

Prevalence of anxiety, depression, and suicidal ideation symptoms among university students: a systematic review**Prevalência de sintomas ansiedade, depressão e ideação suicida entre estudantes universitários: uma revisão sistemática**

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ABSTRACT

Several studies have suggested an increase in the prevalence of mental disorders and suicidal ideation among university students. This review aims to determine the current prevalence of university students identified with anxiety, depression, and suicidal ideation symptoms worldwide. After the survey in five electronic databases utilizing the PRISMA guidelines, 48 articles involving 40 countries and 56,816 students were selected. The results showed a prevalence of 24.5% for anxiety symptoms, 26.1% for depression symptoms, and 18.8% for suicidal ideation. Moreover, the prevalence of all these situations was higher in health students than in the general university population. The high prevalence of mental disorders in university students highlights the importance of strategies for prevention, diagnosis and treatment in this population.

Keywords: Mental health, anxiety, depression, suicidal ideation, university students

RESUMO

Vários estudos têm indicado aumento da prevalência de transtornos mentais e ideação suicida entre estudantes universitários. Esta revisão tem por objetivos determinar as

prevalências globais dos sintomas de ansiedade, depressão e ideação suicida em estudantes universitários. Após pesquisa em cinco bancos de periódicos eletrônicos, foram selecionados 48 artigos envolvendo 40 países e 56,816 estudantes universitários. Os resultados mostraram uma prevalência de 24.5% para sintomas de ansiedade, 26.1% para sintomas de depressão e 18.8% para ideação suicida. Além disso, as prevalências destas situações foram superiores em universitários da área da saúde em relação à população universitária em geral. A alta prevalência de transtornos mentais em estudantes universitários destaca a importância da execução de estratégias de prevenção, intervenção e tratamento nesta população.

Palavras-chave: Saúde mental, ansiedade, depressão, ideação suicida, estudantes universitários

1 INTRODUCTION

Mental disorders represent a serious public health problem as they significantly compromise the quality of life of an individual, being among the greatest causes of disability in the world (Whiteford et al., 2010). Anxiety and depression disorders are highly prevalent and affect the mood and feelings of those affected, changing the way they see the world and reality as well as influencing emotions, mood, and lifestyle in general (Baxter, Scott, Vos, & Whiteford, 2013; Ferrari et al., 2013). According to the World Health Organization (WHO), in 2015, 322 million people worldwide had depression and 264 million had anxiety disorders (World Health Organization, 2017a). Anxiety and depression disorders may be associated with suicidal ideation and suicide attempts, as any psychiatric diagnosis is a risk factor (World Health Organization, 2017b). In 2015, 788,000 people were estimated to have committed suicide, excluding the much higher number of those who attempted suicide (World Health Organization, 2017a).

Several studies (Beiter et al, 2015; Bolsoni Silva, & Loureiro, 2015; Auerbach et al., 2016; Eskin et al., 2016) have suggested an increase in the prevalence of symptoms of anxiety and depression disorders and suicidal ideation among university students. In the USA, data from American College Health Association indicate that more than half of university students have symptoms of anxiety (American College Health Association, 2018). Other researches involving different countries have reported that approximately 30% of them suffering from depressive symptoms and suicidal ideation (Ibrahim, Kelly, Adams, & Glazebrook, 2013; Eskin et al., 2016).

Many challenges are faced by students when entering university because it is a moment of psychological, social, and environmental transition, which is often accompanied by the departure from their parents' home and a consequent change of city and routine. Students usually face difficulties in adapting to academic life, which favors the presence of

depressive feelings, such as loneliness and despair. Moreover, the lack of time to prepare for tests and anxiety about scores contribute to the emergence of adverse effects on the mental health of this population (Casiano, Katz, Globerman, & Sareen, 2013; Wani et al., 2016). Suicidal ideation can also occur at a particularly important moment, due to either the transition from adolescence to adulthood or the adversities experienced in academic life (Santos, Marcon, Espinosa, Baptista, & de Paulo, 2017).

Given the increased prevalence of these situations and the peculiarity of this phase of life, this systematic review aims to determine the current prevalence of university students identified with symptoms of anxiety, depression, and suicidal ideation worldwide.

2 METHODS

This systematic review followed the procedures described in the PRISMA checklist (Liberati et al., 2009) and is registered in the PROSPERO platform database under the identification CRD42018114450. Throughout the process, two researchers (E.L.M. and A.L.M.), who were familiar with the systematic review methodology, followed the development and writing of the article.

Data were searched in the following electronic databases: Science Direct, PubMed, PsycInfo, Medline (via VHL), and Lilacs (via VHL), using keywords in English. These keywords were divided into two information blocks. The first was related to the population of interest (“university students”) and the second, to the expected outcome (“mental health”, “anxiety disorders”, “depression,” “suicidal ideation,”). The keywords were standardized using the “Descritores em Ciências da Saúde” (DeCS). The logical operator “OR” was used for combining information within each block, and the logical operator “AND,” for combining information between blocks.

The search was limited to articles written in English. We considered the articles published from 2013 to 2018 to obtain an updated overview of the prevalence of symptoms of anxiety, depression, and suicidal ideation among university students. The articles were searched in the databases in April and May 2018. We used the advanced search option in all databases.

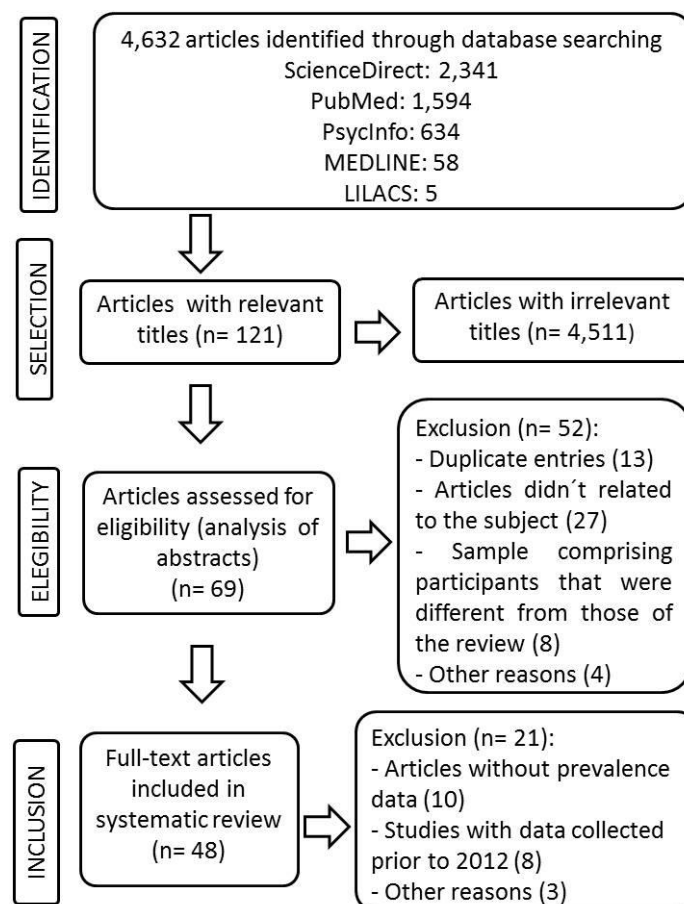
The articles were selected according to the search criteria established by two independent authors (W.P. and G.S.B.). The studies initially selected had titles that suggested that they addressed the prevalence of anxiety and/or depression and/or suicidal ideation in university students. In the second stage, we searched for articles that suggested

or included data in the abstract on the prevalence of anxiety and/or depression and/or suicidal ideation in university students. Finally, we excluded the duplicate articles.

The articles identified by these initial selection strategies were read in full and evaluated independently according to the following inclusion criteria: (1) original scientific articles; (2) population: university students; (3) articles that address the prevalence of at least one of these situations: anxiety, depression, and suicidal ideation; and (4) search period of the study: data collected from 2012. We excluded articles with characteristics that were not according to our proposal, such as: (1) absence of data on the prevalence of mental disorders; (2) studies that had data collected prior to 2012; (3) duplicate entries; and (4) inadequate sample (population different from those considered in this review study).

The references collected in this review were managed using the free access Mendeley Desktop®, version 1.17.9. The steps for searching the keywords in the databases are summarized in the flowchart shown in Figure 1.

Figure 1: Flowchart for identification, selection, and inclusion of articles (adapted from Liberati et al., 2009)



The information extracted from the articles included in the synthesis was grouped according to descriptive data (authors' names, year of publication, country of study,

scale/questionnaire used, sample size, mean age, gender, course, and prevalence of anxiety, depression, and suicidal ideation). The results of the evaluated studies include only data on the prevalence of symptoms of anxiety, depression and suicidal ideation. The quantitative analysis (meta-analysis) of the data could not be performed because the questionnaires that were used to identify mental disorders were heterogeneous.

Based on the prevalence of mental disorders reported in the analyzed articles, we calculated the weighted averages using Microsoft Excel® to determine the prevalence in the population selected for this study.

3 RESULTS

Considering all databases analyzed, 4,632 entries were retrieved and 4,511 were excluded after reading the titles. The analysis of the abstracts of the 121 remaining articles led to the exclusion of 52 studies (13 duplicate entries, 27 not related to the subject, 8 had a sample comprising participants that were different from those of the review, and 4 were excluded for other reasons). After this step, 21 of the 69 studies were excluded (10 articles without prevalence data, 8 with data collected prior to 2012, and 3 for other reasons). At the end of the search process, 48 articles (all cross-sectional studies, except for one cohort study¹⁴ were selected. The results obtained are summarized in Table 1. The data referred to 56816 university students and 40 countries; specifically, 18 were located in Asia (45.0%), 11 in Europe (27.5%), 7 in Africa (17.5%), 3 in South America (7.5%), and only 1 in North America (2.5%).

Table 1: Information extracted from the 48 studies involving anxiety, depression, and suicidal ideation symptoms among university students

Number	Author(s) (Year)	Country	Scale/ Questionnaire	Number of students	Mean age (year)	Male gender (%)	Courses	Prevalence (%)		
								Anxiety	Depression	Suicidal ideation
1	Amarasuriya et al. (2015)	Sri Lanka	PHQ-9	4,304	NR	30.5	Several	*	22.8	*
2	Amiri et al. (2013)	United Arab Emirates	Own questionnaire	115	20.7	40.9	Medicine	*	*	17.5
3	Aradilla-Herrero et al. (2014)	Spain	SDS; SRS	93	20.5	19.4	Nursing	*	44.1	14.0
4	Asante and Andoh- Arthur (2015)	Ghana	CES-D	270	22.0	48.9	Psychology	*	39.2	*
5	Azad et al. (2017)	Pakistan	BAI; BDI	150	20.6	25.4	Medicine	13.2	51.5	*
6	Bantjes et al. (2016)	South Africa	BAI; BDI	1,337	21.0	36.0	Several	15.5	36.1	24.5
7	Bauer et al. (2014)	United States	SBQ	354	19.1	29.5	Psychology	*	*	30.2
8	Becker et al. (2018)	United States	SBQ	1,700	19.0	35.2	Several	*	*	24.0
9	Beiter et al. (2015)	United States	DASS-21	374	NR	37.0	Several	40.0	33.0	*
10	Cheung et al. (2016)	Hong Kong	DASS-21	661	NR	27.5	Nursing	49.3	35.1	*
11	Coentre et al. (2016)	Portugal	BDI; SAS	456	23.4	33.3	Medicine	19.7	6.1	3.9
12	Davaasambuu et al. (2017)	Mongolia	BSI	117	NR	41.9	Several	*	14.5	47.0
13	Deb et al. (2016)	India	USDI	717	NR	56.1	Several	*	53.2	*
14	Diab et al. (2018)	Egypt	DASS-21	779	NR	42.2	Medicine	49.3	49.2	*
15	Elkins et al. (2017)	United States	PHQ-2	268	NR	59.7	Medicine	*	28.2	*
16	Eskin et al. (2015)	Austria	Own questionnaire	310	22.3	30.6	Medicine and psychology	*	*	45.9
		Turkey		351	21.0	26.8				29.9

		Saudi Arabia		413	25.0	70.0				20.0
		Austria		627	22.8	45.3				49.1
		China		651	21.5	48.0				22.9
		United States		239	26.9	31.3				31.4
		Iran		1,000	22.4	39.6				30.3
		Italy		471	23.3	48.1				20.5
17	Eskin et al. (2016)	Japan	Own questionnaire	246	21.0	67.5	Several	*	*	25.9
		Jordan		436	21.1	40.7				29.6
		Palestine		358	20.8	40.0				25.6
		United Kingdom		150	19.9	49.0				39.3
		Tunisia		484	21.5	22.9				20.9
		Turkey		497	20.6	37.5				24.7
18	Fawzy and Hamed (2017)	Egypt	DASS-21	700	21.2	35.4	Medicine	73.0	65.0	*
19	Horgan et al. (2016)	Ireland	CES-D	417	NR	11.3	Nursing	*	34.0	*
20	Horgan et al. (2018)	Ireland	CES-D	220	NR	19.0	Several	*	59.0	28.5
21	Iqbal et al. (2015)	India	DASS-42	353	20.8	41.1	Medicine	66.9	51.3	*
22	James et al. (2017)	Nigeria	HADS	623	23.9	57.6	Medicine	28.1	21.3	*
23	Jamshidi et al. (2017)	Iran	GHQ-28	781	NR	33.0	Medicine	21.5	11.7	*
24	Kunwar et al. (2016)	Nepal	DASS-42	538	NR	48.0	Medicine	41.1	29.9	*
25	Leal and Santos (2016)	Portugal	RFLI	1,130	20.0	16.8	Nursing	*	*	5.2
26	López et al. (2017)	Chile	DASS-21	235	20.7	NR	Medicine and nursing	39.0	23.0	*
27	Mahroon et al. (2018)	Bahrain	BAI; BDI	307	NR	36.8	Medicine	51.5	40.0	*

28	Mall et al. (2018)	South Africa	Own questionnaire	686	NR	45.1	Several	*	16.1	*
29	Mustafa et al. (2015)	Albania	SAS	63	21.3	31.7	Several	14.3	*	*
		Kosovo		62	25.8	46.8		45.2		
30	Nguyen et al. (2018)	Vietnam	CES-D	1,319	NR	28.1	Medicine	*	39.0	*
31	Osama et al. (2014)	Pakistan	Own questionnaire	331	20.7	41.2	Medicine	*	*	35.6
32	Othieno et al. (2015)	Kenya	CES-D	923	23.0	56.9	Several	*	41.3	*
33	Peltzer et al. (2013)	Ivory Coast	CES-D	824	23.7	50.0	Several	*	17.6	*
34	Pereira and Cardoso (2015)	Portugal	SIQ	366	21.1	36.3	Several	*	*	12.6
35	Phimarn et al. (2015)	Thailand	CES-D	1,421	NR	20.5	Health Science	*	13.7	*
36	Santos et al. (2017)	Brazil	DSM-IV	637	NR	46.8	Several	*	*	9.9
37	Sarmiento (2015)	Portugal	HADS	1,031	NR	28.3	Several	14.5	6.4	*
38	Seun-Fadipe and Mosaku (2017)	Nigeria	HADS	505	21.9	50.5	Several	16.4	12.7	*
39	Shamsuddin et al. (2013)	Malasya	DASS-21	506	20.8	44.7	Several	63.0	37.2	*
40	Simić-Vukomanović et al. (2016)	Serbia	BAI; BDI	1,940	21.0	34.8	Several	23.6	33.5	*
41	Talih et al. (2018)	Lebanon	GAD-7; PHQ-9	172	NR	51.2	Medicine	22.7	23.8	14.5
42	Tang et al. (2018)	China	SCL-90R	5,972	20.9	53.4	Several	16.7	19.6	7.6
43	Torres et al. (2017)	Ecuador	PHQ-9	1,092	18.3	46.3	Several	*	*	13.8
44	Tran et al. (2017)	France	DSM-IV	4,184	NR	42.6	Several	7.6	12.6	*
45	Wahed and Hassan (2017)	Egypt	DASS-21	442	20.2	38.9	Medicine	64.3	60.8	*

46	Xu et al. (2016)	China	CES-D	1,907	19.5	46.7	Several	*	29.7	*
47	You et al. (2014)	China	Own questionnaire	5,989	19.9	52.8	Several	*	*	16.4
48	Zeng et al. (2018)	China	SBQ	3,212	25.8	45.8	Medicine	*	*	25.7
Total number of students				56,816						

* Study didn't work with this disorder; NR: not reported.

Scale/Questionnaire - BAI: Beck Anxiety Inventory; BDI: Beck Depression Inventory; BSI: Brief Symptom Inventory; CES-D: Center for Epidemiologic Studies Depression Scale; DASS: Depression Anxiety Stress Scale; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders; GAD: Generalized Anxiety Disorder Scale; GHQ: General Health Questionnaire; HADS: Hospital Anxiety Depression Scale; PHQ: Patient Health Questionnaire; RFLI: Reason for Living Inventory; SAS: Zung Self-Rating Anxiety Scale; SBQ: Suicide Behaviors Questionnaire; SCL-90R: Symptom Checklist-90R; SDS: Zung Self-Rating Depression; SIQ: Suicidal Ideation Questionnaire; SRS: Plutchik Suicide Risk Scale; USDI: University Student Depression Inventory.

The average age of university students was found in 29 articles [2-8,11,16-18,21,22,25,26,29,31-34,38-40,42,43,45-48] ranging from 18.3 to 26.9 years. Considering these studies and a total sample of 37,883 students, the calculated average age was 21.3 years. A single study [26] did not report the gender distribution of the sample. The average of male university students accounted for 41.8% and ranged from 11.3% to 70.0%.

Different scales were applied to the 48 articles analyzed in this review. Nine [9,10,14,18,21,24,26,39,45] out of twenty-two [5,6,9-11,14,18,21-24,26,27,29,37-42,44-45] studies that evaluated anxiety used the Depression Anxiety Stress Scale (DASS). This questionnaire was also the most used among the 35 studies [1,3-6,9-15,18-24,26-28,30,32,33,35,37-42,44-46] that evaluated depression disorder (9 studies) [9,10,14,18,21,24,26,39,45], followed by the Center for Epidemiological Studies Depression Scale (CES-D) (8 studies) [4,19,20,30,32,33,35,46]. Suicidal ideation was evaluated using different instruments, with no predominance of any specific questionnaire. With the exception of the DSM-IV (Diagnostic and Statistical Manual of Mental Disorders) classification (used for psychiatric diagnosis purposes), the questionnaires and scales analyzed are employed for symptom screening and may be useful as a diagnostic assessment tool (McDowell, 2006).

The prevalence of anxiety disorder symptoms ranged from 7.6% to 73.0% in a total of 23 rates reported in 22 studies [5,6,9-11,14,18,21-24,26,27,29,37-42,44-45]. Of the 22,171 university students evaluated, 24.5% had anxiety symptoms. The studies of Fawzy and Hamed (2017) and Iqbal et al. (2015) reported the highest prevalence of anxiety in Egypt and India (73.0% and 66.9%, respectively) (Fawzy, & Hamed, 2017; Iqbal, Gupta, & Venkatarao, 2015), whereas the lowest rates were reported in France and Pakistan (7.6% and 13.2%, respectively) (Tran et al., 2017; Azad, Shahid, Abbas, Shahenn, & Munir, 2017).

Depression disorder was addressed in 35 studies [1,3-6,9-15,18-24,26-28,30,32,33,35,37-42,44-46], with prevalence ranging from 6.1% to 65.0%. A total of 26.1% of 35,532 university students were identified with depressive symptoms. Two studies conducted in Portugal showed the lowest prevalence (6.1% and 6.4%, respectively) (Coentre, Faravelli, & Figueira, 2016; Sarmiento, 2015). Similar to the data obtained on anxiety, the studies of Fawzy and Hamed (2017) and Wahed and Hassan (2017) conducted in Egypt reported a high prevalence of depressive symptoms (65.0% and 60.8%, respectively) (Fawzy, & Hamed, 2017; Wahed, & Hassan, 2017).

Suicidal ideation was evaluated from 31 prevalence rates, obtained in 19 studies [2,3,6-8,11,12,16,17,20,25,31,34,36,41-43,47,48] ranging from 3.9% to 49.1%. The 29,526 university students evaluated in the studies had a prevalence of suicidal ideation of 18.8%. As observed in the analysis of prevalence of depression symptoms, the lowest rates of suicidal ideation (3.9% and 5.2%) were found in two studies conducted in Portugal (Coentre, Faravelli, & Figueira, 2016; Leal, & Santos, 2016). Eskin et al. (2016) and Davaasambuu et al. (2017) found a high prevalence in Austria and Mongolia (49.1% and 47.0%, respectively) (Eskin et al., 2016; Davaasambuu, Aira, Hamid, Wainberg, & Witte, 2017).

Of the 48 studies selected, 23 [1,6,8,9,12,13,17,20,28,29,32-34,36-40,42-44,46,47] analyzed students from different courses (university students in general) and 25 [2-5,7,10,11,14-16,18,19,21-27,30,31,35,41,45,48] evaluated health sciences students, with 16 studies [2,5,11,14,15,18,21-24,27,30,31,41,45,48] exclusively evaluating medicine students. The prevalence rates of the three situations addressed in our study were higher in health students than in the general university population. The prevalence and number of health sciences students evaluated for symptoms of anxiety, depression, and suicidal ideation were as follows: 43.6% (out of 6,197 university students), 33.1% (out of 9,985 students), and 22.0% (out of 6,524 students). Among the general university population, 17.0% of students had anxiety symptoms (out of 15,974 students), 23.4% had depressive symptoms (out of 25,547 students), and 18.0% had suicidal ideation (23,002 out of students).

4 DISCUSSION

Anxiety disorders are the most prevalent common psychiatric disorders and affect approximately one-third of adults during their lifetime (Wittchen, & Jacobi, 2005; Bandelow, & Michaelis, 2015). Together with depression, they are the most reported mental disorders by university students and may significantly impact academic performance (American College Health Association, 2018).

These mental disorders are more common among females than males (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Hunt, & Eisenberg, 2010). Genetic, neurobiological and psychosocial (e.g, stressful events as such sexual abuse during childhood) factors have been identified as possible causes of the highest prevalence in women (Bandelow, & Michaelis, 2015). It is also important to highlight that cultural variables as familial, religious, geopolitical and economic (i.e., low-, middle-, or high-income countries) factors can influence development and reporting of mental health symptoms (Hofmann, Anu Asnaani,

& Hinton, 2010; Baxter, Scott, Vos, & Whiteford, 2013; Ferrari et al., 2013, Stopa et al., 2015).

The results of this review showed a prevalence of 24.5% (ranging from 7.6% to 73.0%) for anxiety and of 26.1% (ranging from 6.1% to 65.0%) for depression in university students. The extreme range in estimates can be explained by the large heterogeneity of the sample, since distinct studies using the same scale have very different results. For example, among studies using the CES-D [4,19,20,30,32,33,35,46] and DASS [9,10,14,18,21,24,26,39,45] scales, the prevalence ranges for symptoms of depression were 13.7%-59.0% and 23.0%-65.0%, respectively. This perhaps highlights the need to adapt the scales according to each country's cultural issues.

According to the WHO, in 2015 the prevalence of anxiety and depression in the world population was estimated at 3.6% and 4.4%, respectively (World Health Organization, 2017a). Therefore, we suggest that anxiety and depression disorders affect a much higher percentage of university population than the general one. The prevalence of depression in this study was similar to that found in a systematic review by Ibrahim et al. (2013), which noted an average rate of 30.6%, ranging from 10.0% to 85.0%, when analyzing 24 studies conducted with university students (Ibrahim, Kelly, Adams, & Glazebrook, 2013). Using the parameters of the DSM-IV as criteria, a research conducted by the WHO in 21 countries showed that 20.0% of university students have mental disorder and only 16.4% of them received some type of treatment (Auerbach et al., 2016).

Suicidal ideation is another serious mental disorder affecting university students significantly. Data from the WHO indicate that suicide was, in 2015, the second leading cause of death in the population between 15 and 29 years old, an age group commonly found in the university population (World Health Organization, 2017a). The students in this review had a high prevalence of suicidal ideation at 18.8% and ranging from 3.9% to 49.1%. The study of Eskin et al. (2016) with 5,572 university students from 12 countries showed an even higher prevalence of suicidal ideation at 28.8% and ranging from 20.0% to 49.1% (Eskin et al., 2016). Considering that psychiatric disorders, such as anxiety and depression, are strong predisposing factors for suicide (Garlow et al., 2008; Hawton, Casanas, Haw, & Saunders, 2013), the high prevalence of these two disorders may be associated with that of suicidal ideation among university students found in this review.

Several studies have indicated that health sciences students have a high prevalence rate of mental disorders (Dyrbye, Thomas, & Shanafelt, 2006; Puthran, Zhang, Tam, & Ho,

2016; Rotenstein et al., 2016; Pacheco et al., 2017). The data in this review are consistent with this finding. The 23 studies that evaluated the general university population reported a prevalence of 17.0%, 23.4%, and 18.0% for anxiety, depression, and suicidal ideation disorders, respectively. Meanwhile, the other 25 studies that analyzed only health sciences students showed a 43.6% prevalence for anxiety, a 33.1% prevalence for depression, and a 22.0% prevalence for suicidal ideation. Several articles have addressed medical students' mental health. In a systematic review of research conducted in 43 countries, Rotenstein et al. (2016) found a prevalence of 27.2% for depression and 11.1% for suicidal ideation (Rotenstein et al., 2016). Puthran et al. (2016), which evaluated 77 studies that analyzed several countries worldwide, found a prevalence of depression among medical students that is similar to the above-mentioned review: 28.0% (Puthran, Zhang, Tam, & Ho, 2016). In Brazil, Pacheco et al. (2017) reviewed 59 studies on medical students and found a prevalence of 32.9% for anxiety and 30.6% for depression (Pacheco et al., 2017).

One limitation of this review is that the studies analyzed used different methods to identify the prevalence rates of the mental disorders addressed in this review. Thus, they had different concepts and instruments for classifying the student as having or not having mental disorders. Furthermore, it was not possible to perform a gender analysis, since many studies did not provide separately the prevalence of mental disorders between men and women. Others limitations of this study including the under- or overrepresentation from certain regions of the world and publication bias.

In conclusion, mental disorders are common disorders that have a significant prevalence among university students and often neglected, especially in developing countries (Auerbach et al, 2016; Eskin et al., 2016). Moreover, the high prevalence of mental disorders in university students found in this review highlights the importance of implementing strategies for prevention, intervention, and diagnosis/treatment of psychiatric disorders in this population.

DISCLOSURE STATEMENT

The authors declare that there is no conflict of interest.

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