ORIGINAL RESEARCH

Anxiety and Stress Among Undergraduate Medical Students of Haramaya University, Eastern Ethiopia

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Background: The perceived stress and anxiety among medical students have bleak consequences on their academic performances, physical, and psychological wellbeing. However, there is a dearth of reliable epidemiological studies in Ethiopia on medical student's experience of stress and anxiety. Therefore, this study was aimed to determine the prevalence and identify factors associated with stress and anxiety among undergraduate medical students of Haramaya University, Eastern Ethiopia.

Methods: An institutional-based cross-sectional study was conducted from May 13 to June 12, 2019 among 523 participants selected by simple random sampling technique. Data were collected by using structured questionarie through self-adminstered method. Data were entered by Epidata version 3.1 and analyzed using Stastical Package for Social Science(SPSS) version 22. Bivariableand multivariable logistic regression analysis were conducted to identify factors associated with anxiety and stress. Adjusted Odd Ratio (AOR) and 95% Confidence Interval(CI) was used to show the strength of association, and P-value of 0.05 was used to declare statistical significance.

Results: The prevalence of stress was 44% (95% CI: 40.2%–48.2%) and anxiety was 48.9% (95% CI: 44.6%−53.3%) among undergraduate medical students of Haramaya University. Being female (AOR=1.90, 95% CI: 1.28–2.81) and living off-campus (AOR=1.75, 95% CI: 1.12–2.73) were factors significantly associated with both stress and anxiety. Whereas, alcohol use (AOR=2.26, 95% CI: 1.50–3.50) and smoking cigarette (AOR=3.50, 95% CI: 1.58–7.73) linked with stress. The poor psychosocial support (AOR=1.93, 95% CI: 1.20–3.20) was significantly associated with anxiety.

Conclusion: Substantially a higher level of stress and anxiety was reported. Being female and living off-campus were linked with both stress and anxiety. Where as, alcohol use and smoking cigarette were associated with stress and poor psychological support was significantly associated with anxiety.

Keywords: stress, anxiety, medical students, Haramaya University, Ethiopia

Introduction

Stress and anxiety often appear after one another.[1] But stress is typically caused by an external trigger and it can be a short term.[2] Anxiety, on the other hand, is defined by persistent excessive worries that do not go away even in the absence of stressors. However, their symptoms are nearly identical.[2] In common, anxiety and stress results from an interaction between persons and their environment that are perceived as straining or exceeding their adaptive capacities.[3] Constant exposure to anxious and stressful situations may increase susceptibility to a variety of health problems.[4] Effects may range from mild, moderate to severe

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health problems and it depends onstressor's duration and individual's ability to cope.[5]

The medical school environment has been recognized as anxious and stressful for the students due to the curricular and extra-curricular situations.[6] The perceived stress and anxiety among medical students have negative consequences on their academic performances, physical and psychological well-being.[6]

The prevalence of anxiety and stress among medical students has been reported higher compared to the general population and age-matched peers. Accordingly, the study results from different countries pointed out the prevalence of anxiety and stress among medical students is 37.2% and 47.1% in Brazil,[7] 50.6% and 32.8% in India,[8] 62.5% and 45.1% in Iraq,[9] 63% and 41% in Saudi Arabia,[10] and 64.3% and 62.4% in Egypt[11] respectively.

In Ethiopia, the reported prevalence of anxiety ranges from 30.1% among Addis Ababa University[12] to 60.8% among Arsi University medical students,[13] whereas, the stress ranges from 40.4% among Arsi university[13] to 52.4% among Jimma university medical students.[14]

Studies showed the level of stress and anxiety experienced by students is elucidated by many factors. Living off-campus,[15] higher body mass index,[11] smoking, being female, being first and second-year Students linked with a higher level of both anxiety and stress.[10,12,16] Likewise, stress among medical students associated with perceived sleeping problem,[17] living situation, monthly income, and educational level.[14] Students with poor social support, first and second-year educational levels were more anxious as compared to their counterparts.[12]

Failure to detect the psychological abnormality among medical students may lead to increased mental illness with unwanted outcomes throughout their careers and lives.[18] Early detection and treatment of such problems will shorten the duration of illness and lessens the long-term social impairment.[19]

Despite few studies[12,14,20,21] assessed the prevalence and identified risk factors of stress and anxiety among medical students, there is a lack of epidemiologically reliable and study with enough sample size in Ethiopia. Therefore, this study was aimed to determine the prevalence and identify factors associated with stress and anxiety among undergraduate medical students of Haramaya University, Eastern Ethiopia.

Method

Study Period and Area
The study was conducted at Haramaya University, College of Health and Medical Science, from May 13 to June 12, 2019. Haramaya University is located in the eastern part of the country at a distance of 510 km from the capital city, Addis Ababa. The university has two campuses and nine colleges. The Harar campus (College of Health and Medical Science) is found at a distance of 17kilometers away from the main campus. School of medicine emerged as an academic constituent in 2007 and currently, a total of 1315, students are following their education in 2019 (unpublished data. School of medicine, College of Health and Medical Science, Haramaya University).

Study Design and Population
Institutional based cross-sectional study design was used. All selected undergraduate medical students were included for study and students transferred from other universities and stayed for less than six months at the university were excluded.

Sample Size and Sampling Technique
Single population proportion formula was used to calculate sample size by considering the assumptions: n^i: minimum sample size required for the study, Z= standard normal distribution (Z=1.96) with a confidence interval of 95% and α=0.05, P=the prevalence anxiety among medical students of Addis Ababa University, 30.1%,[12] d=tolerable margin of error (d) =4%. The total sample size for this study was 556 with a 10% non-response rate added. The simple random sampling technique was used to select study participants after proportional allocation of the sample size according to the student's academic year.

Data Collection Tool and Procedure
The data was collected by using a standardized tool. The socio-demographic characteristics; age, sex, marital status, and living conditions were collected. ASSIST (Alcohol, Smoking and Substance Involvement Screening Test), which was developed by the World Health Organization, was used to assess the psychoactive substance use (WHO).[22]

Depression, anxiety, and stress: Were measured by Depression, Anxiety, and Stress Scale (DASS-21) short form, which has 21 items and seven items each. It was

the Likert scale ranges from zero to three,computed and multiplied by two. The sum scores of ten and above was indicative of depression, eight and above was indicative of anxiety since,15 and above was for the stress.[23]

Suicidal history: It was assessed by the module of the world mental health survey initiative version of the WHO and CIDI (Composite International Diagnostic Interview).[24] Concerning the social support, the Oslo-three-item, social support scale was used.[25] Four psychiatric nurses (bachelor of degree holder) were participated in data collection through self-administered technique and supervised by one psychiatrist (master's degree holder).

Data Quality Control

Pre-test was done among Dire Dawa University medical students on 5% (28) of total samples, and relevant modification taken. During the data collection, the questionnaire was checked for its completeness on daily basis by supervisors and investigators. Double data entry was conducted by two independent data clerks, and the proper corrections were made based on the variation between two data clerks.

Data Processing and Analysis

The data was checked and entered to Epi-Data version 3.1 and exported to SPSS (Statistical Package for Social Science) version 22 for analysis. Descriptive statistics (percentage, mean and standard deviations), bivariable and multivariable binary logistic regression analysis was performed to identify factors associated with stress and anxiety. All variables with a P-value less than 0.25 at bivariable logistic regression analyses were entered into the multivariable logistic regression model, and variables with a P-value less than 0.05 at 95% confidence interval with their adjusted odds ratio were considered statistically significant.

Results
Socio-Demographic Characteristics of Participants

A total of 523 undergraduate medical students were included in the study with a response rate of 94%. The mean age of the students were, 23.62 years (±2.36SD) with ages ranging from, 19 to 34 years. The majority of the students, 362 (69.2%) were male, 266 (50.9%) orthodox by religion and, 393 (75.1%) were living in the campus. Regarding their cumulative grade point average, the mean grade of students was, 3.00 with grades

Table 1 Socio-Demographic Characteristics of Undergraduate Medical Students of Haramaya University, Eastern Ethiopia, 2019 (N=523)

Variables	Category	Frequency	Percentage
	Mean	**Standard Deviation**	
CGPA	3.00	0.63	
Age in years	23.6	2.36	
Sex	Male Female	362 161	69.2 30.2
Marital status	Single/divorced Married	466 57	89.1 10.9
Living situation	In campus Off campus	393 130	75.1 24.9
Religion	Orthodox Muslim Protestant Others*	266 135 104 18	50.9 25.8 19.9 3.4
Educational level	First year Second year Third year Fourth year Fifth year Sixth year	58 78 89 84 99 115	11.1 15.0 17.0 16.1 19.0 22.0

Note: *Wakefata, Atheist, Catholic, Jehovah witness and Apostle.

ranging from, 1.83 to 3.87 and, 115 (22%) students were 6th year, followed by 5th year, 99 (19%) in the medical school (Table 1).

Substance Use History

About,146 (27.9%) students have been consuming alcohol and, 41 (7.8%) students were smoking cigarette in the past, 3 months (Figure 1).

Clinical and Psychosocial Characteristics

A total of, 228 (43.6%) students had depressive symptoms, 120 (22.9%) had suicidal ideation, and, 22 (4.2%) had a suicidal attempt. Around, 223 (42.6%) students reported moderate perceived social support (Table 2).

Prevalence of Stress and Anxiety

The prevalence of stress was, 230(44%) (95% CI: 40.2%–48.4%) and anxiety was, 256(48.9%) (95% CI: 44.6% −53.3%) among undergraduate medical students (Figure 2).
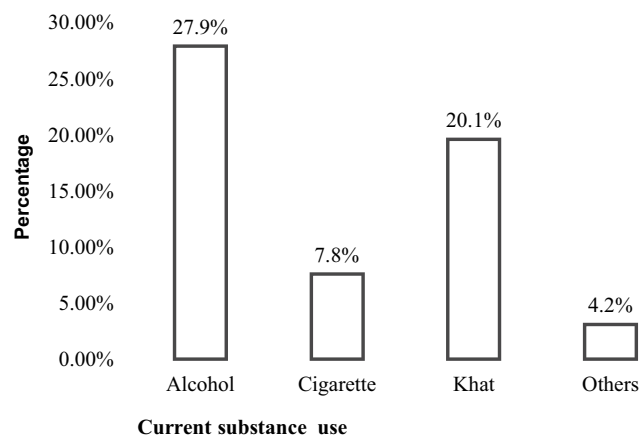
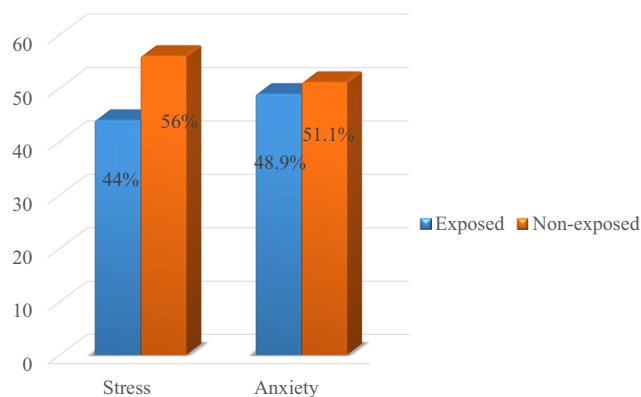Figure 1 Substance use characteristics of undergraduate medical students of Haramaya University, Eastern Ethiopia, 2019 (N=523).

Figure 2 Prevalence of stress and anxiety of undergraduate medical students of Haramaya University, Eastern Ethiopia, 2019 (N=523).

Among students with stress, 61% were males and, 60.5% were among those with anxiety (Table 3).

Factors Associated with Stress and Anxiety

During the bivariable analysis; sex, marital status, living situation, family history of suicidal attempt, family history of mental illness, current alcohol use, current cigarette use, and current khat use fulfilled the minimum requirement

(P-value less than 0.25) and were taken into a multivariable logistic regression model to control confounding factors.

From the multivariable logistic regression analysis being female, living off-campus, current alcohol use, current cigarette use, and poor social support were found to be statistically significant at P-value less than 0.05.

According to the current study female students experience stress; 1.9 times (AOR=1.90, 95% CI: 1.28–2.81) and anxiety; 2.1 times (AOR=2.10, 95% CI: 1.40–3.10) more likely than male students. The odds of having stress and anxiety among students who were living off-campus were 1.75 times (AOR=1.75, 95% CI: 1.12–2.73) and 2.21 times (AOR=2.21, 95% CI: 1.42–3.44) higher as compared to the students who were living in the campus respectively. Those students using alcohol were 2.28 times (AOR=2.26, 95% CI: 1.50–3.50) more likely to experience stress as compared to non-

Table 2 Clinical and Psychosocial Characteristics of Undergraduate Medical Students of Haramaya University, Eastern Ethiopia, 2019 (N=523)

Variables	Category	Frequency	Percentage
Depressive	Yes No	228 295	43.6 56.4
Suicidal ideation	Yes No	120 403	22.9 77.1
Suicidal attempt	Yes No	22 501	4.2 95.8
Family history of suicidal attempt	Yes No	41 482	7.8 92.2
Family history of committed suicide	Yes No	22 501	4.2 95.8
Family history of mental illness	Yes No	57 466	10.9 89.1
Perceived social support	Poor Moderate Strong	192 223 108	36.7% 42.6% 20.7%

Table 3 Prevalence of Stress and Anxiety Among Undergraduate Medical Students of Haramaya University, Eastern Ethiopia

Characteristics		Stress	Anxiety
Sex	Male Female	61% 39%	60.5% 39.5%
Living situation	In campus Off campus	69.5% 30.5%	66.7% 33.3%
Marital status	Married Single	9% 91%	12.5% 87.5%
Current alcohol use	Yes No	37.8% 62.2%	33% 67%
Current khat use	Yes No	23% 77%	72.6% 27.4%
Current cigarette use	Yes No	13% 87%	9.3% 90.7%

alcoholic students. Similarly, students who smoke cigarettes were 3.5 times (AOR=3.50, 95% CI: 1.58–7.73) more likely to have anxiety as compared to nonsmokers. Whereas, students with poor social support were 1.93 times (AOR=1.93, 95% CI: 1.20–3.20) more likely to have anxiety as compared with students with strong social support (Table 4).

Discussion

This study determined the prevalence and identified the factors associated with stress and anxiety among undergraduate medical students of Haramaya University. Hence, the overall prevalence of stress and anxiety was, 44% (95% CI: 40.2%-48.4%) and 48.9% (95% CI: 44.6%-53.3%) respectively. This is in line with the study finding from Turkey, 47.1% for anxiety,[16] Hong Kong University, 54.4% for anxiety[26] and Malaysia, 41.9% for stress.[27] However, the current finding is lower as compared to the study finding by Abdallah et al (2014) with the prevalence of stress, 57.8%, and anxiety, 78.4%.[28] Similar studies from other countries showed far higher rates of stress and anxiety among medical students; in Egypt, stress, 62.4% and Anxiety, 64.3%,[11] in Saud Arabia, stress, 71.9%.[17] This variation could be attributed to socio-cultural differences, and the tools used for the study.[11]

The study finding from Jordan[29] and Michigan University reported a lower level of anxiety, 13.58% and 15.6% among university students respectively[30] as compared to our study finding. This could be linked with the fact that students in a developed country may have less financial hardship compared to those students in low-income countries including Ethiopia.[31]

This study identified gender difference in the self-reported level of stress and anxiety with much higher among female students. This finding is in consonance with study results conducted among Egyptian and Turkish female students reporting a higher level of stress and anxiety.[11,28] This is possibly due to the fact that females complain more about the high load of the curriculum and they are also more likely to report the stress, physical and psychological symptoms.[32] Additionally, the study result conducted among a sample of college students in the United States of America outlined the

Table 4 Factors Associated with Stress and Anxiety Among Undergraduate Medical Students of Haramaya University, Eastern Ethiopia, 2019

Characteristics		Stress		COR (95% CI)	AOR (95% CI)	Anxiety		COR(95% CI)	AOR(95% CI)
		Yes	No			Yes	No		
Sex	Male	140	222	I	I	155	207	I	I
	Female	90	71	2.01(1.38–2.93)	1.90(1.28–2.81)*	101	60	2.25(1.54–3.30)	2.1(1.40–3.10)**
Living situation	In campus	160	233	I	I	171	222	I	I
	Off campus	70	60	1.70(1.14–2.53)	1.75(1.12–2.73)*	85	45	2.45(1.62–3.71)	2.21(1.42–3.44)*
Marital status	Married	21	36	I	I	32	25	I	I
	Single	209	257	1.40(0.80–2.50)	1.770.94–3.33)	224	242	0.72(0.42–1.30)	1.02(0.60–1.90)
Family history of suicidal attempt	Yes	22	19	1.53(0.80–2.90)	1.10,(0.52–2.30)	26	15	1.90(0.98–3.70)	1.28(0.60–2.80)
	No	208	274	I	I	230	252	I	I
Family history of mental illness	Yes	31	26	1.60(0.92–2.80)	1.75(0.92–3.32)	36	21	1.92(1.10–3.38)	1.90(0.90–3.64)
	No	199	267	I	I	220	246	I	I
Current alcohol use	Yes	87	59	2.40(1.63–3.60)	2.28(1.50–3.50)**	82	64	1.50(1.02–2.20)	1.50(0.94–2.21)
	No	143	234	I	I	174	203	I	I
Current khat use	Yes	53	52	1.40,(0.90–2.13)	0.75(0.45–1.25)				
	No	177	241	I	I				
Current cigarette use	Yes	30	11	3.85(1.90–7.86)	3.50(1.58–7.73)*	24	17	1.52(0.80–2.90)	1.10(0.53–2.20)
	No	200	282	I	I	232	250	I	I
Perceived social support	Strong					43	65	I	I
	Moderate					102	121	1.27(0.80–2.03)	1.30(0.80–2.10)
	Poor					111	81	2.07(1.28–3.35)	1.93(1.20–3.20)**

Notes: *p<0.05 and **p<0.001.
Abbreviations: COR, crude odds ratio; AOR, adjusted odds ratio.

body image and lower self-esteem was the significant contributor of stress and anxiety among females.[15]

Our current study suggests the living situation of students contributes to stress and anxiety. Students living off-campus were reported more stress and anxiety than those who are living in a campus dormitory. This is in agreement with previous study findings.[30,33–36] This could be linked with the fact that students live off-campus were responsible to pay monthly house rent, prepare or buy daily meals and deal any issues raised related to the house or apartment they live in.[15] There is also evidences that living alone is the risk factor for stress and anxiety.[37,38] So the university has to give psychosocial support for students living off-campus. The students also need to get ready before they plan to live off-campus.[30]

Good social support is perceived to have a positive effect on health and defined as through which social relationships promote health and well-being.[39] Our study finding also delineated students who have poor social support were more anxious than students who have good social support. This is in agreement with the previous study results.[40,41] Hamadan et al (2008) also depicted that University students who have a lower perception of social support are expected to have a higher perception of life events as anxious situations.[42]

Both social cognitive and stress environment model emphasizes the reciprocated association among physiological, cognitive, behavioral, and socio-environmental factors that can both cause stress symptoms as well as mediate effective coping responses to stressors.[43] Evidences also showed up the relationship between stress and alcohol looks like a vicious circle.[44,45] Stress is a significant motivator for university students to drink alcohol or smoke cigarettes as a coping mechanism. Despite, it is not merely the reason, occasional celebration, peer pressure, and social acceptance were raised.[46] Reciprocally the intended coping mechanism may lead to stress.

Our study finding also highlighted students who drink alcohol and smoke cigarette were more likely to experience stress than their counterparts. This is supported by previously conducted study results which revealed the excessive alcohol consumption and smoking cigarette, which is considered as a coping response, in turn, have exacerbated the stress symptoms.[47] The ill-effects of the substance abuse among medical students, were not limited to the psychological stress but lead to physical impairment, poor interpersonal relationships and poor academic performance.[46]

This study was not without limitation. Its cross-sectional nature may fail to capture the long-term cause and effect relationship. The study was also conducted in one university and might not be generalized to whole university students. Despite these limitations, the study expanded our knowledge on the prevalence and factors associated with stress and anxiety among undergraduate medical students of Haramaya University. It also provides an insight for the Haramaya University administrators and stakeholders to tackle the problem. Additionally, the current finding might help as baseline data for further studies with advanced methods and multi centers.

Conclusion

The study depicted the higher prevalence of stress and anxiety among undergraduate medical students of Haramaya University. Being female gender, living off-campus, perceived poor social support, using alcohol and cigarette were associated with stress and anxiety. The establishment of students' counseling, behavioral change, and communication unit in medical schools, promoting student wellbeing, providing supportive, preventive, and curative psychosocial services to enable students to cope with their new phase of life is recommended. Medical schools have to encourage students to spend more time on their social lives and provide them with coping tools to overcome stress throughout their medical education. There should be special attention given to female students and those living off-campus. Leisure activities should be included in the curriculum to promote better interaction between the students and their medical environment.

Abbreviations

AOR, adjusted odds ratio; ASSIST, Alcohol; Smoking and Substance Involvement Screening Test; CPGA, Cumulative Grade Point Average; CI, Confidence Interval; CIDI, Composite International Diagnostic Interview; COR, Crude Odds Ratio; DASS, Depression; Anxiety; Stress Scale; SD, standard deviation.

Data Sharing Statement

The datasets used for analysis are available from the corresponding author upon a reasonable request.

Ethical Approval

This study was conducted in accordance with the Declaration of Helsinki-Ethical principle for medical research involving the human subjects. Accordingly, the ethical clearance was obtained from a joint ethical review committee of the University of Gondar and Amanuel mental specialized hospital. A formal letter was obtained from the University of Gondar

and submitted to Haramaya University, College of Health and Medical Science for administrative approval. Written informed consent was obtained from the students prior to the data collection by explaining the purpose of the study. Those who did not wish to take part could be allowed either to withdraw from the study at any time they want. All informations collected from the subjects were handled confidentially.

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Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare that they have no conflicts of interest for this study.

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