International Review of Psychiatry

ISSN: 0954-0261 (Print) 1369-1627 (Online) Journal homepage: https://www.tandfonline.com/loi/iirp20

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To cite this article: Oluyomi Esan, Arinola Esan, Ayorinde Folasire & Philip Oluwajulugbe (2019): Mental health and wellbeing of medical students in Nigeria: a systematic review, International Review of Psychiatry, DOI: 10.1080/09540261.2019.1677220

To link to this article: https://doi.org/10.1080/09540261.2019.1677220

Published online: 24 Oct 2019.

INTERNATIONAL REVIEW OF PSYCHIATRY
https://doi.org/10.1080/09540261.2019.1677220

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REVIEW ARTICLE

Mental health and wellbeing of medical students in Nigeria: a systematic review

Oluyomi Esan[a,b], Arinola Esan[c], Ayorinde Folasire[d] and Philip Oluwajulugbe[b]

[a]Department of Psychiatry, University of Ibadan, Ibadan, Nigeria; [b]Department of Psychiatry, University College Hospital, Ibadan, Nigeria; [c]Department of Medicine, University College Hospital, Ibadan, Nigeria; [d]Department of Radiation Oncology, University of Ibadan, Ibadan, Nigeria

ABSTRACT

In addition to the stresses common to medical school training, medical students in Nigeria face additional peculiar contemporary social problems due to income inequality, poverty, insecurity and political instability. These have a direct impact on their mental health and wellbeing. The aim of this study was to systematically review articles reporting on the epidemiology of psychiatric disorders among medical students in Nigeria. Studies were identified using MEDLINE, HINARI, *African Journal Online* (AJOL) and Google Scholar databases using search terms encompassing psychiatric morbidity amongst medical students. No date restrictions were applied to the search. The pooled prevalence estimate was calculated for each disorder. Psychological distress was present in 25.2% of the students, perceived stress in 60.5%, depression in 33.5% and anxiety in 28.8%. The current use of at least one psychoactive substance was present in up to 44.2%, while 35.5% of all the respondents had experienced one or more forms of abuse during their training as medical students. The prevalence of psychiatric disorders among medical students in Nigeria is high. Positive coping mechanisms such as religiosity, positive reframing and resilience which were identified in this review should be optimized to reduce the burden.

ARTICLE HISTORY
Received 3 October 2019
Accepted 3 October 2019

KEYWORDS
Mental health and wellbeing; medical students; Nigeria; psychiatric disorders

Introduction

Medical school is characteristically a demanding, stressful, daunting and challenging academic experience (Cuttilan, Sayampanathan, & Ho, 2016; Dyrbye, Thomas, & Shanafelt, 2006; Hope & Henderson, 2014; Pacheco et al., 2017). This has often led to untoward consequences such as impaired academic performance, burn out, substance abuse, suicide, cynicism, attrition from medical school, medical errors, broken relationships, poor self-care (poor diet, poor sleep, inadequate exercise etc.) and a decline in physical health (Dyrbye, Thomas, & Shanafelt, 2005). Although many students get into medical school with the altruistic and humanistic aim of being compassionate, caring and empathic when they graduate, many come out with a decline in empathy and other humanitarian qualities (Crandall, Volk, & Loemker, 1993; Woloschuk, Harasym, & Temple, 2004).

Existing studies indicate that at the onset of their medical training, medical students have similar prevalence estimates of psychiatric morbidity comparable to the general population and their non-medical peers in the university (Rosal et al., 1997). Unfortunately, psychiatric morbidity increases during medical training (Dahlin, Joneborg, & Runeson, 2005; Dyrbye et al., 2006; Rosal et al., 1997). Reports indicate that the mental health of medical students deteriorates soon after they begin medical school and remains poor throughout their training(Dyrbye et al., 2005). A global systematic review indicates that among medical students, prevalence estimates for anxiety range between 7.7–65.5%, for depression 6.0–66.5% and for psychological distress 12.2–96.7% (Hope & Henderson, 2014). These prevalence estimates are between 2 and 5 times higher than reports from the corresponding general population(Cvejic et al., 2017). The prevalence of depression among medical students increases during medical school training (Dahlin et al., 2005; Dyrbye et al., 2006; Rosal et al., 1997). This increase is more prominent in females (Dahlin et al., 2005; Vitaliano, Maiuro, Russo, & Mitchell, 1989). Up to 11.1% of medical students experience suicidal ideation. Furthermore, endorsement of suicidal ideation has been demonstrated to increase the risk of suicide completion over the next year by 100-fold (Rotenstein et al., 2016; Simon et al., 2013).

CONTACT Oluyomi Esan oluyomie@yahoo.com Department of Psychiatry, University of Ibadan, Ibadan, Nigeria

The aforementioned scenario is compounded by the fact that medical students often do not seek help for mental health problems(Tjia, Givens, & Shea, 2005). The reasons attributed to this include concerns about confidentiality, lack of convenient access, time constraints and a preference to manage problems on their own (Guille, Speller, Laff, Epperson, & Sen, 2010).

This review was carried out first because to date there is a lack of research synthesis focussing solely on the mental health of Nigerian medical students and second because of the recent anecdotal reports of an increase in suicidal attempts by medical students in southwest Nigeria. Since several mental health conditions contribute to the development of suicidal behaviours we sought to study psychiatric morbidity among medical students in Nigeria. The primary objective was to assess the prevalence of mental disorders and mental health conditions among medical students in Nigeria, the risk factors associated with such, and identify the coping mechanisms that are significantly associated with alleviating such conditions.

Methods

Search strategies

The present review used electronic searches with PubMed, HINARI, *African Journal Online* (AJOL) databases supplemented with Google Scholar search. No date restrictions were applied to the search. The search expression used for PubMed was ([Medical students] OR [Medical undergraduates] OR [MBBS students]) AND (depress* OR anxiety OR stress* OR psych* OR mental) AND [Nigeria OR Nigerian]; 'Medical students' OR 'MBBS students' AND Mental AND Nigeria. Additional studies were identified from the bibliographies of the studies screened during the literature review.

On November 9, 2018, one reviewer (OE) searched MEDLINE (via PubMed), HINARI and AJOL.

Title and abstract screening were done by OE and PO, and articles were selected with mutual consensus. Searches were assessed against strict inclusion criteria: (i) the study population must comprise clinical or pre-clinical medical students (ii) the study must be located in Nigeria.

A total of 10,794 unique records were obtained and their titles reviewed. Of these, 10,761 were excluded because of ineligibility (Figure 1). Subsequently, the full text of 33 papers was reviewed. We further excluded seven studies for reasons such as the failure to address the objectives of this review, or if the full text was not available. The final number of studies included in qualitative synthesis was 26 (Figure 1).

Study inclusion/exclusion

Studies were included if they had reported the epidemiology of any type of psychiatric disorder among medical students in Nigeria. Only articles published in peer-reviewed, English-language journals were included. We also included studies conducted in heterogeneous groups from different courses students (such as physiotherapy, nursing students) if they had reported psychiatric disorders/conditions in medical students separately.

Exclusion criteria

We excluded studies if the full text was not available or if medical student participants with other students from allied professions were in the same group, but subgroup analysis was not provided for medical students.

Included studies

Twenty-six studies written in English were included in the final qualitative synthesis.

Data extraction

The data extracted from each study included the name(s) of the authors, publication date, study design, sample size, disorder(s)/condition(s) assessed, the prevalence estimate of the disorder, risk factors, the gender distribution of the disorder, mean age and the type of students studied (clinical vs. preclinical students).

Results

A total of 26 full-text articles, with 10,421 participants, were included in the current review (Figure 1). The review addressed issues on psychological distress, anxiety disorders, depressive disorders, substance-related and addictive disorders, stress, mistreatment/abuse, substance-related disorders, somatic symptom and related disorder, Post Traumatic Stress Disorder (PTSD), sexual orientation, sleep-wake disorders and parasomnias among medical students.

Most of the studies (24 out of 26) were cross-sectional in design Table 1.

Seven studies evaluated psychological distress, five studies evaluated depressive disorders, while four studies addressed anxiety disorders (Table 2).

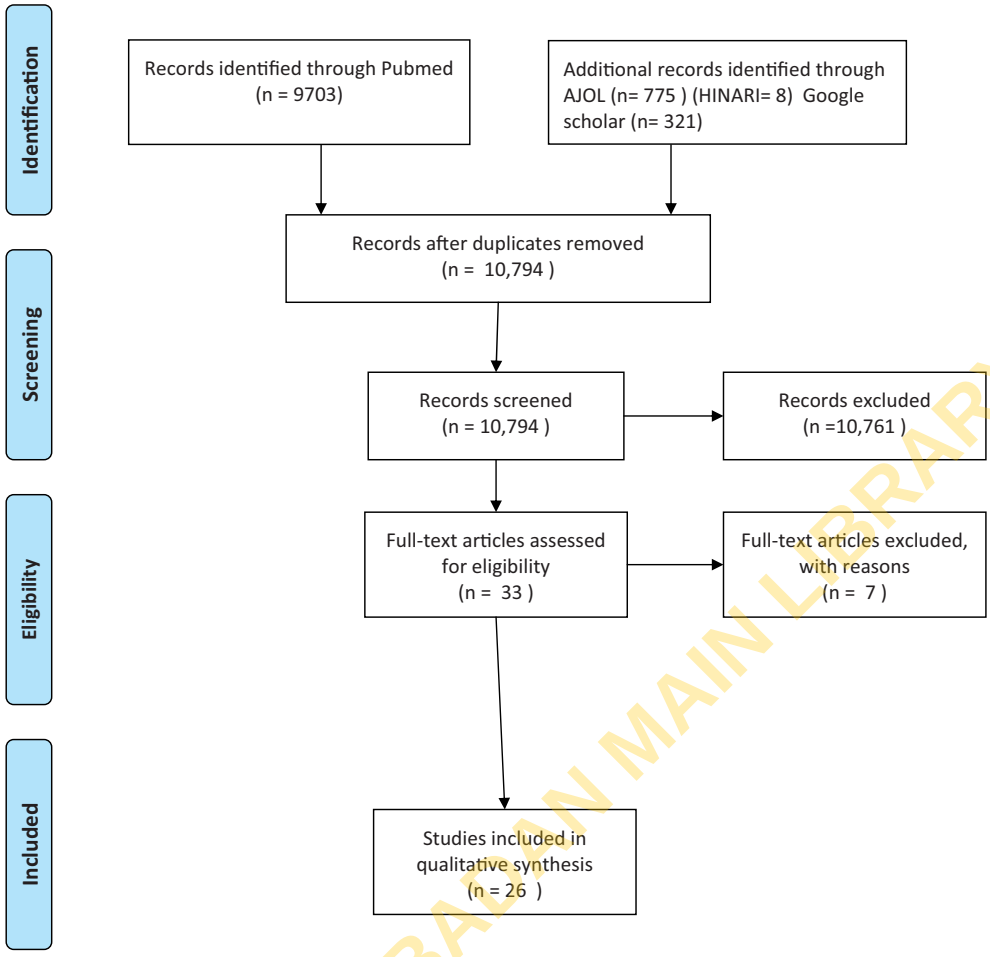

Figure 1. Selection of studies for this systematic review.

There were no reports of suicidal ideation, suicidal plan or suicidal attempt. Coping mechanisms such as religiosity, positive reframing and resilience were addressed by six studies (Table 2).

Prevalence and factors associated

Table 3 enumerates the factors that were associated with mental health conditions in the students after significant testing.

Psychological distress

High levels of psychological distress were identified among Nigerian medical students ranging from 15.2% (Yussuf, Issa, Ajiboye, & Buhari, 2013) to 42.2% (Oshodi, Erinfolami, & Akinbode, 2012). The pooled prevalence was 25.2%. The factors that were significantly associated with psychological distress are enumerated in Table 3.

The pooled prevalence of perceived stress in the current review was 60.5%. Financial distress was one of the factors associated with perceived stress. Financial distress was also significantly associated with psychological distress and depression, thus financial distress was associated with many more mental health conditions than any other factor.

Depression

The prevalence estimates of depression reported by the individual studies ranged from 4% (Tamunosiki et al., 2017) to 61.9% (Nwobi, Ekwueme, & Ezeoke, 2009).

Anxiety

The prevalence of anxiety was between 28.6% (James et al., 2017) and 61.6% (Abiola, Lawal, & Habib, 2015). Only two factors were identified as being significantly associated with anxiety in this study. These were being a medical student (i.e. compared to others e.g. nursing students) and a lack of someone to talk to Table 3.

Table 1. Studies evaluating psychiatric disorders and mental health conditions among medical students in Nigeria.

Reference	Study year	Study type	Mental health problem assessed	Assessment tools	Sample size	Subject characteristics
1 Omokhodion (2003)	NS	CS	Psychological distress	General Health Questionnaire Lecturers 'Lecturers' (GHQ-12)	176	P
2 Chinawa et al. (2016)	2014	CS	Psychosomatic disorder	Enugu Somatisation Scale (ESS)	385	NS
3 Oku, Oku, Owoaje, and Monjok (2015)	NS	CS	Psychological distress	GHQ-12	451	C & P
4 Chinawa et al. (2014)	2012	PS	Sleep, parasomnias	Pittsburgh Sleep Quality Index (PSQI); DSM-IV	222	C
5 Yussuf et al. (2013)	2011	PS	Psychiatric morbidity	GHQ-12, Maslach's Burnout Inventory (MBI) and Brief COPE.	79	P
6 Issa, Yussuf, Olatinwo, and Ighodalo (2010)	NS	CS	Psychological distress /Premenstrual dysphoric disorder	GHQ-12 & DSM-IV	208	NS
7 Omigbodun, Omigbodun, et al. (2006)	2001	CS	Psychological distress /GHQ12	GHQ-12	1119	C & P
8 James et al. (2017)	2014	CS	Perceived stress, alcohol use disorder, drug abuse, anxiety, depression	Perceived Medical School Stress (PMSS) Questionnaire, Alcohol Use Disorders Identification Test (AUDIT), Drug Abuse Screening Test (DAST), Hospital Anxiety Depression Scale (HADS).	623	C
9 Omigbodun, Omigbodun, et al. (2006)	2001	CS	Stress and counselling needs	GHQ-12	1118	C & P
10 Omokhodion and Gureje (2003)	NS	CS	Psychological distress	GHQ-12	316	C
11 Makanjuola et al. (2007)	2004	CS	Psychoactive substance use	World Health Organisation's guidelines for student substance use survey	906	C & P
12 Ohaeri et al. (1989)	1986	CS	Isolated sleep paralysis.	Sleep Paralysis Questionnaire (SPQ), Self-Reporting Questionnaire (SRQ),	164	C
13 Ihezue (1988a)	NS	CS	Substance and alcohol use	NS	728	C & P
14 Ihezue (1988b)	1982–1983	CS	Psychoactive substance use	NS	728	C & P
15 Abiola et al. (2015)	NS	CS	Anxiety, depression	HADS, Resilience Scale (RS) and Oslo and Social Support Scale (OSS-3).	122	C
16 Asani, Farouk, and Gambo (2016)	NS	CS	Perceived stress	The Cohen's Perceived Stress Scale (PSS-10)	224	C
17 Coker, Coker, and Sanni (2018)	NS	CS	Depression and anxiety symptoms	The short version of the Depression Anxiety and Stress Scale	240	C & P
18 Daniyam et al. (2010)	2008	CS	Sexual orientation	An adapted version of the World Health Organisation/ Global AIDS Programme	364	C
19 Babalola et al. (2014)	2011	CS	Substance-related disorders and psychological distress	The World Health Organisation's Student Drug Use Questionnaire & GHQ-12	246	C
20 Ogunsemi et al. (2013)	NS	CS	Psychological distress	Stress and Well-Being Questionnaire; HADS, GHQ-12	137	C
21 Nwobi et al. (2009)	NS	CS	Depression	Becks Depression Inventory (BDI-II)	762	C & P
22 Oku et al. (2014)	2011	CS	Mistreatment/abuse	NS	451	C & P
23 Nwoga, Audu, and Obembe (2016)	2013	CS	PTSD	PTSD Checklist-Civilian Version; Impact of Event Scale; Composite International Diagnostic Interview (CIDI)	200	Not stated
24 Fawibe and Shittu (2011)	2009	CS	Cigarette smoking	Self-Designed Questionnaire	1754	Not stated
25 Oshodi et al. (2012)	NS	CS	Problematic internet usage and psychological distress	Internet Addiction Scale (IAS)	192	C & P
26 Tamunosiki et al. (2017)	NS	CS	Depression	NS	352	C

NB

NS: Not stated; CS: cross-sectional study; PS: prospective study; C: clinical students; P: preclinical students.

Table 2. Mental Conditions, coping mechanisms and studies that addressed them among medical students in Nigeria.

		Number of studies	References
1	Psychological distress	7	Omokhodion (2003), Oku et al. (2015),Yussuf et al. (2013), Issa et al. (2010), Omigbodun, Omigbodun, et al. (2006), Omokhodion and Gureje (2003), Babalola et al. (2014)
2	Anxiety disorders	4	Abiola et al. (2015), Coker et al. (2018), Ogunsemi et al. (2013), Nwoga et al. (2016)
3	Depressive disorders	5	Abiola et al. (2015), Coker et al. (2018), Ogunsemi et al. (2013), Nwobi et al. (2009), Tamunosiki et al. (2017)
4	Substance related disorder and addictive disorders	7	James et al. (2017), Makanjuola et al. (2007), Ihezue (1988a, 1988b), Babalola et al. 2014), Fawibe and Shittu (2011),Oshodi et al. (2012)
5	Sexual orientation	1	Daniyam et al. (2010)
6	Psychosomatic disorder	1	Chinawa et al. (2016)
7	Sleep disorder	2	Chinawa et al. (2014), Ohaeri et al. (1989)
8	Premenstrual dysphoric disorder	1	Issa et al. (2010)
9	Stress	4	Omigbodun, Omigbodun, et al. (2006), James et al. (2017), Omigbodun, Omigbodun, et al. (2006), Asani et al. (2016)
10	Mistreatment	1	Oku et al. (2014)
11	Coping mechanisms	6	Yussuf et al. (2013), Omigbodun, Omigbodun, et al. (2006), Makanjuola et al. (2007), Abiola et al. (2015), Nwobi et al. (2009), Oku et al. (2014)

Table 3. Risk factors shown to have a significant association with the various mental health conditions/ issues among medical students in Nigeria.

	References
1. Psychological distress	
Recent mistreatment by colleagues and trainers	Oku et al. (2015)
Financial distress*	Oku et al. (2015)
The stress of medical school training	Oku et al. (2015), Yussuf et al. (2013), Ogunsemi et al. (2013)
Spending more years in school than is normally required (e.g. > 6 years)	Ogunsemi et al. (2013)
Competing with their peers	Yussuf et al. (2013)
Inadequate learning materials	Yussuf et al. (2013)
Being a medical student (compared to other students e.g. nursing, physiotherapist students)	Omigbodun, Omigbodun, et al. (2006)
Living off campus	Omokhodion and Gureje (2003)
Poor self-perception	Omokhodion and Gureje (2003)
Substance use	Babalola et al. (2014)
Lack of someone to talk to	Ogunsemi et al. (2013)
2. Stress (Perceived stress)	
Female gender	James et al. (2017)
Weak adherence to religious faith	James et al. (2017)
Anxiety symptoms	James et al. (2017)
Problematic alcohol use	James et al. (2017)
Choice of medicine as a career was influenced by parents	James et al. (2017)
Financial distress*	James et al. (2017)
Depressive symptoms	
Type of posting (Medicine, pathology paediatric more stressful compared to obstetrics and gynaecology)	Asani et al. (2016)
Overcrowded accommodation	Omigbodun, Omigbodun, et al. (2006)
Noisy living environment	Omigbodun, Omigbodun, et al. (2006)
Fear of rapists (males terrorising at night)	Omigbodun, Omigbodun, et al. (2006)
Other transportation problems (fuel scarcity)	Omigbodun, Omigbodun, et al. (2006)
Prolonged frequent strikes by faculty	Omigbodun, Omigbodun, et al. (2006)
Excessive school work	Omigbodun, Omigbodun, et al. (2006)
Congested classrooms	Omigbodun, Omigbodun, et al. (2006)
Lack of/too short holiday periods	Omigbodun, Omigbodun, et al. (2006)
3. Substance-related and addictive disorders	
Perceived stress	James et al. (2017)
Male gender	Makanjuola et al. (2007), Ihezue (1988a), Babalola et al. (2014)
Living alone	Makanjuola et al. (2007)
The stress of medical school training	Makanjuola et al. (2007)
Being a clinical student (Compared to being in preclinical school)	Makanjuola et al. (2007)
Age > 25 years	Makanjuola et al. (2007)
Decreased religious activity	Makanjuola et al. (2007), Babalola et al. (2014)
Poor mental health	Makanjuola et al. (2007)
High GHQ score	Babalola et al. (2014)
Poor performance in examinations	Ihezue (1988a)
Psychoactive substance use among friends and peers	Ihezue (1988a)
Low socioeconomic status	Ihezue (1988a)

(*continued*)

Table 3. Continued.

	References
4. Anxiety disorders	
Being a medical student (Compared to others e.g. nursing students)	Abiola et al. (2015)
Lack of someone to talk to	Ogunsemi et al. (2013)
5. Depressive disorders	Nwobi et al. (2009)
Failure in MBBS examinations	Nwobi et al. (2009)
Frequent rescheduling of lectures	Nwobi et al. (2009)
Long distance from hostel to lecture rooms	Nwobi et al. (2009)
Spending more years in school than is normally required (e.g. > 6 years)	Nwobi et al. (2009)
Inadequate accommodation	Nwobi et al. (2009)
Lecturers' attitudes	Nwobi et al. (2009)
Financial distress*	Nwobi et al. (2009)
Frequent examinations and tests	Nwobi et al. (2009)
The parental expectation of the medical student	Nwobi et al. (2009)
Dual roles	Nwobi et al. (2009)
Poor relation with parents	Nwobi et al. (2009)
Lack of someone to talk to	Ogunsemi et al. (2013)
6. Mistreatment	
Being a clinical student	Oku et al. (2014)
Age > 25 years	Oku et al. (2014)
7. Internet addiction	
Forms online relationships	Oshodi et al. (2012)
Checks email first in the morning	Oshodi et al. (2012)
Uses the internet to block disturbing thoughts	Oshodi et al. (2012)
Always says 'a few more minutes' when online	Oshodi et al. (2012)
8. Post Traumatic Stress Disorder (PTSD)	
Previous childhood trauma	Nwoga et al. (2016)
9. Somatic symptom and related disorder	*No risk factor identified
10. Sexual orientation	*No risk factor identified
11. Sleep-wake disorders parasomnias	*No risk factor identified
NB	

*No risk factor identified: means that the reports on these disorders did not identify any statistically significant risk factor associated with the disorder or the authors did not explore for risk factors.

Table 4. Current use of psychoactive substance use among medical students in Nigeria.

References	Makanjuola et al. (2007)	Babalola et al. (2014)	Ihezue (1988b)	James et al. (2017)	Ihezue (1988a)	Fawibe and Shittu (2011)
Psychoactive substance						
Any substance	40.4	58.4	N	N	N	N
Tobacco	3.2	13.0	N	N	N	5.7
Alcohol	13.6	57.7	N	N	66.7	N
Cannabis	0.6	4.5	N	N	N	N
Cocaine	0	0.8	N	N	N	N
Mild stimulant	33.3	14.6	N	N	N	N
Strong stimulant	0.7	N	N	N	N	N
Tranquilizer	N	4.5	N	N	N	N
Sedative	7.3	1.2	N	N	N	N
Anabolic steroid	0.4	N	N	N	N	N
Heroin	0	0.4	N	N	N	N
Sniffing agents	0.7	N	N	N	N	N
NB						

N: No data available.

Substance-related and addictive disorders (including internet addiction)

The lifetime prevalence estimate of any psychoactive substance use among medical students ranged from 56% (Ihezue, 1988b) to 78% (Makanjuola, Daramola, & Obembe, 2007). The prevalence of the current use of any psychoactive substance was between 40.4–58.4% with a pooled estimate of 44.2%. With regards to current use, the most frequently used substances were alcohol, mild stimulants, tobacco and sedatives. The use of heroin, cocaine and anabolic steroids was rare (Table 4). Most of the users of these substances reported using them only monthly without any evidence of dependence (Ihezue, 1988b; Makanjuola et al., 2007).

Substance use was associated with gender, reduced frequency of participation in religious activities and the severity of psychological distress (Babalola, Akinhanmi, & Ogunwale, 2014). The prevalence of substance use was highest among the fourth and final year students (Ihezue, 1988b).

A study showed that up to 28% of medical students met the criteria for lifetime abuse of substances (Ihezue, 1988b). The substances most commonly

abused in decreasing order of frequency were alcohol, minor tranquillizers, tobacco and opioids (particularly codeine) (Ihezue, 1988b). A study indicated that the majority of the students were occasional abusers of psychoactive substances with no evidence of physical dependence (Ihezue, 1988b). Of the numerous factors identified as being associated with substance abuse (Table 3), more studies reported the male gender and decreased religious activity as risk factors for substance-related disorders than any other factor.

Internet addiction

Internet addiction was reported in one study. Using the Internet Addiction Scale (IAS), 29.2% of the students had occasional problematic internet use, while 4.7% had significant problematic internet use symptoms (Oshodi et al., 2012). Factors associated with problematic internet use included forming online relationships, checking email first thing in the morning, using the internet to block disturbing thoughts and wanting to spend more time when online (Table 3).

Premenstrual Dysphoric Disorder (PMDD)

A study that aimed at estimating the prevalence and factors, associated with PMDD among medical students in a university in the north-central state of Nigeria found that 36.1% of the respondents met the criteria for the diagnosis of PMDD.

Abuse/mistreatment

One study assessed the prevalence and patterns of mistreatment experienced by medical students. Over a third (35.5%) of all respondents had experienced one or more forms of mistreatment during their training. The most common form of mistreatment experienced was verbal abuse (52.5%). The main perpetrators of such mistreatment were the faculties/medical consultants. Being a clinical student (compared to being a preclinical student) and age above 25 years were significantly associated with experiencing such mistreatment (Table 3).

Somatic symptom disorder

A study assessed for the presence of somatization among medical students. The prevalence of psychosomatic disorder was 14.3%. No risk factors were significantly associated with somatization (Chinawa et al., 2016) Table 3.

Post Traumatic Stress Disorder (PTSD)

One study that aimed to determine the prevalence and correlates of PTSD among medical students, using the PTSD Checklist-Civilian Version found a prevalence of PTSD of 23.5%. Previous childhood trauma was significantly associated with having PTSD (Table 3).

Sexual orientation

Sexual practices of medical students were investigated in one study, 62% of the respondents had never had sex before, less than 30% of them were sexually active and homosexuality was present in 1.9% (Daniyam, Agaba, & Agaba, 2010).

Sleep

Only one study described sleep practices among undergraduate medical students. The average number of hours of night sleep on a weekday and weekend was six and seven hours respectively. There was a significant correlation between the number of hours of sleep and the use of caffeine. About 11.3% of the respondents experienced unusual sleep practices such as sleepwalking, sleep talking and night terrors(Chinawa, Chukwu, & Obu, 2014). Another study investigated the pattern of isolated sleep paralysis among Nigerian medical students. Isolated sleep paralysis was found in 26.1% of the respondents. Of the respondents with sleep paralysis, 32.6% had hypnapompic/hypnagogic hallucinations during the episode mainly visual (Ohaeri, Odejide, Ikuesan, & Adeyemi, 1989).

Suicide

No studies on suicidal thoughts, suicidal plans or suicidal acts from Nigeria were identified in our systematic review.

Risk factors associated with the various mental health conditions/issues among medical students in Nigeria

Table 3 shows a breakdown of the factors associated with mental health conditions after significant testing. Some risk factors cut across many disorders and mental health conditions. Particularly, financial distress was associated with psychological distress, perceived stress and depressive disorders. Similarly, the stress of medical school training was associated with psychological distress, substance-related disorders and anxiety disorder.

Coping mechanism

The issues related to coping were addressed by six studies (Table 2). The issues addressed included psychological distress, depression, mistreatment/abuse and psychoactive substance use.

Yussuf et al. showed that psychological distress was significantly more likely to prompt the use of 'religion and self-blame as coping strategies and less likely to cause the use of 'positive reframing' as a coping strategy (Yussuf et al., 2013). Another study indicated that not being a Pentecostal Christian was associated with psychological distress (Omigbodun, Omigbodun, & Odukogbe, 2006). Furthermore, a study indicated that there is an inverse relationship between psychoactive substance use and religiosity (Makanjuola et al., 2007)

Regarding depression, Nwobi et al revealed that 25% coped passively, 25% talked to friends or classmates, 23.9% discussed it with their parents or guardians while 17.1% talked to a priest, 11.5% resorted to alcohol and 4.7% to smoking or use of stimulants. Only 2.1% sought medical advice (Nwobi et al., 2009). The students who reported mistreatment or abuse stated that their medical school did not have effective stress coping mechanisms for the students and therefore could not help them deal effectively with stress (Oku, Owoaje, Oku, & Monjok, 2014).

Also, a study indicated that medical students seem to have poorer resilience compared to their counterparts in physiotherapy. The authors suggested that this may account for the high prevalence of psychological distress among the medical students compared to physiotherapy students (Abiola et al., 2015).

Discussion

This systematic review of 26 studies involving 10,421 medical students showed that a high proportion of Nigerian medical students suffer from various psychiatric disorders and mental health conditions. Psychological distress was present in 25.2%. of the students, perceived stress in 60.5%, depression in 33.5% and anxiety in 28.8%. The current use of at least one psychoactive substance was present in up to 44.2% while over a third (35.5%) of all respondents had experienced one or more forms of mistreatment during their training as medical students. We found no reports on suicidality.

There are several caveats to interpreting our findings. First, many of the articles that were examined in this review were of particularly low quality, mainly because of issues with design and reporting. Second, most of the reports in the review were from screening instruments and rating scales rather than validated diagnostic instruments. The prevalence estimates may have been lower if diagnostic instruments had been used. Also, although globally, medical students generally face lots of challenges, the medical student in Nigeria faces additional peculiar contemporary socioeconomic problems which can have a direct impact on their mental health and wellbeing. These problems include poverty, terrorism, armed robbery, juvenile delinquency, drug abuse, kidnapping, cultism, tribalism, crime-prone-films, as well as poor infrastructure (inadequate electricity supply, poor road network within the country, etc.) (George & Ukpong, 2013). These may increase the prevalence of psychiatric disorders in any population.

Despite these caveats, many of our findings are worthy of note. Our results support those from other parts of the globe underscoring the high prevalence of mental disorders among medical students (Dyrbye et al., 2006; James et al., 2017; Makanjuola et al., 2007; Pacheco et al., 2017). The fact that the prevalence of psychiatric disorders is still as high as presented in this report supports the assertion by Slavin (2016) that mental health problems among medical students typically have not been taken as seriously as physical problems and that treatment has largely been embraced over prevention (Slavin, 2016). Reports of high psychiatric morbidity among medical students have been reported as early as 1936 (Slavin, 2016) yet the current status in Nigeria still shows high prevalence estimates of psychiatric disorders among medical students. A pointer to the fact that little has been done to reduce this burden.

Psychological distress had a pooled prevalence of 25.2%. The present report on psychological distress builds on earlier studies from Nigeria demonstrating a high prevalence of psychological distress among resident doctors. In the earlier report among resident doctors, there was evidence of psychological distress in 48.4% of doctors interviewed (Esan et al., 2014). This suggests that psychological distress is not restricted to medical students but affects other levels of medical training (Rotenstein et al., 2016), and maybe worse with higher levels of medical educational attainment.

In keeping with existing systematic reviews showing a range of 12.2–96.7% perceived stress amongst medical students, the medical students in Nigeria showed high levels of perceived stress. The pooled prevalence of perceived stress in the current review was 60.5%. The risk factors that were significantly associated with perceived stress are listed in Table 3. They include

spending more years in school than is normally required (due to industrial action by teaching staff etc), inadequate learning materials, living off-campus, and poor self-perception. Such risk factors constitute potentially modifiable factors that can be harnessed to reduce the effects of stress on these students.

The reported prevalence estimate of depression in the present review ranged from 4% to 61.9%. Existing studies indicate that the global prevalence estimate of depression for medical students is 6.0–66.5% (Hope & Henderson, 2014). Our result is similar to this global picture, supporting the evidence of high levels of depression among medical students. A community survey in Nigeria conducted using the Structured Clinical Interview for DSM IV (SCID-IV) for assessment of clinical depression, put the prevalence of depression among adults at 5.2% (Amoran, Lawoyin, & Lasebikan, 2007). Expectedly, this is lower than the pooled estimate in the current review since studies have shown that medical students have a higher prevalence of depression than the corresponding general population. However, the more important point is that SCID is a validated diagnostic instrument. Hence, it would generate diagnoses based on the Diagnostic and Statistical Manual of Mental Disorders (DSM), not symptoms or symptom scores. Therefore, even though we expect medical students to have a higher prevalence of depression than the corresponding general population based on existing reports, (Dyrbye et al., 2014), the true prevalence of depression amongst medical students in Nigeria would likely be lower than the 33.5% we have reported, if diagnostic instruments were used. Nevertheless, these figures are high and fall within the global prevalence of depression among medical students.

The prevalence of anxiety among medical students was 28.8%. Our review suggests that a higher level of anxiety is associated with being a medical student compared to being a student of an allied profession (e.g. nursing or physiotherapy). A lack of someone to talk to was also associated with anxiety among the medical students.

There were similarities in the types of substances used amongst medical students in Nigeria and the global pattern of use among medical students (Roncero et al., 2015). The most frequently used substances in Nigeria were alcohol, mild stimulants, tobacco and sedatives (Babalola et al., 2014; Makanjuola et al., 2007). This mirrors the global picture in existing literature, that is, alcohol (24%), tobacco (17.2%) and cannabis (11.8%) (Roncero et al., 2015). In our review heroin, cocaine and anabolic steroid use were rare in keeping with the global picture of low opiate and cocaine use among medical students. Additionally, in keeping with the global pattern, the use of substances among medical students in Nigeria was more common among men than women (Roncero et al., 2015).

No study on suicide among Nigerian medical students was identified in our systematic review, despite the anecdotal reports. Existing studies suggest that medical students are at high risk for suicidal ideation (Rotenstein et al., 2016). In a systematic review, the summary estimate of the prevalence of suicidal ideation was 11.1% (Rotenstein et al., 2016). In keeping with global trends, suicide behaviour is likely to be a major problem among medical students in Nigeria. The lack of studies on suicidality among medical students in Nigeria is a gap that needs to be filled with research and appropriate intervention.

Coping mechanisms

The commonest coping mechanism found in this review was the use of religion. Religion was related to less psychological distress and reduced use of psychoactive substance use. The importance of spirituality and religion in mental health and as a means of coping with stress is well established (Goncalves et al., 2018; Nejat, Whitehead, & Crowe, 2017). Religiosity and spirituality are important in providing an increased experience of connectedness to the moment, to self, to others, to nature, bringing a person into contact with the divine and having a sense of purpose in life. These experiences are all associated with higher resistance to stressful situations (Krageloh, Henning, Billington, & Hawken, 2015; Krok, 2015; Moutinho et al., 2017). In medical students, reduced meaning in life and hope have been shown to be one of the strongest indicators of psychological distress (Krageloh et al., 2015) and having a belief system has been shown to assist the medical student in coping with the academic learning environment (Henning et al., 2015). Consequently, religion/spirituality may be an overlooked free resource that can help with coping with the stresses of medical school in Nigeria.

Another coping mechanism found in this review that can be harnessed to improve mental health is 'positive reframing'. Positive Reframing is a type of active coping strategy that helps an individual to view the other person's motives and behaviours in a more positive light. It is negatively correlated with psychological distress (Ong, Ibrahim, & Wahab, 2016; Singh, Prakash, Das, & Srivastava, 2016). In the current

review, it was reported to be associated with psychological distress and can be harnessed to improve the mental and wellbeing of medical students.

A third coping strategy is resilience. Resilience is the ability to bounce back from stressful circumstances- adversity, trauma, tragedy, threats or significant sources of stress. Enhancing resilience can help promote well-being and prevent psychological distress among medical students. Strategies that may increase resilience include psychosocial support, social activities, mentorship and intellectual stimulation (Dunn, Moutier, Green Hammond, Lehrmann, & Roberts, 2008). Workshops, training sessions, lectures can be organized by medical school authorities to boost resilience in medical students.

Limitations

This study has important limitations. First, most of the studies in the current review were single-centred and cross-sectional in design. Cross-sectional studies are not suitable for making causal inferences. Second, there was a lack of uniformity in the assessment tools and for many of the mental disorders, the 'mental condition' was not well defined in the eligible studies. For instance, it was not clear whether the diagnosis was made, according to DSM-IV, or ICD 9 criteria or other diagnostic classification systems in several situations.

Third, most of the eligible studies used rating scales rather than diagnostic instruments for diagnosis. Furthermore, different cut-off values for diagnosing these mental health conditions were adopted resulting in heterogeneous prevalence estimates. Multicenter, prospective studies using single validated diagnostic instruments for the various mental health conditions could be a solution to this limitation in future studies.

Fourth, the studies used in the systematic review used different time frames, different school environments (Nigeria has six geopolitical zones with diverse cultures, traditions and beliefs) medical school curricula and data collection methods. This could partly account for some variations in the prevalence estimates observed.

Conclusions

This review, taking into consideration the aforementioned limitations, suggests that medical school is a period of significant stress for a medical student in Nigeria. A large proportion of medical students in Nigeria suffer from psychological distress, perceived stress, anxiety, depression and substance-related problems. Apart from giving appropriate support to students to ensure their mental health and wellbeing, medical schools in Nigeria should optimize positive coping mechanisms such as religiosity, positive reframing and resilience to the benefit of medical students. Additional high-quality research is required to identify strategies for preventing and treating these disorders in this population.

Disclosure statement

No potential conflict of interest was reported by the authors.

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