

Mental Distress and Associated Factors Among Undergraduate Engineering Students of Hawassa University, Ethiopia

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Background: Mental distress is a range of symptoms and experiences of a person's internal life that are commonly held to be troubling, confusing or out of the ordinary. Mental distress often interferes with studying, social interaction, and academic outcomes. Therefore, this study aimed at assessing the prevalence of mental distress and factors associated with it among undergraduate engineering students at Hawassa University.

Methods: We conducted an institution-based cross-sectional descriptive study on undergraduate engineering students at Hawassa University. We collected the data from January to April 30, 2018, using interviewer-administered Self-Report Questionnaire 20 (SRQ-20) from 341 participants selected by stratified sampling and we performed multiple logistic regression analysis to find factors associated with mental distress.

Results: Out of the total study population, 222 (65.1%) were males, and 172 (50.4%) were age ≥ 21 . We found the prevalence of mental distress using SRQ-20 with a cut-off point ≥ 8 to be 28.7%. Female students were 2.9 times more likely to have mental distress as compared to male students (AOR= 2.90, 95% CI: 1.52–5.50). Facing financial problem (AOR= 2.20; CI= 1.25–3.85), poor social support (AOR= 2.58, 95% CI: 1.51–4.42), lack of interest in their field of study (AOR=2.57; CI: 1.23–5.38) and unresolved conflict with roommate (AOR= 2.29, 95% CI: 1.08–4.00) were significant predictors of mental distress.

Conclusion: This study showed a high prevalence of mental distress among engineering students. So, policymakers, university officials, and parents need to give due attention to engineering undergraduate students for proactive measures.

Keywords: mental distress, engineering students, Hawassa, Ethiopia

Introduction

Although mental distress is referenced in health-care literature, the origin of the concept of mental distress or psychological distress is not defined as a discrete concept.¹ The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) defines the term psychological distress as “A range of symptoms and experiences of a person's internal life that are held to be troubling, confusing, or out of the ordinary”.²

University students have a high level of psychological distress more than the public, and mental distress has been the most common disabling condition among university students in the world.^{3–5} This higher predisposition to mental distress might be because students are prone to stressors like; pressure from family and teachers to succeed, competitions with peers, exams, financial issues, separation from family, living in

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a new environment, and lack or shortage of facilities for entertainment.^{6,7} When a student experiences high or chronic stress, it can interfere with her/his ability to learn, memorise, and good grades. Intense pressure may cause severe mental illness in particular depression and debilitate physical health.^{8,9}

The study conducted by the World Health Organization (WHO) with a sample of 1,572 participants from 21-different countries (lower to upper-income countries) showed that one-fifth (20.3%) of college students had mental disorders; The majority (83.1%) had pre-matriculation onsets and only 16.4% of students received mental healthcare.⁵

According to studies in the USA, 15.6% of undergraduates and 13.0% of graduate students experienced anxiety or depression.¹⁰ In Australia, one study showed a higher prevalence of mental distress among undergraduate students (53.0%).⁴ A study from 16 Canadian universities (n=7800) stated that 30% of the students have high psychological distress.¹¹ In Malaysia 41.9% and Brazil, 49.1% of medical students found to have emotional distress.^{12,13}

A cross-sectional comparative study determining stress level between medical and non-medical students showed that 54.6% of medical and 20.6% of undergraduate engineering students suffer from high stress in Karachi, Pakistan.¹⁴ A study from the Engineering College of Rajasthan, India, showed that 24.5% of undergraduate engineering students have a mental illness.¹⁵ In Africa, research conducted in Nigeria showed a 36.9% prevalence of general psychiatric morbidity among undergraduate students. In Egypt, a study among medical students (n=700) showed psychological stress of 59.9%.¹⁶ Research from Uganda shows the level of stress among health science students was 57.4% and a study from Zimbabwe reported a Higher prevalence of mental distress (64.5%) amongst first-year medical students.^{16,17} In Somaliland at the University of Hargeisa, a lower prevalence of mental distress was reported (19.8%).¹⁸

In Ethiopia, a study done among 10,203 residents of Addis Ababa using SRQ-20 revealed a prevalence of mental distress 11.7%.¹⁹ Another most recent study with a larger sample size (n=2180) done in the same town using the same tool but restricted to the adult population showed a prevalence of mental distress to be 17.7%.²⁰ Three studies using SRQ-20 showed a prevalence of mental distress among medical students to be; 29.2% at Mizan Aman Health Science College, 30% at Hawassa University and 32.6% at Addis Ababa University. A study done at Adama University

and Gondar University reported a prevalence of mental distress 21.6% and 40.9%, respectively.^{24,25}

Studies showed different factors can affect mental distress among students. Studies from Gondar (AOR = 1.65, 95% CI: 1.17–2.30) and Axum (AOR =1.7, 95% CI: 1.20–2.34) universities of Ethiopia showed that the odds of having mental distress is higher in females than in males.^{25,26} An Indian study reported a significantly higher prevalence of psychological distress on people living in rural areas than people from urban areas.²⁷ Never attending religious practice was an important predictor of mental distress^{24,25} and studies from Adama and Axum Universities evidenced that students with a family history of mental illness have higher odds of mental distress.

Being a freshman student (AOR = 1.73, 95% CI: 1.10, 2.71) was associated with mental distress in the Axum University study.²⁶ In the meantime, a study from Adama University revealed that the odds of having mental distress is less among second-year students as compared to third-year students (AOR=0.41, 95% CI: 0.18–0.91).²⁴

Students with poor CGPA (AOR = 2.07, 95% CI: 1.51–2.83) and students who lack interest in their field of study (AOR = 2.28, 95% CI: 1.49–3.50) have higher odds of having mental distress than their counterparts.²⁵ Financial distress and lack of social support were the other factors that may lead students to mental distress^{25,26} and Conflict with friends and Khat use were the other reported important predictors of mental distress.^{24–26}

Starting from 2009 to 2010, Ethiopian Mistry of education implemented 70:30 student placement policy that is, 70% catering for Science and Technology students and 30% for humanities and social sciences.^{28,29} This placement strategy symbolises the shift of emphasis towards Engineering by the government market-driven decision to divide 70% of new students to engineering-related faculties and institutions irrespective of students' preferences.

In Ethiopia, unfulfilled facilities, overcrowded classrooms and prolonged school year can lead to stressful environments for Science and Technology students. Despite the 70:30 student placement teaching policy, most teaching staff and university management lack confidence in the competence of their graduates, reflecting the lack of a university quality assurance program and the increasing number of students in science and technology.^{30,31} Although the Ethiopian ministry of education (EMoE) has been implementing these programs for decades, to the best of the authors' knowledge, there is no study done in Ethiopia

regarding mental distress among engineering undergraduate students.

Therefore, this study measures the level of mental distress and examines the relationships of various factors with mental distress among engineering students. Findings from this study could resolve the information gap about the prevalence of mental distress and factors associated with it, provide other researchers with valuable information to build on and findings could be a valuable asset in identifying information gaps for university officials and policymakers.

Methods and Materials

Study Design and Setting

We used an institution-based quantitative cross-sectional study at the Institute of Technology (IOT) campus, Hawassa University, Ethiopia, from January – April 30, 2018. Hawassa University, the only university found in Hawassa, has six campuses each with different fields of study and centre of excellence. One campus is the Institute of Technology campus which has 12 departments and the IOT campus registrar office reported the most recent number of undergraduate engineering students from every academic year and all departments are 5448.

Participants and Sample Size

We used a single-population proportion formula to calculate the sample size. Taking into account the prevalence of mental distress of 40.9%²⁵ and 5% as the minimal difference with 95% confidence of certainty, the calculated sample size was 371. Since the source population is 5448, which is less than 10,000, we used a correction formula and the sample size is calculated to be 348. Overall, with a non-response rate of 10%, the total sample size was 383.

After getting a list of students' names who are enrolled and available during the data collection period from the IOT campus registrar office, we randomly selected study participants (using OpenEpi Random Number Generator).

Data Collection Procedure

Study Variables

Mental distress is the outcome variable. The exposure variables included: Socio-demographic and economic factors such as sex, age, religion, the place of residence (urban or rural), a distance of the students' home from

the university, family visit and family history of mental illness, pocket money, and facing financial problems.

Academic characteristics include variables such as the year of study, the field of study, cumulative grade point average (CGPA), choice of and interest in the field of study. We also included social support, unresolved conflict with a roommate, current use of a substance (use with in the past 30days), poly or single substance use and age of first use.

Measurements

We collected the data using a structured self-administered questionnaire which includes: a structured question of socio-demographic, economic, educational and substance use characteristics of the students; The next part of the questionnaire has Oslo-3 item social support scale with items sum >9 showing good social support; We used the English version SRQ-20 to measure mental distress.^{32,33}

World Health Organization (WHO) developed SRQ-20 as an instrument to screen mental distress, for developing countries. It has 20 "YES" or "NO" questions, and plausible to use it as a self-administered or interviewer-administered questionnaire.³⁴

We score each item 0 or 1, where one means that the symptoms were present and 0 means the symptom was absent for the past 30 days; so, the greatest score is 20 out of 20, and the least score is 0 out of 20. The tool was validated in low and middle-income countries including Ethiopia^{26,27} and we used the cut-off point based on the reports from the validation study of SRQ-20 that gave the highest sensitivity and specificity at a cut-off point 8.³⁴

To make sure completeness and consistency inflow of items, to minimise systematic errors and to estimate the time needed to complete the questionnaire; We pre-tested the questionnaire on 5% of a similar population in another department before the actual data collection.

Statistical Analysis

We checked the data completeness and entered it to Epi-Data (Classic) Entry version 3.1 and exported the data to IBM SPSS version 24 for cleaning and further analysis. We used percentages and frequencies to present descriptive statistics. Associated variables in bivariate logistic regression ($P < 0.05$), were computed to multiple logistic regression to control confounders. We used the adjusted odds ratio to measure the strength of the relationship between explanatory and outcome variables at a significance level < 0.05 .

Result

Socio-Demographic and Socio-Economic Characteristics

From 383 participants, we got completed data for 341 respondents (Response rate: 89%). Two hundred and twenty-two (65.1%) were male students, and of all participants, 277 (81.2%) are single. Half 172 (50.4%) of the study participants were age ≤ 21 years. Two hundred and twenty-six (66.3%) were Orthodox Christians, followed by 76 (22.3%) Protestants. Most of the respondents 282 (82.7%), have a habit of attending religious practices in which 106 (31.1%) of the students had a habit of attending religious practice at least once in a week and 84 (24.6%) of the students have a habit of attending religious practice every day. Seventeen (5%) of the students have a family history of mental illness and 86 (25.2%) visit their families at least twice a year (Table 1).

The majority, 278 (81.5%) undergraduate engineering students in the campus came from urban areas of Ethiopia, and 68 (20.0%) came from very remote places of Ethiopia to join the university. One hundred and one (29.6%) of the participants get a high amount of pocket money (>700 Ethiopian Birr (ETB)) and 44 (12.9%) of participants get the lowest amount of pocket money (<400 ETB). One hundred and twenty-seven (37.2%) of the students reported that they have been facing financial problems in the time being (Table 1).

Academic, Social Support and Substance Use Characteristics

Most students were from the Department of Civil Engineering, 100 (29.3%) followed by students from Electromechanical Engineering 64 (18.8%). While looking at sample distribution through the academic year, 104 (30.5%) of the participants were second-year students followed by 94 (27.6%), first-year students and 14.6% of the participants were graduate class. Eighty-eight (25.8%) of participants have a cumulative grade point average score range between 2.51 and 3.00, followed by 72 (21.1%) of the students' CGPA score between 3.01 and 3.50 and eight students have CGPA <2.00. Meanwhile, 280 (82.1%) joined their field by their own choice and 293 (85.9%) have an interest in their field of study (Table 2).

According to social support, 173 (50.7%) scored >9 or have good social support on the Oslo social support scale and 135 (39.7%) of undergraduate engineering students have had an unresolved conflict with one or more of

Table 1 Frequency and Percentage Distribution of Sociodemographic and Economic Characteristics of Hawassa University Engineering Students, Ethiopia, April 2018

Variable	Specific Variable	Frequency	%
Sex	Male	222	65.1%
	Female	119	34.9%
Age	≤ 21	172	50.4%
	>21	169	49.6%
Relation-ship status	Single	277	81.2%
	In relationship	54	15.9%
	Married	10	2.9%
Place of residence	Urban	278	81.5%
	Rural	63	18.5%
Distance of the university from the student's homeland	Near	69	20.2%
	Not that far	115	33.7%
	Far	89	26.1%
	Very far	68	20.0%
Religion	Orthodox Christian	226	66.3%
	Protestant	76	22.3%
	Muslim	28	8.2%
	Others*	11	3.2%
Attending religious practice	Yes	282	82.7%
	No	59	17.3%
Frequency of attending religious practice	Every day	84	24.6%
	Weekly	106	31.1%
	Occasionally	92	27.0%
	Not at all	59	17.3%
Frequency of family visit	4 times a year	101	29.6%
	3 times a year	65	19.1%
	2 times a year	86	25.2%
	Once a year	71	20.8%
Family history of mental illness	Yes	17	5%
	No	324	95%
Monthly pocket money	Low <400	44	12.9%
	Moderate 400-700	89	26.1%
	High > 700	101	29.6%
	Non response	107	31.4%
Facing financial problem	Yes	127	37.2%
	No	214	62.8%

Note: *Adventist, Catholic & Apostolic.

their roommates'. Sixty-one (17.9%) of participants used substance within the past 30 days, out of which, 24 (39.3%) were polysubstance users. Students use the

substance as of their first-time at the mean (SD) age of 17 (± 3) (Table 2).

Mental Distress and Associated Factors

Prevalence of mental distress using SRQ-20, with a cut-off point 8 and above is 28.7%, and the internal consistency of SRQ-20 was $\alpha=0.87$. The odds of having mental distress are 2.9 times more likely with females than males (AOR= 2.90; CI = 1.52–5.50), and students who lack interest in their field of study are 2.6 times more likely to have mental distress as compared to their counterparts (AOR= 2.57, 95% CI= 1.23–5.38). Besides, students with poor social support were 2.6 times more likely to have mental distress compared to that of students with good social support (AOR= 2.58, 95% CI: 1.51–4.42). Students who face financial problems were 2.2 times more likely to develop mental distress than students with good financial status (AOR= 2.20; CI = 1.25–3.85). The odds of having mental distress were 2.3 times more likely in students having an unresolved conflict with a roommate (AOR= 2.29, 95% CI: 1.08–4.00).

Age, having a family history of mental illness, not joining the field of study by choice, year of study, current use of a substance and distance of the university from the student's homeland were not significantly associated with mental distress in multiple logistic regression (Table 3).

Discussion

In this study, 28.7% of the study participants were found to have mental distress, and this finding is consistent with similar studies among medical students in Ethiopia (29.2% at Mizan Aman Health Sciences College, 30% at Hawassa University and 32.6% at Addis Ababa University) and with the study from Canada.¹¹ The prevalence of mental distress in our study is higher than the prevalence in the general population (11.7% and 17.7%) of Addis Ababa.^{19,20} As explained by previous comparative studies, factors like; academic pressure, a stressful campus environment and substance use could be the reasons behind high mental distress in students than the general population.^{4,7}

Mental distress prevalence in our study is lower than previous studies done in Gondar university (40.9%) this can be because of the variation in the time frame, and the survey of Gondar university included study participants from different fields of study (n=872).²⁵ Our study participants have higher mental distress than undergraduate engineering students in Karachi, Pakistan (20.6%)¹⁴ and Rajasthan, India (24.5%),¹⁵ this could be explained by both studies used different data

Table 2 Description of Academic, Social Support and Substance Use Characteristics of Hawassa University Engineering Students, Ethiopia, April 2018

Variable	Specific Variable	Frequency	%	
Academic year	1st year	94	27.6%	
	2nd year	104	30.5%	
	3rd year	75	22.0%	
	4th year	18	5.3%	
	5th year	50	14.6%	
Field of study	Civil	100	29.3%	
	Electrical	36	10.6%	
	Chemical	64	18.8%	
	Electromechanical	32	9.4%	
	Mechanical	30	8.8%	
	Construction	24	7.0%	
	Management			
	Hydraulics	45	13.2%	
Others*	10	2.9%		
Joining field by choice	Yes	280	82.1%	
	No	61	17.9%	
Interest in the field of study	Yes	293	85.9%	
	No	48	14.1%	
	Cumulative grade point	<2.00	8	2.3%
		2.00–2.5	45	13.2%
		2.51–3.00	88	25.8%
		3.01–3.50	72	21.1%
		>3.50	30	8.8%
No reported	98	28.8%		
Social support	Good	173	50.7%	
	Poor	168	49.3%	
Unresolved conflict with roommate	Yes	135	39.7%	
	No	204	60.3%	
Current substance use	Yes	61	17.9%	
	No	280	82.1%	
Substance used	Single substance only	37	60.7%	
	Polysubstance use	24	39.3%	

Note: *Water supply and Environmental, Bio-system and water resource, and irrigation.

instrument than SRQ-20 and have different socio-economic ground. The Pakistan study was a comparative study that only took a sample of 50 engineering students.

Similar to that of the earlier studies, the odds of having mental distress is higher in females than males (AOR= 2.90; CI = 1.52–5.50).^{5,18–22,25,35} The interaction between different biological (hormonal changes in the menstrual cycle and females' nature of affective stress reaction) and psychosocial factors can explain the higher odds in females.^{36–38} Our study

Table 3 Bivariate and Multiple Logistic Regression Analysis Showing Significant Predictors of Mental Distress Among Hawassa University Engineering Students, Ethiopia, April 2018

Variable (N=341)		Mental Distress		OR with 95% CI	
		Yes	No	Crude	Adjusted
Sex	Male	54	168	1	
	Female	44	75	1.82* (1.12,2.96)	2.90* (1.52,5.50)
Age of the students	≤ 21	55	117	1.38 (0.86, 2.21)	1.26 (0.70,2.27)
	>21	43	126	1	1
Attending religious practice	Yes	76	206	1	1
	No	22	37	1.61 (0.89,2.90)	1.30 (0.65, 2.64)
Distance of the university from the student's homeland	Near	12	57	1	1
	Not that far	35	80	2.08 (0.99,4.34)	1.77 (0.78, 4.03)
	Far	30	59	2.41* (1.12,5.18)	2.24 (0.96, 5.22)
	Very Far	21	47	2.12 (0.95, 4.76)	1.96 (0.79,4.84)
Facing financial Problem	Yes	48	79	2.03* (1.26,3.29)	2.20* (1.25,3.85)
	No	49	164	1	1
Family history of mental illness	Yes	8	9	2.31 (0.87,6.18)	1.53 (0.53,4.43)
	No	90	234	1	1
Joining field by choice	Yes	76	204	1	1
	No	22	39	1.51*(0.84,2.72)	0.83 (0.41,1.67)
Interest in the field of study	Yes	74	219	1	1
	No	24	24	2.96*(1.59,5.52)	2.57* (1.23,5.38)
Social support	Good	33	140	1	1
	Poor	65	103	2.67** (1.64,4.37)	2.58** (1.51,4.42)
Unresolved conflict with roommate	Yes	52	84	2.14* (1.33, 3.45)	2.29* (1.32,3.99)
	No	46	159	1	1
Current substance use	Yes	23	38	1.65 (0.92,2.96)	1.81 (0.91,3.60)
	No	75	205	1	1

Notes: *p < 0.05; **P<0.01; 1= Reference.

Abbreviation: OR, odds ratio.

showed that lack of interest in the field of study is an essential factor of mental distress; students who lack interest in their field of study are 2.6 times more likely to have mental distress as compared to their counterparts (AOR= 2.57, 95% CI= 1.23–5.38). This finding is consistent with other studies done in Ethiopia.^{25,26} This might be because of students who lack interest in the field of their study may end-up with chronic motivation that students lack the initiation to achieve better grades and this may expose them to psychological distress.³⁹

Social support can improve mental and physical health through stress reduction by catharsis and poor social support leads to stress which alters the physiological homeostasis of the hypothalamic-pituitary-adrenocortical (HPA) system.^{40,41} Our study showed that students with poor

social support were 2.6 times more likely to have mental distress compared to students with good social support (AOR= 2.58, 95% CI: 1.51–4.42). This is supported by studies from Gondar and Axum University.^{25,26}

Students who face financial problems were 2.2 times more likely to develop mental distress than students with good financial status (AOR= 2.20; CI = 1.25–3.85). This finding is in line with results from different studies in Ethiopian universities.^{23,25,26} This might be for a reason that student's face financial constraints to buy necessary stationery materials these might lead to frustration, anxiety, and feeling of inefficient.⁴²

Similar to studies from Gondar and Adama universities,^{24,25} our data showed that the odds of having mental distress were two times more likely in students having

an unresolved conflict with a roommate than students not (AOR= 2.078, 95% CI= 1.078–4.003). This can be explained by the fact that disputes may cause greater stress and physical limitations. Stress can reduce the immune system and lead to several health conditions.⁴³

Unlike other previous studies; year of study, scoring lower grades and having financial problems statistically has no significant association with mental distress.^{23–25,44} This can be because of the variation in the study population, and we conducted our study only among engineering students; the result may not be conclusive to all students attending higher Ethiopian institutions. Nevertheless, our study shows the current status of mental distress among engineering students, which can be generalised to institutions of similar setups in Ethiopia and this finding may benefit the EMoH in suggesting a plan of re-evaluating higher education student deployment policy and encourages researchers to develop a robust study to improve mental distress among undergraduate engineering students.

This study has certain potential drawbacks. Since we used a cross-sectional study design, the study does not allow inferring the causation. This study was not a comparative study which could not provide an enormous wealth of information on the prevalence rate of mental distress amongst different university population in Ethiopia.

Conclusion

This study provides evidence of a high prevalence of mental distress among undergraduate engineering students at Hawassa University (28.7%) which is comparable to other stressful fields of study, such as that of a medical study.

The odds of having mental distress are higher in female students, students with financial problems, poor social support, and students who have an unresolved conflict with their roommates. Therefore, policymakers, university officials, and parents need to give due attention to undergraduate engineering students with prioritising risky groups for early intervention and proactive measures. We also recommend

Abbreviations

CGPA, Cumulative Grade Point Average; DSM-5, Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition; EMoE, Ethiopian Ministry of Education; ETB, Ethiopian Birr; IOT, Institute of Technology; SRQ-20, Self-Report Questionnaire 20; USA, United States of America; WHO, World Health Organization.

Data Sharing Statement

All essential data generated or analysed during this study are included in this published article. However, supplementary datasets are available from the corresponding author on a reasonable request.

Ethics Approval and Consent to Participate

The study was conducted in accordance with the Declaration of Helsinki and we obtained ethical clearance from Hawassa University College of Medicine and Health Sciences Institutional Review Board. The right of the participants to refuse or discontinue participation was respected and confidentiality was ensured. All respondents signed written informed consent before taking part in the research.

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Author Contributions

All authors contributed to data analysis, drafting and revising the article, gave final approval of the version to be published, and agree to be accountable for all aspects of the work.

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Disclosure

All authors declared no conflicts of interest in this work.

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