

# Mental health issues amongst medical students in Asia: a systematic review [2000–2015]

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**Background:** Studies have shown that the stress experienced by medical students is far greater than that experienced by other university students. In this study, we aim to understand the consequent mental health issues that are experienced by medical students, particularly in Asia, via a systematic review of the current literature.

**Methods:** Initial searches on MEDLINE, Embase and SpringerLink came up with a total of 1,033 unique articles. Studies not focusing on medical students alone, not mentioning mental health issues or not containing prevalence values were excluded.

**Results:** We included 14 articles in our analysis. ADs had a prevalence of 7.04% (100/1,420). Depression was prevalent in 11.0% (1,115/10,147) of students. A total of 12.9% (54/420) and 12.9% (41/319) of male and female medical students respectively were screened for depression. Preclinical students were also 1.63 times more likely to be depressed compared to clinical students, with 98.0% (48/49) pre-clinical students having screened for depression, compared to 60% (27/45) clinical students. Home staying medical students are 1.33 times more likely to be depressed compared to hostel-stayers, with 12.1% (29/239) of home stayers being depressed compared to 9.2% (37/402) of hostel stayers.

**Conclusions:** We found that mental health issues affect a significant proportion of medical students and they are more prevalent in certain subpopulations of medical students. Our data revealed that preclinical and home staying students can be more susceptible to depression. More research should be done regarding this issue. With such information, it is hoped that appropriate interventions can be designed to improve the mental health of medical students.

**Keywords:** Mental health issues; medical students; medical school; Asia; prevalence; systemic review

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## Introduction

One of the main functions of medical schools is to train physicians to meet the healthcare needs of current and future national populations (1,2). This is usually achieved through arduous training curriculum and programmes in which high levels of motivation, intelligence and stamina are expected. In fact, the total expanse of professional

knowledge and skills acquired by medical students is greater than that of students from other majors (3,4). This is exacerbated by the fact that individuals aged between 18–24 years of age are particularly at risk of developing mental disorders such as major depressive disorder (MDD), anxiety disorders (ADs) and psychiatric comorbidity (5-7). As a consequence, stress levels and the extent of emotional disturbances amongst medical students is high (8-10).

Studies have also shown that mental health problems are higher amongst university students as compared to their peers (11-13). Despite this, the prevalence of such mental disorders amongst universities students continues to rise (14-16).

Mental disorders and distress can result in numerous undesirable personal and professional consequences which include burnout, social isolation, growing cynicism and eventual physician impairment (17-19). At times, mental health issues may persist into adulthood if they remain undetected or are not treated appropriately (20). Furthermore, undesirable coping mechanisms such as substance abuse, alcohol consumption, smoking and harm to self and others may be observed in mentally and emotionally distressed medical students.

Within Asia, there are numerous medical education systems (21). Initially having adopted their traditional education systems from their previous Western colonial leaders such as the United Kingdom, the US, Netherlands and France, there have been significant medical education reforms within Asian countries so as to prepare physicians to meet the unique cultural and healthcare needs of local communities within the continent (22,23). As such, the current state of medical education in Asia differs in certain areas compared to Western medical education. Thus, the different curricula place separate demands and expectations upon medical students. This may potentially result in distinct incidence and prevalence statistics of mental health issues amongst medical students in Asian medical schools.

### **Objective**

Two previous systematic reviews done with papers from the United States of America (USA), and the United Kingdom (UK) and other English-speaking countries respectively, showed that North American and other medical students are more depressed and anxious than their peers. However there is a dearth of research synthesis focusing solely on Asian medical students (8,24). Consequently, the objective of this study is to perform a systematic review of papers that have studied mental health issues amongst Asian medical schools so as to identify the prevalence of mental health problems amongst medical students within Asia. We hope that the synthesised information obtained can bring to light the severity of mental health issues within Asian universities, and consequently result in psychological interventions within universities so as to improve the mental health of medical students.

## **Methods**

### **Identification of studies**

Our study focused on the incidence and prevalence of mental health issues in Asian medical schools. A broad search string (((medical student) OR medical school) AND mental AND Asia) was used in Medline, Embase/Scopus, and SpringerLink.

A total of 1,033 unique records were obtained and their titles and abstracts were reviewed in order to exclude irrelevant studies; articles in English and with sufficiently detailed English abstracts were included, articles not related to medical school or medical students were excluded. Potentially relevant abstracts were assessed and relevant articles were downloaded and their entire texts assessed. The references cited by each potentially relevant paper and papers suggested by databases, such as Elsevier, were also assessed for relevance; 94 potentially relevant abstracts were assessed and 47 full text articles downloaded (*Figure 1*).

### **Included studies**

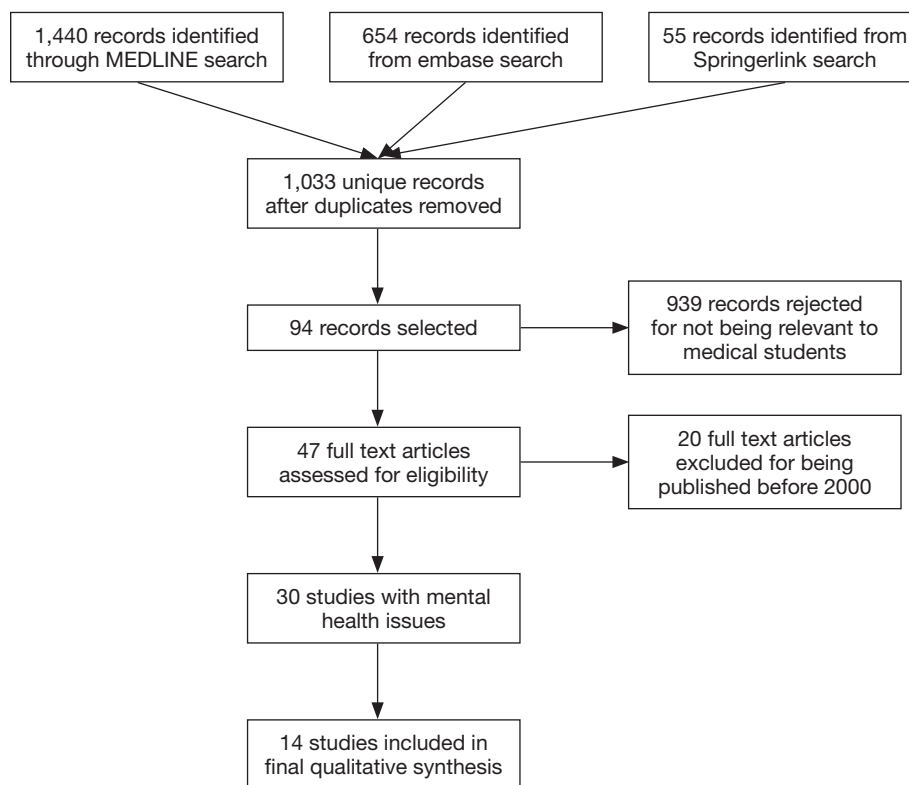
Thirty studies written in English and published between January 2000 till February 2015, reported primary data on the incidence and prevalence of mental disorders (according to various diagnostic criteria, such as the Beck Depression Inventory or Beck Anxiety Inventory) from a population or sub-population of medical students in Asian countries (25,26). Out of these 30 studies, 14 were included in the final qualitative synthesis.

### **Data extraction**

Once a study was included, the data relevant to the study-level variables (first author, year of publication, country of study, diagnostic criteria) were noted. The studies were then given points according to the Joanna-Briggs Institute Prevalence Critical Appraisal Tool for rate-related variables (27). Two independent authors (ANC and AAS) assessed all the selected papers used in this analysis and disagreements were resolved by consensus. Studies were included for (qualitative synthesis) if there was a consensus between the two authors if the number of points ('Yes') were more than 6 out of 10 points.

## **Results**

Fourteen full text articles, with 13,111 participants, were



**Figure 1** PRISMA™ diagram of the selection of studies for the systematic review.

included in this study. This systematic review focused on depression, anxiety, common coping mechanisms, body dysmorphic disorders and its associated eating disorders, and suicidal ideations among medical students. The assessment tools used in each study are compiled in *Table 1*.

Nine studies (*Table 2*) evaluated depression among medical students, with an aggregate prevalence of 11.0%. ADs had an aggregate prevalence of 7.04%, based on data from six studies (*Table 3*). Coping mechanisms in the form of alcohol use, cigarette smoking and problematic Internet behaviors were discussed in 3, 4 and 1 study respectively (*Table 4*). One study and its 2-year follow-up included body dysmorphic disorder and disordered eating attitudes among medical students, but the prevalence for both of these issues was low, 1% and 2% respectively (*Table 5*). The prevalence of suicidal ideations was reported in one study, with 3% of medical students having such ideations (*Table 6*); none of the students were reported to have attempted suicide in the study.

### Depression

Data on depression was found in 9/30 studies, with a pooled

prevalence of 11.0% (1,115/10,147) of students. Students were screened for depression using seven different tools (*Table 1*). The nine studies were from East Asia, South Asia and the Middle East (28-36).

Two studies categorized depression based on gender, showing no significant difference between the prevalence for male and female students, 12.9% (54/420) and 12.9% (41/319) for male and female medical students respectively.

The odds of preclinical students having being screened for depression was 1.63 times higher compared to clinical students. A total of 98.0% (48/49) of pre-clinical students were screened for depression, compared to 60% (27/45) clinical students. Home staying medical students had a 1.33 times higher odds to be depressed compared to hostel-stayers, with 12.1% (29/239) of home stayers being depressed compared to 9.2% (37/402) of hostel stayers.

### Anxiety

Data on ADs was found in 6 studies with a pooled prevalence of 7.04% (100/1,420) (28,30-33,35). Five different tools were used to assess anxiety. There were no

**Table 1** Tools used to assess student's mental health

Assessment tool	Abbreviation	Number of studies
<b>Depression</b>		
Aga Khan University Anxiety and Depression Scale	AKUADS	1 (28)
Beck depression Inventory	BDI	3 (29-31)
Hospital Anxiety and Depression Scale	HADS	1 (32)
Influence of Studying on Students' Health	ISSH	1 (33)
Self-Rating Depression Scale	SDS	1 (34)
Symptoms Checklist 90	SCL-90	1 (35)
Zung Depression Scale	ZDS	1 (36)
<b>Anxiety</b>		
Aga Khan University Anxiety and Depression Scale	AKUADS	1 (28)
Beck Anxiety Inventory	BAI	2 (30,31)
Hospital Anxiety and Depression Scale	HADS	1 (32)
Influence of Studying on Students' Health	ISSH	1 (33)
Symptoms Checklist 90	SCL-90	1 (35)
<b>Body Dysmorphic Disorder (1 study with multiple tools)</b>		
Body Shape Questionnaire	BSQ	1 (34)
Swansea Muscularity Attitudes Questionnaire	SMAQ	1 (34)
Dysmorphic Concern Questionnaire	DCQ	1 (34)
Body Dysmorphic Disorder Questionnaire	BDDQ	1 (34)

significant differences in prevalence between genders for anxiety.

### ***Coping mechanisms***

Alcohol use was prevalent in 38.7% (849/2,196) of students and cigarette smoking was prevalent in 5.5% (76/1,386) of students in the included studies (28,37-39,41). One study in Vietnam compared the difference in alcohol use between male and female students (39). Male students had a 2.02 times higher odds to consume alcohol compared to female students. There was no significant difference in genders among students who smoked cigarettes.

Problematic internet behavior was noted in 27.3% (139/503) of students in a study done in Sri Lanka (40). The behaviors ranged from online pornography, fraudulent financial transactions, cyber attacks and overuse of internet. A total of 40.6% of these students admitted to viewing and downloading online pornography, 6% had used it for cyber attacks and 4.4% had been involved in some form of online fraudulent activity. A total of 6% of these students believed that they needed professional help to overcome their behaviors.

### ***Body dysmorphic disorders***

A study done by among first year medical students from Central South University (Hunan Province, Changsha City) in 2006 using the Body Shape Questionnaire (BSQ), Dysmorphic Concern Questionnaire (DCQ) and Body Dysmorphic Disorder Questionnaire (BDDQ) (34). One third of students showed a concern with some aspect of their physical appearance, measured by the BDDQ, however only 5 students out of 486, screened positive for body dysmorphic disorder; where they spent a significant portion of time every day pre-occupied with the appearance of a body part.

A third of the sample was concerned with some aspect of their physical appearance (as measured by BDDQ)—this finding is markedly lower than rates reported in other studies although the inclusion of weight-related concerns with their appearance screened positive for BDD in our study. The most significant correlates of dysmorphic concern for males were scores on the SIAS (anxiety) ( $P<0.001$ ) and SDS (depression) ( $P<0.001$ ). For females, the most significant correlates of dysmorphic concern were scores on the BSQ (body shape) ( $P<0.001$ ), SDS ( $P<0.001$ ) and SIAS ( $P<0.05$ ).

**Table 2** Prevalence of depression in medical students

Reference	Study location	Study population	Age group	Assessment tool	Sample size	Response rate (%)	Subject characteristics	Prevalence of depression
Ahmed <i>et al.</i> , 2009 (30)	Dubai, UAE	Students of Dubai Medical College for Girls (DMCG)	Unclear	BDI	165	100%	Female medical students	28.6%
Basnet <i>et al.</i> , 2012 (36)	Nepal	B. P. Koirala Institute of Health Sciences	21.18±1.65; range, 18–26 y	Zung depression scale	94	94 % (94/100)	57 were males and 37 females	29.78%
El-Ghiany <i>et al.</i> , 2008 (32)	Saudi Arabia, Egypt	College of Medicine in Al-Hassa, King Faisal University, Saudi Arabia	Mean age: 21.0±1.9 y	Hospital Anxiety and Depression Scale (HAD)	284	81.6% (284/348)	All males	16.20%
Khan <i>et al.</i> , 2006 (28)	Karachi, Pakistan	Aga Khan University. All medical students who had spent more than 6 months in the institution and did not have any physical illness	21.3±1.88 y	Depression which was defined as a cut off score 19 or above on Aga Khan University Anxiety and Depression Scale (AKUADS)	142	Over 90%	59% were females. Most of the students were from middle socio-economic class	70%
Liao <i>et al.</i> , 2010 (34)	China	First year medical students from Central South University (Hunan Province, Changsha City)	16–21 y	Cross-sectional, descriptive survey design; SDS	487	97.4% (487/500)	306 females (62.8%) and 181 males (37.2%)	5.6%
Lupo <i>et al.</i> , 2011 (31)	Israel	Medical students from Tel Aviv University	18–37 (24.6±3.2) y	Cross-sectional study, BDI	119	Unclear	NA	25.20%
Roh <i>et al.</i> , 2009 (29)	Seoul, South Korea	Medical Students attending all 41 medical schools in South Korea	18–26 y	Cross-sectional study; questionnaire included BDI	7,357	52.2% (7357/14095)	NA	9.4% (689 students)
Taha <i>et al.</i> , 2012 (33)	Saudi Arabia	Male Preclinical (from first to fourth year) Medical Students, College of Medicine, University of Dammam, Saudi Arabia	15–30 (20.21±1.46) y	Validated Arabic version of "Influence of Studying on Students' Health" (SSH) questionnaire	363	85.4% (363/425)	169 (37.1%) students do not study in their own city, 21.5% share rooms with other medical students. Majority of students (70.2%) live with their parents	31.10%
Yang <i>et al.</i> , 2014 (35)	China	First to fifth year medical undergraduates in Huazhong University of Science and Technology, China	17–24 y	Symptoms Checklist 90 (SCL-90)	1,137	98.9% (1,137/1,150)	624 males, 513 females; 59% pre-clinical students (671/1,137)	3.17% (36)

**Table 3** Prevalence of anxiety in medical students

Reference (first author)	Study location	Study population	Age group of subjects (Y)	Assessment tool	Sample size	Response rate (%)	Subject characteristics	Prevalence of anxiety
Ahmed et al., 2009 (30)	Dubai, UAE	Students of Dubai Medical College for Girls (DMCG)	Unclear	BAI	165	100%	Female medical students	28.7%
El-Gilany et al., 2008 (32)	Saudi Arabia, Egypt	College of Medicine in Al-Hassa, King Faisal University, Saudi Arabia	21.0±1.9	Hospital Anxiety and Depression Scale (HAD)	284	81.6% (284/348)	All males	15.5%
Khan et al., 2006 (28)	Karachi, Pakistan	Aga Khan University. All medical students who had spent more than 6 months in the institution and did not have any physical illness	21.3±1.88	Aga Khan University Anxiety and Depression Scale (AKUADS)	142	Over 90%	59% were females. Most of the students were from middle socio-economic class	70%
Lupo et al., 2011 (31)	Israel	Medical students from Tel Aviv University	18–37 (24.6±3.2)	Cross-sectional study. BAI	119	Unclear	NA	29.4%
Taha et al., 2012 (33)	Saudi Arabia	Male Preclinical (from first to fourth year) Medical Students, College of Medicine, University of Dammam, Saudi Arabia	15–30 (20.21±1.46)	Validated Arabic version of "Influence of Studying on Students' Health" (ISSH) questionnaire	363 male medical students	85.4% (363/425)	169 (37.1%) students do not study in their own city, 21.5% share rooms with other medical students. Majority of students (70.2%) live with their parents	39.4%
Yang et al., 2014 (35)	China	First to fifth year medical undergraduates in Huazhong University of Science and Technology, China	17–24	Symptoms Checklist 90 (SCL-90)	1,137	98.9% (1,137/1,150)	624 males, 513 females; 59% pre-clinical students (671/1,137)	2.02% (36)

Table 4 Prevalence of coping mechanisms in medical students

Reference	Study location	Study population	Age group of subjects (Y)	Sample size	Response rate (%)	Subject characteristics	Prevalence of alcohol consumption = more than 21 drinks/week	Prevalence of cigarette use	Internet behaviour
Abramovitch et al., 2000 (37)	Israel	First Year Medical Students in Tel Aviv University, Israel	25.8±2.3037	71	100	Mean age: 25.8 (23–27); sex ratio (m/f) (69.6/30.4); religion (Jewish:other 89.2:10.8)	27.9%, 10.4% who drank more than 10 drinks/week	19.7%, 40.0% of whom smoked more than 10 cigarettes/day	NA
Chan et al., 2007 (38)	Singapore	Medical students from the Yong Loo Lin School of Medicine, National University of Singapore	17–25	909	85% (909/1,069)	Males 60%, females 40%	7.7% (more than 4 drinks a week)	1.5%	NA
Diep et al., 2013 (39)	Vietnam	Medical Students from Hanoi Medical University	Male: 18–28 20.6, female: 17–26 (20.8), total, 17–28 20.7	1,216	96.50%	Male: 610, female: 606	Male: 77.2%, female: 37.7%, total: 62.4%	NA	NA
Khan et al., 2006 (28)	Karachi, Pakistan	Aga Khan University	21.3±1.88	Aga Khan University Anxiety and Depression Scale (AKUADS)	142	Over 90%	NA	21.8%	NA
Rodrigo et al., 2011 (40)	Sri Lanka	Medical Students, University of Colombo, Sri Lanka	22.7	503	Unclear	Males: 48.7%, females: 51.3%	NA	NA	27.6%. 40.6%: viewing online pornography, 6%: used the internet to attack a person or a group. 4.4%: involved in online fraudulent financial activities. 14%: overuse 34.6%: had been told by parents/teachers/peers that their internet use was too much. 6%: believed that they need professional help to overcome
Shaikh et al., 2004 (41)	Pakistan	Undergraduate medical students of all five years in a medical college in Karachi	17–25 [21]	264	88% (264/300)	52.3% [138] were males, 47.7% [126] were females. 136 day scholars (51.5%), 128 (48.5%) were hostelites. Those on college's financial assistance were 41.3%	NA	6.44%	NA



**Table 5** Prevalence of body dysmorphic disorders in medical students

Reference (first author)	Study location	Study population	Age group of subjects (Y)	Assessment tool	Sample size	Response rate	Subject characteristics	Prevalence of body dysmorphic disorder
Liao <i>et al.</i> , 2010 (34)	China	Fist year medical students from Central South University (Hunan Province, Changsha City)	16–21	Cross-sectional, descriptive survey design; BSQ, SMAQ, DCQ, BDDQ	487 students	97.4% (487/500)	306 females (62.8%) and 181 males (37.2%)	1.3%

**Table 6** Prevalence of suicidal thoughts in medical students

Reference (first author)	Study location	Study population	Age group of subjects (Y)	Sample size	Response rate	Subject characteristics	Prevalence of suicidal ideation
Ahmed <i>et al.</i> , 2009 (30)	Dubai, UAE	Students of Dubai Medical College for Girls (DMCG)	Unclear	165	100%	Female medical students	3% of depressed patients (0.858% of total study population)

### *Suicidal ideation*

One study in the UAE reported 3% prevalence of suicidal ideation in medical students. This can be compared to a study in the United States with a prevalence of 20.4% (30,42). None of the students in the study attempted suicide.

### **Discussion**

Medical school is a highly demanding phase in a student's medical career where a lot is expected from students due to the course content and duty hours in the curricula. In addition to coping with normal stressors in life, medical students have to cope with the amount complexity of the medical knowledge they learn, the financial debt that they sometimes have to take up, the lack of leisure time compared to their peers and having to make career choices at the end of medical school (28).

This systematic review showed that medical students in Asia are prone to mental health issues, with 52.7% of students citing significant stress as one of the issues that they faced in medical school.

### *Depression*

A systematic review on undergraduate students showed that the global prevalence for depression among undergraduate students was 33% (43). While depression had a pooled prevalence of 11% in this systematic review, 5 of the studies

done in the Middle East and South Asia had incidence of depression near or higher than 30% (28,29,31,33,36). This fitting with the prevalence of depression found in the undergraduates in general as well as the 2 other systematic reviews of medical students' mental health issues (8,24). The study in Pakistan had a 70% incidence of depression in its cohort (28). This prevalence of depression in these studies could be due to cultural and social reasons, as a similar study done in Pakistan before 2000 had similar rates of depression, stating that terrorism and political instability had a role to play in the mental health issues faced by medical students (44). Three reasons could be given for the low pooled prevalence, the first being underreporting in certain studies as some Asian cultures do not view mental health issues favorably, and thus students might be unwilling to report certain issues which they face (34). However a second reason is that medical students obtain relevant knowledge in psychiatry and medical psychology during their clerkships and hence they know more about self-psychological management (35). Thirdly, this low prevalence could also be due to good support by medical schools (35), where the schools have improved their focus on students' mental health education as well as engaging psychological counselors to help students who have mental health issues (35).

### *Anxiety*

While the pooled prevalence of anxiety was 7.04%, there



was a study in China with a prevalence of 2.02% (35). The rest of the studies from the Middle East and South Asia had prevalences from 15.5–70% (28-30,32). Like depression, this low prevalence in China was associated with medical students having more knowledge compared to their other undergraduate contemporaries as well as schools being more prepared to cope with students' mental health issues by engaging psychological counselors to help students.

### ***Suicidal ideation***

The study on suicidal ideations noted that students in the UAE, while they did have ideas of suicide, did not attempt suicide due to religious reasons. A study in Sweden showed a 2.8% suicide attempt rate among medical students (45). It is thus relevant to note that Asian students' religions might preclude them from acting on these suicidal ideations.

### ***Strengths***

One of the biggest strengths of this study would be the fact that the overall sample size was large covering a total of 13,111 participants from various regions in Asia, from East to South Asia and the Middle East. This number of participants is comparative to the previous systematic reviews done in other regions. Furthermore the study focussed on newer studies published after 2000, thus being more applicable for current medical students.

### ***Limitations***

We noted certain limitations to our systematic review. Firstly, due to the lack of sufficient data within the current literature, we were unable to perform a quantitative meta-analysis of the various risk factors which could explain the mental health issues amongst medical students. Apart from that, there were certain limitations to the scales used by the various studies included within our systematic review. While the Beck's Depression and Anxiety indexes are validated tools for making the diagnosis of depression and anxiety, certain studies used different cut-off values for diagnosing these mental health issues, thus this would result in differing prevalences seen in the different studies. However the BDI was used in only three studies and the BAI in 2, hence reducing the extent of this limitation.

In addition to the depression and anxiety scores, the data for the prevalence of body dysmorphic disorder and eating disorders might be limited by the self-reporting nature

of the tools, such as the BDDQ, thus leading to either an over- or under-estimation of the actual incidence of such disorders and hence more studies should be done to find out more about how medical students are affected by these issues.

### **Conclusions**

Mental health issues affect a significant proportion of medical students in Asia. While the prevalence of depression and anxiety are lower than global values, the high levels of motivation, intelligence and stamina expected of medical students can result in undesirable personal and professional consequences which can cause eventual physician impairment. Studies have shown that medical students' knowledge in mental health issues as well as schools' support through psychological intervention results in these lower prevalence rates compared to undergraduate students. More research should be done regarding this issue. With such information, it is hoped that appropriate interventions can be designed to improve the mental health of medical students.

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### **Footnote**

*Conflicts of Interest:* The authors have no conflicts of interest to declare.

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