalence of depression in medical students of approximately 30%. In Brazil, the prevalence in the two studies analyzed was 28.8% and 10.9%. In Portugal, South Korea, Lebanon, United States, Nepal, Italy, Ethiopia, Bosnia and Herzegovina, Cameroon and China, prevalence rates of depression were reported, respectively 6.1%, 6.5%, 23.8%, 25%, 29.2%, 29.5%, 30%, 30.1%, 30.6% and 33.3%.

This study identified that mild depression had a higher prevalence when compared to severe and moderate classifications. It was also observed that female students had a significantly higher prevalence of depression than male students. In the study carried out in Portugal, 7.9% of women were diagnosed with depression against 2.6% of men<sup>20</sup>. This variation in depressive state may be a reflection of the greatest challenges that women face as a result of gender inequality and its consequences, such as moral abuse, sexist comments and greater career obstacles when compared to men<sup>31,32,33,34</sup>.

Another fact frequently cited in the articles selected for this review was that the rate of depression is high during the first year, followed by a gradual decline in the last years of medical school<sup>35,36,17</sup>. At the Federal University of Cariri and at the Estácio de Juazeiro do Norte Medical School, the prevalence of depression found in the first two years of college was 31.1%; in the two intermediate years, 27.8%; and in the last two years, 25%<sup>17</sup>. This fact may be related to the change in the routine of students who have just entered the medical course, who now receive a great deal of information, an increase in study hours and a drastic change in the teaching method.

The study above performed a correlation of depressive aspects with the degree of doubt of the undergraduate in relation to academic activities that will interfere in the choice of specialization and in their professional future<sup>17</sup>. Students who experience such doubts were 2.97 times more likely to have depression, when compared to those who had no uncertainties<sup>17</sup>. This fact may be based on the justification that insecurity can generate anxiety and fear. During graduation, students are required to make choices that will tell them about their future and, the greater the degree of uncertainty, the greater the possibility of developing a depressive condition.

Drug use was associated as a consequence of depressive symptoms. Consumption was higher in medical students who had depression. It is reported that 68% of students used alcohol occasionally, 16.6% illicit drugs and 11.1% psychoactive drugs<sup>37</sup>. It is believed that factors such as relief from depressive symptoms during drug use, frustration with academic performance and the search for increased concentration can influence the overuse of the drugs in question<sup>38</sup>.

Absence of leisure was reported for being associated with depressive disorder. Students who abdicate their leisure activities, largely privileging tasks related to studies, were associated with a higher prevalence of depression<sup>39,40</sup>. This association may be related to the fact that the absence of a pleasurable activity contributes to a constant experience of stress in academic life, which causes depressive events to develop<sup>41</sup>. Thus, it emphasizes the need to clarify students about the benefits of good use of leisure periods as an escape mechanism from the pressures experienced in the academic environment.

Increased prevalence of depression was found in academics who left their hometown to study and live alone<sup>42,43</sup>. This increase may be related to new responsibilities assumed by the student that were previously shared with their family members. In this new context, they have to be able to take over domestic activities, manage the payment of household bills and, in addition, there is a decrease in emotional support from family members, which is essential in times of difficulty during graduation<sup>44,45</sup>.

Regarding physical activity, it was observed that its absence can interfere with the development and worsening of depressive conditions<sup>20</sup>. It is known that exercise causes an increase in the release of substances responsible for well-being and has other mechanisms that support the prevention and reduction of depressive symptoms<sup>46</sup>. Therefore, the absence of regular exercise can favor the development of depression in certain cases.

Academics entering medical school with a diagnosis of anxiety disorder were also scored as a group with the highest prevalence of depression in their undergraduate course<sup>20</sup>. Evidence suggests that such disorders share neurochemical and genetic alterations, which may favor their coexistence<sup>47</sup>. In addition, these disorders not only have risk factors in common, but one also serves as a risk factor for the emergence and severity of the other<sup>48</sup>. Common non-genetic risk factors associated with the development of anxiety and depression include previous adversities, trauma or neglect, parenteral style and exposure to stress<sup>48</sup>.

In short, it is noteworthy that in all the articles studied, the prevalence of depression in medical students outweighed the depression values of the general population. An example of this statement is provided in a study carried out in Brazil, in which the prevalence found of depressive symptoms in medical students was 28.8%, while in the general population it was 7%<sup>17</sup>.

An aggravating factor in this context is the frequency of underdiagnosis existing in this environment<sup>49</sup>. Psychic illnesses are still viewed with prejudice in the academic community and it is believed that many students fear that the diagnosis of depression and, consequently, its treatment, will put their medical career at risk. Furthermore, symptoms of depression in medical students can be difficult to distinguish from the effects of stress inherent

in the student's life. Students often see their feelings of discouragement as their own, and even expected, emotional response to the academic environment.

Based on this, one asks what would be the reasons that would lead the medical course to be a risk factor for depression. One can cite, as contributors, high workload, large volume of materials, greater contact with patients with various diseases and prognoses, insecurity in relation to entering the labor market, demands from society and the educational institution, in addition to self-demanding typical of the medical course<sup>17</sup>. In addition, there is also the lack of empathy in the teacher-student relationship, the quality of teaching, inadequate assessment systems for the students' learning process<sup>8,49,50</sup> and excessive responsibility for human life.

The need for change in this scenario is evident. Vanderbilt University School of Medicine, USA, created a rewards program in which students earned points for exercising, developing a new hobby, connecting with friends and avoiding harmful habits. This program resulted in a lower rate of depression in this group<sup>20</sup>. Mirroring this strategy, it is suggested that medical schools implement student welfare programs to promote and provide resources for healthy living, especially in the first year and recycle them during graduation.

As program suggestions, curricular changes are included that aim to reduce the workload, making more free time available to students so that they can use the surplus between studies and leisure activities. Added to this are the distribution of content equitably in relation to the periods,

**Acknowledgments:** We would like to thank our advisor *Marcela Paulo* who, since the beginning of graduation in Medicine, motivated us in writing the article and accompanied us throughout the process, helping us in the smallest detail with her knowledge of scientific writing and being an example of dedication. To *Marcos Meireles*, who helped us review the manuscript. To *Vinicius Souza*, who helped us translate the manuscript.

**Author participation:** *Souza AL*: actively participated in the selection of the research database, analysis and interpretation of data, writing and review of the manuscript. *Castro FV*: actively participated in the analysis and interpretation of data and writing and review of the manuscript. *Ferron K*: actively participated in data analysis and interpretation and manuscript writing. *Rodrigues ALZC*: actively participated in data analysis and interpretation and manuscript writing. *Cau AC*: actively participated in the analysis and interpretation of data and writing of the manuscript. *Meireles MS*: actively participated in the manuscript review. *Paulo MSL*: actively participated in the writing and review of the manuscript.

## REFERÊNCIAS

1. Organização Pan-Americana da Saúde (OPAS). Aumenta o número de pessoas com depressão no mundo. Brasília: OPAS; 2017. Disponível em: <https://www.paho.org/pt/topicos/depressao>.
2. Organização Pan-Americana da Saúde (OPAS). Depressão: o que você precisa saber. Brasília: OPAS; 2016-2017. Disponível em: [https://www.paho.org/bra/index.php?option=com\\_content&view=article&id=5372:depressao-o-que-voce-precisa-saber&Itemid=822](https://www.paho.org/bra/index.php?option=com_content&view=article&id=5372:depressao-o-que-voce-precisa-saber&Itemid=822).
3. Adewuya AO, Ola BA, Aloba OO, Mapayi BM, Oginni OO. Depression amongst Nigerian university students. Prevalence and sociodemographic correlates. *Soc Psychiatry Psychiatr Epidemiol*. 2006;41(8):674-8. doi: 10.1007/s00127-006-0068-9.

promotion of physical exercise on fixed days of the week, psychological support for students, mindfulness programs and access to general health services.

It is believed that if there is a balance between medical education and the student's mental health, there will be a decrease in the prevalence of depression and, consequently, a better use of the course. During this scoping review, there was a large number of observational research in this area, which demonstrates a good understanding and results of the association between depression and medical students. It is understood that changes in the academic environment, even if minimal, are being implemented and undergraduates, in turn, are demanding improvements and looking for help. Such events may be starting the creation of a new scenario in the medical school environment, but, even so, there is a need for improvements so that the prevalence of depression and its complications are minimized among medical students.

## CONCLUSION

Through this scoping review, it can be concluded that the medical school is an environment that has a high prevalence of students with depression. This data is due to the fact that the medical course requires a great psychic, economic, disciplinary and social demand from students. However, even though it is a lethal disease, there are several ways to control and reverse this condition, with the faculties being the fundamental components in this process.

4. Hahn MS. Estudo da clientela de um programa de atenção em saúde mental junto ao estudante universitário de São Carlos [Dissertação]. Campinas (SP): UNICAMP; 1994. Disponível em: <http://www.repositorio.unicamp.br/handle/REPOSIP/312864>.
5. Al-Maashani M, Al-Balushi N, Al-Alawi M, Mirza H, Al-Balushi M, Obeid Y, et al. Prevalence and correlates of depressive symptoms among medical students: a cross-sectional single-centre study. *East Asian Arch Psych*. 2020;30(1):28-31. doi: 10.12809/eaap1882.
6. Bert F, Lo Moro G, Corradi A, Acampora A, Agodi A, Brunelli L, et al. Prevalence of depressive symptoms among Italian medical students: the multicentre cross-sectional "PRIMES" study. *PLoS ONE*. 2020;15(4):E0231845. doi: 10.1371/journal.pone.0231845.

7. Teh CK, Ngo CW, Zulkiffi RAB, Vellasamy R, Suresh K. Depression, anxiety and stress among undergraduate students: a cross sectional study. *Open J Epidemiol.* 2015;5(4):260-8. doi: 10.4236/ojepi.2015.54030.
8. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med.* 2006;81(4):354-73. doi: 10.1097/00001888-200604000-00009.
9. Pacheco JP, Giacomini HT, Tam WW, Ribeiro TB, Arab C, Bezerra IM, et al. Mental health problems among medical students in Brazil: a systematic review and meta-analysis. *Rev Bras Psiquiatr.* 2017;39(4):369-378. doi: 10.1590/1516-4446-2017-2223.
10. Mao Y, Zhang N, Liu J, Zhu B, He R, Wang X. A systematic review of depression and anxiety in medical students in China. *BMC Med Educ.* 2019;19(1):327. doi: 10.1186/s12909-019-1744-2.
11. Moir F, Yelder J, Sanson J, Chen Y. Depression in medical students: current insights. *Adv Med Educ Pract.* 2018;9:323-33. doi: 10.2147/AMEP.S137384.
12. Joanna Briggs Institute (JBI). Methodology for JBI Scoping Reviews - Joanna Briggs; 2015. Available from: [http://joannabriggs.org/assets/docs/sumari/Reviewers-Manual-Methodology-for-JBI-Scoping-Reviews\\_2015\\_v2.pdf](http://joannabriggs.org/assets/docs/sumari/Reviewers-Manual-Methodology-for-JBI-Scoping-Reviews_2015_v2.pdf).
13. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol.* 2005; 8:19-32. doi: 10.1080/1364557032000119616.
14. Ferraz L, Pereira RPG, Pereira AMRC. Tradução do Conhecimento e os desafios contemporâneos na área da saúde: uma revisão de escopo. *Saúde em Debate.* 2019;43(spe 2):200-16. doi: 10.1590/0103-11042019S215.
15. Roh MS, Jeon HJ, Kim H, Han SK, Hahm BJ. The prevalence and impact of depression among medical students: a nationwide cross-sectional study in South Korea. *Acad Med.* 2010;85(8):1384-90. doi: 10.1097/ACM.0b013e3181df5e43.
16. Ghodasara SL, Davidson MA, Reich MS, Savoie CV, Rodgers SM. Assessing student mental health at the Vanderbilt University School of Medicine. *Acad Med.* 2011;86(1):116-21. doi: 10.1097/ACM.0b013e3181ffb056.
17. Paula JA, Borges AMFS, Bezerra LRA, Parente HV, Paula RCA, Wajnsztein R, et al. Prevalência e fatores associados à depressão em estudantes de medicina. *Rev. Bras. Crescimento desenvolv. Hum.* 2014;24(3):274-81. Disponível em: <https://idonline.emnuvens.com.br/id/article/download/2367/3902>.
18. Sobowale K, Zhou N, Fan J, Liu N, Sherer R. Depression and suicidal ideation in medical students in China: a call for wellness curricula. *Int J Med Educ.* 2014;5:31-6. doi: 10.5116/ijme.52e3.a465.
19. Melese B, Bayu B, Wondwosse F, Tilahun K, Lema S, Aychu M, et al. Prevalence of mental distress and associated factors among Hawassa University medical students, Southern Ethiopia: a cross-sectional study. *BMC Res Notes.* 2016; 9:485. doi: 10.1186/s13104-016-2289-7.
20. Coentre R, Faravelli C, Figueira ML. Assessment of depression and suicidal behaviour among medical students in Portugal. *Int J Med Educ.* 2016;7:354-363. doi: 10.5116/ijme.57f8.c468.
21. Adhikari A, Dutta A, Sapkota S, Chapagain A, Aryal A, Pradhan A. Prevalence of poor mental health among medical students in Nepal: a cross-sectional study. *BMC Med Educ.* 2017;17(1):232. doi: 10.1186/s12909-017-1083-0.
22. Ngasa SN, Sama CB, Dzekem BS, Nforchu KN, Tindong M, Aroke D, et al. Prevalence and factors associated with depression among medical students in Cameroon: a cross-sectional study. *BMC Psychiatry.* 2017;17(1):216. doi: 10.1186/s12888-017-1382-3.
23. Talih F, Daher M, Daou D, Ajaltouni J. Examining burnout, depression, and attitudes regarding drug use among lebanese medical students during the 4 years of medical school. *Acad Psychiatry.* 2018;42(2):288-96. doi: 10.1007/s40596-017-0879-x.
24. Džubur A, Abdulahović D, Kurspahić-Mujčić A, Džubur A, Loga-Zec S, Škrijelj V. Depressive symptoms among Sarajevo University students: prevalence and socio-demographic correlations. *Acta Med Acad.* 2018;47(2):155-64. doi: 10.5644/ama2006-124.227.
25. Castaldelli-Maia JM, Lewis T, Marques dos Santos N, Picon F, Kadhum M, Farrell SM, et al. Stressors, psychological distress, and mental health problems amongst Brazilian medical students. *Int Rev Psychiatry.* 2019;31(7-8):603-7. doi: 10.1080/09540261.2019.1669335.
26. Kendall PC, Hollon SD, Beck AT, Hammen CL, Ingram RE. Issues and recommendations regarding use of the Beck Depression Inventory. *Cogn Ther Res.* 1987;11(3):289-99. doi: 10.1007/BF01186280.
27. Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. Primary care evaluation of mental disorders. Patient health questionnaire. *JAMA.* 1999;282:1737-44. doi: 10.1001/jama.282.18.1737.
28. Sheehan DV, Lecrubier Y, Sheehan KH, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I.): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry.* 1998;59(Suppl 20):22-33. Available from: <https://www.psychiatrist.com/read-pdf/11980/>.
29. Santos KOB, Araújo TM, Pinho PS, Silva ACC. Avaliação de um instrumento de mensuração de morbidade psíquica: estudo de validação do Self-Reporting Questionnaire (SRQ-20). *Rev Baiana Saude Publica Miolo.* 2010;34(3):544-60. Disponível em: <http://files.bvs.br/upload/S/0100-0233/2010/v34n3/a1881.pdf>.
30. Goldberg DP, Williams PA. A user's guide to the General Health Questionnaire. Windsor: NFER-Nelson; 1988. Available from: [https://www.scirp.org/\(S\(oyulxb452alnt1aej1nfow45\)\)/reference/ReferencesPapers.aspx?ReferenceID=189650](https://www.scirp.org/(S(oyulxb452alnt1aej1nfow45))/reference/ReferencesPapers.aspx?ReferenceID=189650).
31. Pacheco JPG, Silveira JB, Ferreira RPC, Lo K, Schineider JR, Giacomini HTA, et al. Gender inequality and depression among medical students: a global meta-regression analysis. *J Psychiatr Res.* 2019;111:36-43. doi: 10.1016/j.jpsychires.2019.01.013.

32. Santos FS, Maia CRC, Faedo FC, Gomes GPC, Nunes ME, Oliveira MVM. Estresse em estudantes de cursos preparatórios e de graduação em medicina. *Rev Bras Educ Med.* 2017;41(2):194-200. doi: 10.1590/1981-52712015v41n2rb20150047.
33. Medeiros MRB, Camargo JF, Barbosa LAR, Caldeira AP. Saúde mental de ingressantes no curso médico: uma abordagem segundo o sexo. *Rev Bras Educ Med.* 2018;42(3):214-21. doi: 0.1590/1981-52712015v42n3rb20170008.
34. Labaka A, Goñi-Balentiaga O, Lebeña A, Pérez-Tejada J. Biological sex differences in depression: a systematic review. *Biol Res Nurs.* 2018;20(4):383-92. doi: 10.1177/1099800418776082.
35. Levine RE, Litwins SD, Frye AW. Avaliação do humor deprimido em duas turmas de estudantes de medicina. *Acad Psychiatry.* 2006;30:235-7. doi: 10.1176/appi.ap.30.3.235.
36. Rosen D, Mascaro N, Ph D, Arnau R, Escamilla M, Ficht A, et al. Depression in medical students: gene-environment interactions. *Ann Behav Sci Med Educ.* 2010;16(2):8-14. doi: 10.1007/BF03355125.
37. Vasconcelos TC, Dias BR, Andrade LR, Melo GF, Barbosa L, Souza E. Prevalência de sintomas de ansiedade e depressão em estudantes de medicina. *Rev Bras Educ Med.* 2015;39(1):135-42. doi: 10.1590/1981-52712015v39n1e00042014.
38. Pereira DS, Souza de RS, Buaiz V, Siqueira de MM. Uso de substâncias psicoativas entre universitários de medicina da Universidade Federal do Espírito Santo. *J Bras Psiquiatr.* 2008;57(3):188-95. doi: 10.1590/S0047-20852008000300006.
39. Abrão CB, Coelho EP, Passos LBS. Prevalência de sintomas de depressão entre estudantes de medicina da Universidade Federal de Uberlândia. *Rev Bras Educ Med.* 2008;32(3):315-23. doi: 10.1590/S0100-55022008000300006.
40. Bassols AM, Okabayashi LS, Silva AB, Carneiro BB, Feijó F, Guimarães C, et al. First- and last-year medical students: is there a difference in the prevalence and intensity of anxiety and depressive symptoms? *Rev Bras Psiquiatr.* 2014;36(3):233-40. doi: 10.1590/1516-4446-2013-118.
41. Andrade JBC, Sampaio JJC, Farias LM, Melo LP, Sousa DP, Mendonça ALB, et al. Contexto de formação e sofrimento psíquico de estudantes de medicina. *Rev Bras Educ Med.* 2014;38(2):231-42. doi: 10.1590/S0100-55022014000200010.
42. Guedes AF, Rodrigues VR, Pereira CDO, Sousa MNA. Prevalência e correlatos da depressão com características de saúde e demográficas de universitários de medicina. *Arq Ciên Saúde.* 2019;26(1):47-50. doi: 0.17696/2318-3691.26.1.2019.1039.
43. Cavaleiro JM, Machado RF, Kirchner LF. Transtornos psiquiátricos menores, hábitos de saúde, atividades sociais e de lazer em estudantes de medicina: um estudo correlacional. *Thêma Scientia.* 2020;10(1):191-204. Disponível em: <http://www.themaetscientia.fag.edu.br/index.php/RTES/article/view/1267/1178>.
44. Sousa PAN. Transtornos psiquiátricos menores em universitários [monografia]. Barra do Garças: Universidade Federal de Mato Grosso; 2019. Disponível em: <https://periodicos.unemat.br/index.php/jhnpeps/article/view/1433/1503>.
45. Lima MCP, Domingues MS, Cerqueira ATAR. Prevalência e fatores de risco para transtornos mentais comuns entre estudantes de medicina. *Rev Saúde Pública* 2006;40(6):1035-41. doi: 10.1590/S0034-89102006000700011.
46. Rosenthal JM, Okie S. White coat, mood indigo--depression in medical school. *N Engl J Med.* 2005;353(11):1085-8. doi: 10.1056/NEJMp058183.
47. Hettema JM. What is the genetic relationship between anxiety and depression? *Am J Med Genet C Semin Med Genet.* 2008;148C:140-6. doi: 10.1002/ajmg.c.30171.
48. Kalin NH. The critical relationship between anxiety and depression. *Am J Psychiatry.* 2020;177(5):365-7. doi: 10.1176/appi.ajp.2020.20030305.
49. Trindade LMDF, Vieira MJ. Medical school: motivations and expectations of incoming students. *Rev Bras Educ Med.* 2009;33(4):542-54. doi: 10.1590/S0100-55022009000400005.
50. Loureiro EMF, McIntyre TM, Mota-Cardoso R, Ferreira MA. Inventário de Fontes de Estresse Acadêmico no Curso de Medicina (IFSAM). *Rev Bras Educ Méd.* 2009;33(2):191-7. doi: 10.1590/S0100-55022009000200005.

Received: 2021, March 11

Aceito: 2021, October 22