

Mental Distress among Medical Students in Khartoum, Sudan 2022

Sara Hassan Mustafa^{1,2*}, Elsir Abdelmutaal Mohammed², Salma Taha Makkawi²,
Yassin Youssif Mohammed³

¹Alnazir for Research and Consulting, Khartoum, Sudan

²Preventive Medicine Residency Program in Riyadh, Riyadh, Saudi Arabia

³Sawed Watanya Charity, Khartoum, Sudan

Email: *hsarra@gmail.com

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Abstract

Background: Young adults in Sudan face numerous challenges that make it difficult for them to maintain their mental health. Due to the academic workload and performance expectations, medical students suffer from a high prevalence of mental distress. **Objectives:** to estimate the prevalence of mental distress among medical students and determine the associated factors. **Methods:** a cross-sectional survey was conducted among medical students in Khartoum, Sudan, using an electronic questionnaire. Mental distress was screened in the period from June 19 to July 30, 2022, using the self-reporting questionnaire (SRQ-20). Descriptive statistics in the form of frequencies and percentages were used to display data. Odds ratios (ORs) with a 95% confidence interval were estimated using univariate and multivariate logistic regression analysis to determine associations between mental distress and related factors. **Results:** A total of 432 valid responses were received with a mean age of 20.37. The Overall prevalence of mental distress (SRQ-20 > 8) in medical students was 241 (55.8%). The prevalence was significantly associated with gender (P-Value > 0.001), type of university (P-Value = 0.001), academic level of education (P-Value = 0.026), and family history of mental illness (P-value = 0.001). **Conclusion:** More than half of the medical students who were screened for mental distress had mental distress. Higher odds are associated with being a female student, attending a private university, studying at a higher academic level, and having a family history of mental illness. This study recommends a review of the academic processes and implementing institutional preventive strategies that target at-risk groups.

Keywords

Mental Distress, University Students, Self Reporting Questionnaire (SRQ),

1. Introduction

Mental health problems among university students have become a public health concern [1]. University students frequently report symptoms of loss of interest, lack of sleep, loss of appetite, frequent headaches, and constant fatigue [2] [3]. Serious illnesses such as anxiety and depression with suicidal tendencies are also commonly reported [4]. Medical students are at higher risk due to factors related to excessive academic workload and exposure to patient suffering and death. Medical students are confronted with academic and performance pressure in addition to planning for an unpredictable professional future [5].

Medical students in Sudan face additional mental health challenges. The Covid-19 pandemic hit Sudan amid a long-standing socio-political dilemma. Young people, including university students, were affected by these instabilities. They suffered from a severe economic crisis in addition to political, social, and health changes. The available information suggests that the prevalence of depression among Sudanese medical students is higher than in other developing countries. A study at the University of Khartoum found that 56% of medical students suffer from psychiatric morbidity [6]. This is compared to mental distress prevalence of 30%, 15%, and 32.2% in Ethiopia, India, and Indonesia, respectively [7] [8] [9]. Other problems, such as substance abuse, are rapidly increasing in Sudan [10]. Medical students suffered constant pressure related to socio-political instability, uncertainty due to prolonged and repeated college closures, and the deteriorating economic situation in the country.

The unstable and dynamic political environment of Sudan has an impact on the mental health of its citizens. Medical students in Khartoum are finding it difficult to balance the demands of their academic programs with the unstable socio-political climate. This study aimed to assess the prevalence of mental distress and associated factors in medical students in Khartoum, Sudan. Our goal is to disseminate knowledge that will assist pertinent authorities in identifying and organizing actions to improve the mental health of medical students. Research is urgently required to shed light, increase authorities' understanding, and speed up preventive and control strategies for the well-being of medical students, which affects their current and future patients.

2. Methods

2.1. Study Design and Setting

This cross-sectional study has been carried out among medical students in private and public universities in Khartoum, the capital of Sudan. The number of medical colleges and schools in Khartoum is 25, with an average of 1000 students per college. An electronic questionnaire to determine the prevalence of

mental distress and associated factors were created using Google forms. The questionnaire was sent as a link in Arabic and English versions to medical students enrolled for the academic year 2021-2022. The students were in the age group of 16 years and older. The data collection period was from June 19-July 30, 2022.

The sample size was calculated with a population size assumption of 25,000, a standard normal value of 1.96 at 95% confidence interval, and 5% margin of error. To calculate the sample size, the estimated prevalence of mental distress in medical students is estimated at 56%, based on a previous study at the University of Khartoum. Using Epi info calculator, the sample size was calculated to be 373.

Convenient sampling was used by sharing the questionnaire through medical student leaders on various student social media platforms, such as Facebook, telegram, and WhatsApp for voluntary participation. The questionnaire was rolled-out in student's WhatsApp groups until it reached groups in 13 medical colleges in Khartoum. It was difficult to calculate the response rate because the exact number of students who received the questionnaire was not known (because of the format of distribution). The questionnaire was introduced by explaining the purpose of the study and the informed consent.

2.2. Study Variables

We administered two questionnaires to assess mental distress and mental health care seeking behavior. Socio-demographic characteristics of students were collected to identify relations. The original format of the Self-Reporting Questionnaire (SRQ-20) within a one-month recall period was used for mental health screening and analyzed for the purpose of this paper. The SRQ-20 was developed by the World Health Organization in 1994 and validated in low and middle-income countries by research [11] [12]. It includes 20 questions with yes/no answers. The original English version was translated to Arabic and pilot tested for validity. The cutoff point of > 8 was taken to consider mental distress.

2.3. Data Analysis

The data was cleaned up, checked, coded and entered in IBM SPSS version 21 for analysis. Descriptive statistics in the form of frequencies and percentages were used to display socio-demographic data and the prevalence of mental distress. A Chi-square test was used to compare differences in proportions between groups. A P-value less than 0.05 was considered statistically significant. Odds ratios (ORs) with a 95% confidence interval were estimated using univariate and multivariate logistic regression analysis to determine associations between mental distress and related factors. Variables in the univariate analysis that showed significant association with the dependent variable were included in the multivariate analysis. The model's fitness was checked using the Hosmer-Lemeshow test. The odds ratios (Ors) and corresponding 95% confidence intervals (95% CIs) and P-values were tabulated.

2.4. Ethics

The study was approved by Khartoum State Ethical Committee. Informed consent was obtained before proceeding with the electronic questionnaire. Participation was voluntary and anonymous.

3. Results

3.1. Socio Economic Characteristics of Respondents

A total of 432 valid responses were received. The age of the respondents ranged from 16 years to 28 years (mean age of 20.37). Most of the respondents 314 (72.7%) were females. One-third 134 (31%) were in the first level of academic enrollment and 252 (58.3%) were studying in public universities. Most of the respondents live with their families 332 (76.9%) and rely on their families for financial support 420 (97.2%). Of the total, 432 (91.2%) do not smoke. Almost all of the respondents were single 426 (98.6%) and Muslim 431 (99.8%). Family history of mental illness was found in 134 (18.8%) of the respondents. Seventy-three (16.9%) did not have pocket money at the time of data collection. The socio-demographic characteristics of respondents are summarized in **Table 1**.

3.2. Prevalence of Mental Distress among Medical Students

The overall prevalence of mental distress (SRQ-20 > 8) in medical students was 241 (55.8%) (**Table 1**). The mean SRQ-20 score was 9. The top three frequently reported symptoms were: feeling nervous, tense, or worried 273 (63.2%); being tired all the time 265 (61.3%), and daily work suffering 264 (61.1%). The least reported symptoms were having thoughts of hurting oneself 73 (16.9%); crying more than usual 141 (32%) and, hands shaking 148 (34%) (**Table 2**).

3.3. Factors Associated with Mental Distress

The prevalence of mental distress was significantly higher among female students (P -Value > 0.001), those studying in private universities (P -Value = 0.001), and those who reported a family history of mental illness (P -value = 0.001) (**Table 1**). The prevalence was lowest among first-level students and highest among third-followed by sixth-year students. The academic level of education was significantly associated with mental distress prevalence (p -value = 0.026) (**Table 1**).

No significant association was found between the prevalence of mental distress and place of residence, source of financial support, having pocket money, and smoking.

In the univariate analysis: gender, university type, academic level of education, and family history of mental illness were significantly (P -value < 0.05) associated with mental distress (**Table 3**). The multivariate analysis indicated that gender, university type (public or private), and academic level of education were the factors significantly associated (P -value < 0.05) with mental distress in this population.

Table 1. Prevalence and factors associated with mental distress among university students in Khartoum, Sudan.

Factors	(N: 432)	Mental Distress (N, %)		P-Value
		No	Yes	
Gender				
Male	118 (27.3%)	81 (68.6%)	37 (31.4%)	0.000
Female	314 (72.7%)	110 (35.0%)	204 (65.0%)	
Type of University				
Public	252 (58.3%)	128 (50.8%)	124 (49.2%)	0.001
Private	180 (41.7%)	63 (35.0%)	117 (65.0%)	
Academic level of education				
First	134 (31.0%)	75 (56.0%)	59 (44.0%)	0.026
Second	51 (11.8%)	19 (37.3%)	32 (62.7%)	
Third	92 (21.3%)	33 (35.9%)	59 (64.1%)	
Fourth	58 (13.4%)	27 (46.6%)	31 (53.4%)	
Fifth	59 (13.7%)	23 (39.0%)	36 (61.0%)	
Sixth	38 (8.8%)	14 (36.8%)	24 (63.2%)	
Place of residence				
With family	332 (76.9%)	139 (41.9%)	193 (58.1%)	0.194
In a hostel	68 (15.7%)	36 (52.9%)	32 (47.1%)	
Other	32 (7.4%)	16 (50.0%)	16 (50.0%)	
Source of financial support				
Family	420 (97.2%)	187 (44.5%)	233 (55.5%)	0.688
Self	7 (1.6%)	2 (28.6%)	5 (71.4%)	
Another source	5 (1.2%)	2 (40.0%)	3 (60.0%)	
Have pocket money				
Yes	359 (83.1%)	165 (46.0%)	194 (54.0%)	0.067
No	73 (16.9%)	26 (35.6%)	47 (64.4%)	
Smoking				
Yes	38 (8.8%)	14 (36.8%)	24 (63.2%)	0.216
No	394 (91.2%)	177 (44.9%)	217 (55.1%)	
Family history of mental illness				
Yes	134 (18.8%)	42 (31.3%)	92 (68.7%)	0.000
No	298 (69.0%)	149 (50.0%)	149 (50.0%)	
Overall Mental Distress		191 (44.2%)	241 (55.8%)	

Table 2. Distribution of mental distress symptoms among medical students.

Symptom	Yes (N, %)	No (N, %)
Do you often have headaches?	241 (55.8%)	191 (44.2%)
Is your appetite poor?	199 (46.1%)	233 (53.9%)
Do you sleep badly?	213 (49.3%)	219 (50.7%)
Are you easily frightened?	227 (52.5%)	205 (47.5%)
Do your hands shake?	148 (34.3%)	284 (65.7%)
Do you feel nervous, tense or worried?	273 (63.2%)	159 (36.8%)
Is your digestion poor?	166 (38.4%)	266 (61.6%)
Do you have trouble thinking clearly?	248 (57.4%)	184 (42.6%)
Do you feel unhappy?	242 (56.0%)	190 (44.0%)
Do you cry more than usual?	141 (32.6%)	291 (67.4%)
Do you find it difficult to enjoy your daily activities?	199 (46.1%)	233 (53.9%)
Do you find it difficult to make decisions?	250 (57.9%)	182 (42.1%)
Is your daily work suffering?	264 (61.1%)	168 (38.9%)
Are you unable to play a useful role in life?	192 (44.4%)	240 (55.6%)
Have you lost interest in things?	217 (50.2%)	215 (49.8%)
Do you feel that you are a worthless person?	152 (35.2%)	280 (64.8%)
Has any thoughts of hurting yourself been in your mind?	73 (16.9%)	359 (83.1%)
Do you feel tired all the time?	265 (61.3%)	167 (38.7%)
Do you have uncomfortable feelings in your stomach?	180 (41.7%)	252 (58.3%)
Are you easily tired?	255 (59.0%)	177 (41.0%)

4. Discussion

Young adults in complex political contexts like Sudan are vulnerable to mental health problems. Medical students are a special at-risk sub-population. Studies that compared age-matched peers from the general population to medical students found that the latter had significantly higher rates of psychological distress, mood disorders, anxiety disorders, and suicidal ideation [4].

This study was conducted among medical students in Sudan to determine the prevalence of mental distress and associated factors. The prevalence of mental distress among medical students was found to be 55.8% in the current study. This prevalence is similar to a study about minor psychiatric morbidity (56%) among medical students at Khartoum University [6]. Another study among medical students in Khartoum during Covid-19 found a high prevalence of depression (75%), anxiety (55.3%), and distress (51.8%) [13]. The two previous studies used different assessment tools than the current study (the “12-General Health Questionnaire (GHQ12)” and the “Depression, anxiety, and stress scale

Table 3. Univariate and multivariate analysis of predictors of mental distress among medical students.

Factor	Univariate Analysis			Multivariate analysis		
	Odds Ratio	95% CI	P-value	Odds Ratio	95% CI	P-value
Gender						
	0.246	0.157 - 0.387	0.000	0.209	0.129 - 0.339	0.000
Type of University						
	0.522	0.352 - 0.773	0.001	0.520	0.320 - 0.845	0.008
Academic level of education						
First			0.028			0.056
Second	0.459	0.218 - 0.964	0.040	0.695	0.295 - 1.638	0.405
Third	0.982	0.412 - 2.345	0.968	1.363	0.529 - 3.513	0.521
Fourth	1.043	0.476 - 2.286	0.916	1.507	0.629 - 3.609	0.357
Fifth	0.670	0.290 - 1.547	0.348	0.657	0.267 - 1.618	0.361
Sixth	0.913	0.394 - 2.118	0.832	1.345	0.533 - 3.397	0.530
Have pocket money						
	0.650	0.386 - 1.096	0.106			
Family History						
	1.754	1.056 - 2.913	0.030	1.511	0.862 - 2.648	0.150

(DASS21”).

The prevalence in the current study is higher as compared to studies in Indonesia, India, Ethiopia, Saudi Arabia, and Brazil [8] [9] [14] [15] [16]. This might be due to differences in assessment methodologies and the political-economic environment or variations in access to infrastructure and wellness support systems. Participants in the current study have been exposed to a complex socio-political setting manifested as a dynamic political environment, social instability, economic hardship, uncertainty, and massive trauma. There were repeated and extended college closures due to political unrest, even after the COVID-19 pandemic. This prevalence indicates the need for further evaluation to understand the underlying factors and design appropriate interventions. Awareness-raising about the problem and the initiation of tested intervention for medical students in Khartoum is needed.

A study in Brazil found a higher prevalence (60%) of mental distress in medical students than in the current study [17]. The difference could be due to using a different assessment tool (Kessler Psychological Distress Scale (K10)) or to academic, cultural and economic variation between Sudan and Brazil.

In comparison to a study conducted on university students in Ethiopia, which found “loss of interest in things” to be the most frequently reported symptom (37.60%), the top frequently reported symptom in the current study was “feeling nervous, tense, or worried” (63.2%) [18]. In the current study, “having thoughts of hurting oneself” was the least reported symptom (16.9%), in contrast to the

Ethiopian study where it was among the top three symptoms. This may be explained by the fact that nearly all of the respondents to the current study are Muslims and that religious Muslims view self harm and suicide as forbidden acts.

Gender was found to be significantly associated with mental distress in the current study. This finding is consistent with other studies in Sudan, Canada, Indonesia, and Ethiopia [4] [8] [13] [14]. Studies in the general population found that young women aged 18 - 24 years old have a higher prevalence of mental distress as compared to men in their age group [19]. The variation could be due to gender differences in experiencing and expressing mental health problems. Research showed that women tend to report internalized disorders such as depression and anxiety more than men, who tend to mask their mental health problems. Men experience more externalized disorders such as substance abuse and dependence [20]. The gender difference in the prevalence of mental distress could also be due to physiological or social factors related to the different roles of men and women in society [19]. Genders also differ in the degree of their response to mental health interventions. Good social support systems are found to be a significant protective factor against mental distress among young women [19]. Young people who report satisfaction with their social network are less likely to experience mental distress [20]. Authorities need to ensure the availability of interventions that target and are proven to be of help to female medical students, such as mental health social support systems in universities.

In the current study, the prevalence of mental distress in respondents studying in private universities was 1.92 times higher than in those in public universities. This finding is close to a study conducted in four universities in Khartoum, where the risk of anxiety was found to be 1.36 times higher in students attending private universities as compared to those in public universities [13]. The prevalence in the current study is different from a study in Bangladesh, where the prevalence of mental distress was found to be higher in public institutions [21]. The difference could be due to variations in the academic and social environments between the two settings. In Khartoum, those studying in private colleges are faced with more strict academic rules, concerns about financial payments and pressure to achieve when compared to public university students.

The prevalence of mental distress in this study was lowest in the first year (44%) and highest in the third (64%) and sixth (63%) years of study. This is consistent with a study in Canada where the rate of mental illness increased at the highest levels, with students in the transition to clinical training being more vulnerable [4]. The study reported that severe mental illness is significantly higher and mild mental distress is significantly lower in medical students in the clinical years as compared to pre-clinical students. This raises the question of whether the educational process is contributing to distress [22]. In Sudan, the third and sixth academic years are followed by high-stake promotion examinations in most of the medical curricula. The educational program, curricula, and

uncertainty about the future could be potential stressors for medical students.

The odds of mental distress increased in respondents in this study who reported a family history of mental illness. This finding is consistent with studies in Ethiopia [14]. The reasons for this association could be a genetic predisposition, lifestyle, or social environment. Awareness programs about protective factors and techniques and counseling services can be introduced in universities to minimize the risk of mental illness in students with a family history.

Limitations: Other than the limitation of using a cross-sectional design, the two main limitations are the small sample size and the convenience sampling. We recommend in future research going more in-depth to explore additional potential associated factors.

5. Conclusion

The prevalence of mental distress among medical students was found to be high. Mental distress was present in more than 5 out of every 10 students screened. Female gender, attendance at private universities, higher academic years of education, and family history of mental illness all increase the odds of experiencing mental distress. The result of this study is a call to all concerned parties to accelerate prevention and treatment strategies for mental distress among young people in Sudan. Attention should be given to medical students, being a high-risk group. More research is needed to understand the underlying factors and test prevention strategies. Awareness-raising, a review of the academic processes, and the introduction of effective university-level interventions are needed.

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Declarations

Ethical approval was obtained from the Khartoum State Ministry of Health Research Committee.

Authors' Contributions

Sara Hassan Mustafa contributed significantly to the conceptualization and design of the study, literature search, analysis and drafting of the article. Esir Abdelmutaal Mohammed, Salma Taha Makkawi and Yassin Youssif Mohammed contributed significantly to the conceptualization and design of the study, data collection and critical review of the article. All authors approved the final manuscript.

Competing Interests

The authors declare no competing interest.

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Annex: Mental Distress and Attitude of Medical Students in Sudan towards Digital Mental Health Questionnaire

This research titled “Mental Distress and Attitude of Medical Students in Sudan Towards Digital Mental Health” is conducted by Sara Hassan Mustafa and the team.

We invite you to participate in this research because you are a medical student in Sudan and you are 16 years old or older. With your participation, we expect to increase the knowledge about mental health problems to help overcome barriers to mental healthcare.

The questionnaire will take 5 - 10 minutes to fill out. There are no risks involved in participating in this research.

Your responses to this survey will be anonymous. Please do not write any identifying information in your questionnaire. Your personal information will be kept strictly confidential.

Participation in this research is of your own choosing. You can choose to participate or not.

If you have questions about this research, the participants, or your rights as a participant, you can contact the principal investigator at ktareegi@gmail.com.

Part 1: Socio-demographic information

1	University	
2	College	
3	Age (in years)	
4	Gender	1/Male 2/Female
5	Religion	1/Muslim 2/Christian 3/Other
6	Academic level of education	1/First 2/Second 3/Third 4/Fourth 5/Fifth 6/Sixth
7	Nationality	1/Sudanese 2/Non-Sudanese
8	Place of living	1/I live with my family 2/I live in a hostel 3/Other type of accommodation
9	What is the source of your financial support	1/My family 2/My self 3/Other source
10	Employment status	1/Student 2/Student with a part-time job
11	Marital status	1/Married 2/Single

Continued

12	Do you have pocket money now	1/Yes 2/No
13	Do you have a relative with a mental illness that required treatment? (Anxiety, depression... etc)	1/Yes 2/No
14	Do you smoke	1/Yes 2/No
Part 2: Mental health assessmet In the past 4 weeks, how frequently have you suffered from the following		
1	Do you often have headaches	1/Yes 2/No
2	Is your appetite poor	1/Yes 2/No
3	Do you sleep badly	1/Yes 2/No
4	Are you easily frightened	1/Yes 2/No
5	Do your hands shake	1/Yes 2/No
6	Do you feel nervous, tense or worried	1/Yes 2/No
7	Is your digestion poor	1/Yes 2/No
8	Do you have trouble thinking clearly	1/Yes 2/No
9	Do you feel unhappy	1/Yes 2/No
10	Do you cry more than usual	1/Yes 2/No
11	Do you find it difficult to enjoy yor daily activities	1/Yes 2/No
12	Do you find it difficult to make descisions	1/Yes 2/No
13	Is your daily work suffering	1/Yes 2/No
14	Are you unable to play a usefull rule in life	1/Yes 2/No

Continued

15	Have you lost interest in things	1/Yes 2/No
16	Do you feel that you are a worthless person	1/Yes 2/No
17	Do you feel tired all the time	1/Yes 2/No
18	Do you have uncomfortable feelings in your stomach	1/Yes 2/No
19	Are you easily tired	1/Yes 2/No
20	Has any thoughts of hurting yourself been in your mind	1/Yes 2/No
21	If you ever had thoughts of hurting your self, please explain these thoughts	

If you have thought of hurting yourself, we recommend you contact the psychiatrist urgently at 0123891926.

Or the Principal Investigator at ktareegi@gmail.com.

List of Abbreviations

CI: Confidence Interval

DASS21: Depression, anxiety, and stress scale

GHQ12: 12-General Health Questionnaire

K10: Kessler Psychological Distress Scale

OR: Odds Ratio

SRQ-20: Self-Reporting Questionnaire