

# Prevalence And Factors Associated With Depression Among Medical Students In Africa; A Systematic Review Study

**Stewart Ndutard Ngasa** (✉ [stewart.ndutard3@gmail.com](mailto:stewart.ndutard3@gmail.com))

Sporedata Inc <https://orcid.org/0000-0001-5954-9717>

**Carlson Babila Sama**

BAMBALANG Health District

**Bonoventure Suiru Dzekem**

Chicago Public Schools

**Neh Chang**

University of Buea Faculty of Health Sciences

**Maxime Tindong**

"Universite Libre de Bruxelles"

**Kilton Nforchu Neba**

"Universite Libre de Bruxelles"

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## Research article

**Keywords:** Depression, depressive symptoms, medical students and Africa

**Posted Date:** March 3rd, 2020

**DOI:** <https://doi.org/10.21203/rs.3.rs-15820/v1>

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## Abstract

**Background:** Depression in its severe form can lead to suicide. In Africa, a couple of studies have been carried to evaluate depression in medical students. These studies have provided variable findings on the prevalence of depression in medical students and associated factors. Given the considerable variability and somewhat controversial findings in the different studies, there is a need for a systematic review study to critically appraise the existing literature.

**Methods:** This was a systematic review of studies published between January 1, 2000, and December 31, 2019 in the selected databases. We used Medical Subject Headings (MeSH) combining relevant keywords to search the databases.

**Results:** Data was extracted from 4 studies included in this review involving a total number of 1848 medical students. The prevalence of depressive symptoms range from 23.3 to 76.5% and major depression was reported in 15.6% and 30.6% of participants in 2 studies. Female gender and being a student in higher level of studies were significantly associated with depression in all included studies. Other factors associated with higher levels of depression included smoking, alcohol consumption, being unmarried, major life events, presence of other mental health condition and the presence of chronic medical condition.

**Conclusion:** Despite paucity of research on depression among medical students in Africa, this review shows that depressive symptoms are common and associated with a number of socioeconomic factors. Being a female student and/or higher level of medical education is associated with depression. There is need for more robust studies to evaluate the impact of depression on medical students.

## Background

Depression is a chronic medical condition characterised by lack of interest, decrease energy and absence of pleasure, feeling of guilt, low self-worth, insomnia and poor concentration<sup>1</sup>. This condition affects more than 300 million people worldwide and thus a major contributor to global disease burden<sup>2</sup>. Depressive symptoms are common among individuals of all walks of life and thus health professionals are not exempted. In university medical students, previous systematic reviews have shown that the prevalence of depression is 6-66.5% in North America<sup>3</sup>, while a more global systematic review and meta-analysis study reported a prevalence of 27.2%<sup>4</sup>. In Africa, there is still a paucity of data on depression among medical students and worse still; no systematic review study has been done to culminate evidence from different studies done in Africa. Many factors have been found to be associated with depression worldwide including stress. The prevalence of stress among medical student is 25–90% and has been demonstrated to be an important determinant of depression<sup>5,6</sup>. Stress contributes to a higher prevalence of depression among medical students than the general population. Other factors demonstrated to be associated with depression include the presence of chronic medical conditions, alcohol consumption, level of study and smoking<sup>4</sup>.

Depression in medical students can lead to a number of adverse outcomes. These outcomes range from impairment of functioning in the classroom to stress-induced disorders and deteriorating clinical performance. In the worst-case scenario, depression can lead suicide. Literature has reported higher rates of suicide in medical professionals than the general population<sup>7</sup>. This is especially true among female medical students and professionals<sup>8</sup>. Due to the effect of depression on the later professional life of medical students, it is important it is identified during medical training and appropriately managed. A systematic review will provide more evidence of the diverse factors associated with depression.

In Africa, a couple of studies have been carried to evaluate depression in medical students. These studies were carried out among medical students from diverse socio-demographic backgrounds. Given the considerable variability and somewhat controversial findings in the different studies, there is a need for a systematic review study to critically appraise existing literature to determine the prevalence of depression in medical students in Africa, its associated factors in different sub-regions in Africa.

### Review questions

This 19 year (2000–2019) systematic review study was done to answer the following questions:

1. What is the prevalence of depression in medical students in Africa?
2. What are the associated factors of depression in medical students in Africa?

## Methods

This study is reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P) 2015 Guidelines<sup>9</sup>.

### Inclusion criteria

**Study designs and participants:** observational studies (cross-sectional, case-control and cohort studies) on the prevalence of depression and its associated factors in medical students in Africa.

We included studies published between January 1, 2000, and December 31, 2019 in the selected databases. No language restrictions were applied and study with duplicate results of the same study, only the most comprehensive and up-to-date version was considered.

### Exclusion criteria

We excluded all interventional studies carried on depression in medical students. We also excluded unpublished manuscripts and conference abstracts as well as editorials and reviews letters to editors.

## Search strategy and identification of studies

### Primary database search

We used Medical Subject Headings (MeSH) combining relevant keywords with names of countries in Africa to search PubMed/MEDLINE for eligible studies. If the name of a country has changed, both names will be included in the search. Key words included in the search included: depression, depressive symptoms, medical students and Africa. Other databases included in the searches include: Excerpta Medica Database (EMBASE) and PsycINFO. Articles returned by the search will be saved to the Mendeley software. Duplicates were highlighted and taken out from the list of potential studies. The retained articles were reviewed for eligibility by going through the abstracts. The full articles were then accessed via PubMed or the corresponding journal's site. The reference lists of all eligible research articles were scrutinised for additional potentially relevant articles.

### Data management and Screening

After de-duplication of records by Mendeley software, a standardised pretested questionnaire containing inclusion and exclusion criteria was drafted to orient the screening of titles and abstracts. The full texts of all potentially eligible studies were rigorously reviewed using the pretested questionnaire. A PRISMA flowchart was generated to reflect the entire review process and also detailing potentially eligible studies which were excluded. Six articles were assessed for eligibility, 4 studies were retained. The two excluded studies were experimental studies which were Randomised control trials.

### Data extraction and items

A data extraction sheet was produced on Microsoft Excel spread sheet. Data from the different selected studies included were then be extracted. The following items were extracted from the selected studies: authors, year of study, year of publication and journal, country where study was conducted, geographical region, language of publication, study design and setting (country), duration of study, sample size, objectives, mean/median age of participants, age range of participants, level of student (clinical and preclinical), gender distribution. Other factors of social/personal life were collected including: gender, the presence of a chronic disease, level of alcohol consumption, smoking, marital status, monthly income. Finally information on associations ( $X^2$ , ORs, RR, CIs and p values) between depression and these factors was collected when available. The STROBE checklist<sup>10</sup> for observational studies was used to evaluate the quality of reporting each paper reviewed. All studies were reported with following the STROBE guidelines except for the earliest study carried out in Nigeria in 2008<sup>11</sup>. The risk of bias in each study was evaluated using the Risk of Bias Tool for Prevalence Studies developed by Hoy and collaborators<sup>12</sup>. GRADE score was not used for assessment of quality of evidence for this particular review study<sup>13</sup>.

## Results

Data was extracted from 4 studies included in this review involving a total number of 1848 medical students. The number of participants included per study range from 230 to 700 participants. Studies were carried out in four different countries (Egypt, Cameroon, South Africa and Nigeria) and seven different medical faculties. When assessing bias, the study carried out by Anuebue and colleague had a high risk of bias, while that of Narushni and colleague was found to have moderate risk and the latest studies done by Ngasa et al and Mohammed et al were judge to have low risk of bias (Table 1).

**Table 1: Evaluation of risk of bias for all included studies**

	1. Target population representation of national population?	2. Sampling frame representation of target population?	3. Was selection random?	4. Likelihood of non-participation bias minimal?	5. Were data collected directly from the subjects?	6. Case definition acceptable?	7. A valid tool used for measurement of outcome?	8. Same mode of data collection for all subjects?	9. Was the length of the shortest prevalence period for the parameter of interest appropriate?	10. Were the numerator(s) and denominator(s) for the calculation of the prevalence depression appropriate?	Risk of Bias
Aniebue 2008 <sup>11</sup>	+	+	+	+	+	+	+	+	+	+	High risk
Narushni 2016 <sup>14</sup>	+	+	+	+	+	+	+	+	+	+	Moderate risk
Mohammed 2017 <sup>15</sup>	+	+	+	+	+	+	+	+	+	+	Low risk
Ngasa 2017 <sup>16</sup>	+	+	+	+	+	+	+	+	+	+	Low risk

We excluded 2 studies which were interventional in nature. A variety of methods were used to diagnose depression and assess the degree of depressive symptoms. All studies used self-rating questionnaires for the diagnosis of depression. Two (02) studies used the Zung Self Rating Depression Scale, one study uses the DASS 21 self-reporting questionnaire and a final study used the PHQ-9 questionnaire for diagnosis of depression and depressive symptoms. The prevalence of depressive symptoms range from 23.3 to 76.5% and major depression was reported in 15.6% and 30.6% of participants in 2 studies of the included studies (Table 2).

Female gender and being a student in higher level of studies were significantly associated with depression in all included studies. Other factors associated with higher levels of depression included smoking, alcohol consumption (2 of 4), being unmarried, major life events, presence of other mental condition, and visit to any traditional, complementary or alternate medical practitioner and the presence of chronic medical condition. One study reported a positive effect of spirituality on depression while 2 studies revealed that depression was not associated with academic performance.

**Table 2: Summary of main findings of included studies**

Study	Number of participants	Findings
Aniebue 2008 [18]	253	<b>Zung self-rating depression scale</b> was used to rate depression. Prevalence of depression reported at 23.3%. Higher depression scores associated with being age 16-20 years, females, those unmarried, students in their second and third year of studies. High evidence of an association between depression and smoking.
Narushni 2016 [19]	230	<b>Zung self-rating depression scale</b> was used to rate depression. Prevalence of depressive symptoms was 76.5% while the prevalence of major depressive symptoms was 15.6%. Depression was associated with lower quality of life and lower levels of spirituality. Factors significantly associated with depression include mental illness and consultation with any traditional, complementary or alternate medical practitioner (TCAMP)
Mohamed 2017 [20]	700	<b>Depression Anxiety Stress Scale (DASS 21)</b> was used to determine depression with a prevalence of 65%, 95%CI: 46.53-75.32%. Females had higher scores of subscales of DASS 21 compared to males. Students who were living in the University campus/students' residence facility had higher scores of subscales of DASS 21 compared to those who were living with their families. Those who were in the preclinical years had higher scores of subscales of DASS 21 compared to those who were in the clinical years. Those with lower academic achievement degrees (good/fair) had higher scores of subscales of DASS 21 compared to those with higher academic achievement degrees (excellent/very good).
Ngasa 2017 [21]	618	<b>9-Item-Patient Health Questionnaire (PHQ-9)</b> was used for assessment of depression. The prevalence of depression was 30.6%. The presence of a chronic disease (OR: 3.70, 95% CI: 1.72-7.94, p = 0.001), major life events (OR: 2.17, 95%CI: 1.32-3.58, P = 0.002), female gender (OR: 1.59, 95% CI: 1.06-2.37, p = 0.024) and being a student at the clinical level (OR: 4.26, 95% CI: 2.71-6.71, p < 0.001) were independently associated with depression. There was no association between depression and self-reported academic performance, (OR: 1.2, 95% CI: 0.9-1.7, p = 0.080)

## Discussion

Depression is a common condition among medical students in Africa. A number of tools have been used to diagnose depression in medical students. Despite having different degrees of validity and reliability in the diagnosis of depression in similar population<sup>17-19</sup>, these tools have revealed a consistently high prevalence of depression in the different included studies. The later studies<sup>14-16</sup> reported much higher prevalence of depression compared to the very first study carried out in Nigeria<sup>11</sup>. The later studies (Mohammed et 2017 and Ngasa et al 2017) also used much larger sample size and these studies employed a sample size calculation unlike the first study. The models used in these studies were developed in samples large enough to be reliable. Other large scale studies in a systematic review done in North American students demonstrated a similar upper limit but a much lower limit for the prevalence of depression (6.0-66.5%)<sup>3</sup>. In Europe, studies have reported much lower range of the prevalence of depression (21.5 to 12.7%)<sup>20</sup>.

Several factors were found to be associated with higher levels of depression in medical students. This include female gender, being a student at a higher level of study, evidence of chronic medical condition, history of other mental illnesses, alcohol consumption, cigarette smoking, being single or unmarried and consultation with traditional, complimentary or alternate medical practitioner. Similar findings have been reported in other systematic review studies<sup>21</sup>. One particular point of interest in many studies in the past is to find the impact of depression on academic performance. In this review 2 studies did not find any association between depression and academic performance<sup>15,16</sup>. This finding is in total contrast with previous studies where depressed students had higher risk of academic problems<sup>22,23</sup>.

Generally the statistical analyses carried out in the included studies were satisfactory however only three studies gave details of the approach of the multivariate analysis used. The different studies included different factors (variables) in the multivariate analysis models<sup>14-16</sup>. A few basic problems were however identified in the statistical methods used to produce the models these studies. The study by Ngasa and collaborators did not mention which variable they controlled for in their logistic model for the relationship between depression and academic performance<sup>16</sup>. The studies Mohammed and colleagues controlled only for age in multivariate analysis<sup>15</sup>. All included studies used a p value cut off of 0.05 for statistical significance. This is no longer recommended, and it's better to present p value as a spectrum of evidence rather than a binary significant or non-significant metric<sup>24</sup>.

The main limitation of this study stems from the fact that the relevant studies included in the review used a wide variety of instruments to assess depression. This made it difficult to carry out an efficient comparison between the different included studies.

## Conclusion

Irrespective of the tool used to assess depression or the geographical location, our analysis demonstrated that depression was generally high among medical students in Africa. This review shows that depressive symptoms are common and associated with a number of socioeconomic factors. Being a female student and/or higher level of medical education is associated with higher degree of depression. We therefore make the following recommendations:

- We recommend large scale RCTs to generate more evidence of the link between depression and its associated factors as there was generally high risk of bias in the included studies.
- Particular attention should be paid to female medical students as almost all studies revealed higher prevalence than in the male counterparts.
- Emphasis should be placed on preventing medical students from smoking cigarettes or consuming alcohol. These factors were reported in most studies to be associated with depression.

## Abbreviations

EMBASE: Excerpta Medica Database

DASS: Depression Anxiety Stress Scale

MeSH: Medical Subject Headings

PHQ-9: 9-Item-Patient Health Questionnaire

PRISMA-P: Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols

RCT: Randomised Control Trials

STROBE: Strengthening the Reporting of Observational Studies in Epidemiology

## Declarations

### Ethics approval and consent to participate

Not applicable

### Consent to Publish

Not applicable

### Availability of data and materials

Not applicable

### Competing interests

The authors declare no competing interests.

### Funding

No external funding sources were used to carry out this study

### Authors' contributions

SNN study protocol, analysis of data, and write up of article. CBS, NC, BSD, KNN, DA and MT analyzed data and contributed in write-up of the different sections of the manuscript. All authors read and approved the final manuscript.

### Acknowledgements

The efforts of Pride Yanu and Wise Nzokie in editing the language of this write-up are commendable.

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## Figures

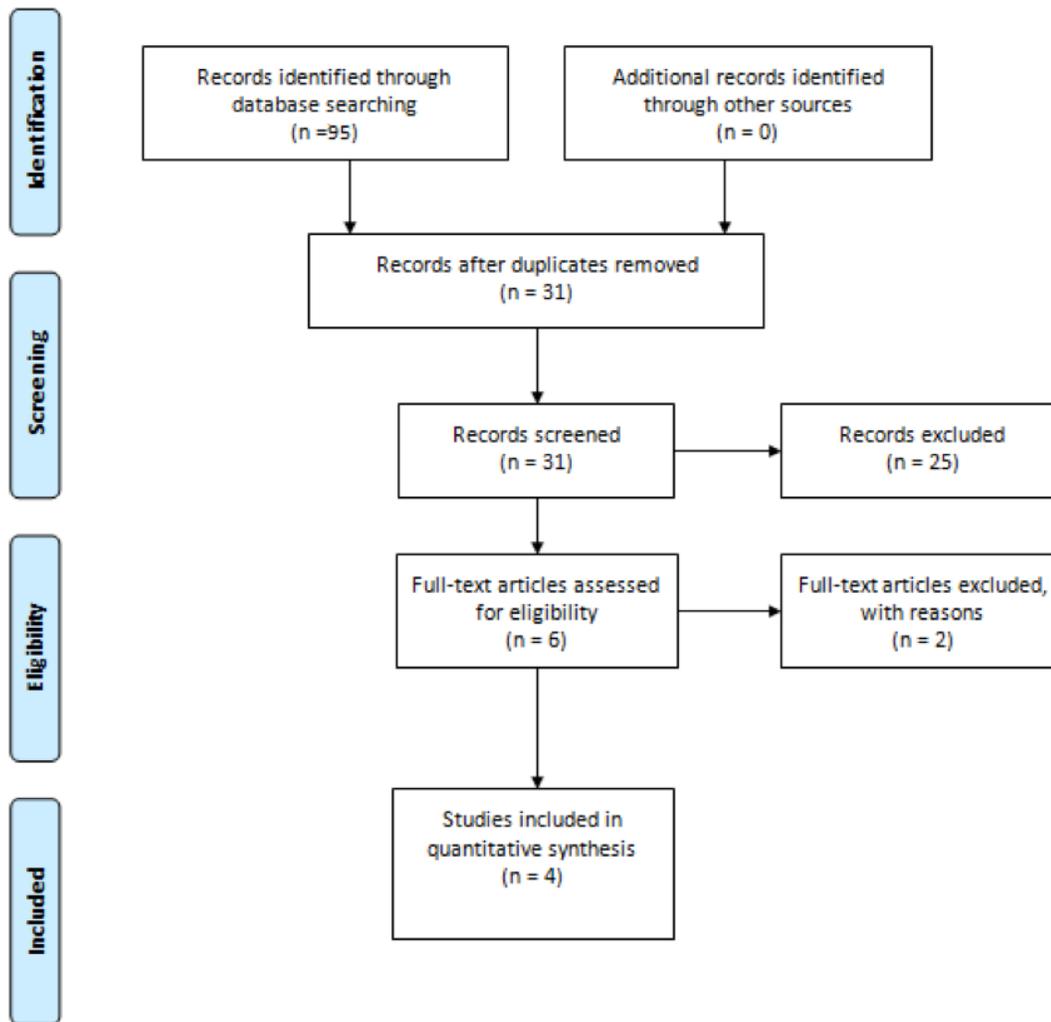


Figure 1

PRISMA Flow Chart

## Supplementary Files

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