



**MENTAL DISTRESS AMONG
MEDICAL STUDENTS OF ADDIS
ABABA UNIVERSITY, ETHIOPIA:
A FOLLOW-UP STUDY**

A DISSERTATION SUBMITTED
IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE
SPECIALTY CERTIFICATE IN PSYCHIATRY

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A dissertation submitted to the Department of Psychiatry, School of Medicine, College of Health Sciences, Addis Ababa University in partial fulfillment of the requirements for the Specialty Certificate in Psychiatry

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LIST OF ABBREVIATIONS

AA	Addis Ababa
AAU	Addis Ababa University
AOR	Adjusted Odds Ratio
CI	Confidence Interval
CIDI	Composite International Diagnostic Interview
COR	Crude Odds Ratio
DSM	Diagnostic and Statistical Manual
FMOH	Federal Ministry of Health
HICs	High Income Countries
LICs	Lower Income Countries
MICs	Middle Income Countries
NIAAA	National Institute on Alcohol Abuse and Alcoholism
OR	Odds Ratio
PCY	Pre-clinical Year
SD	Standard Deviation
SoM	School of Medicine
SPSS	Statistical Package for the Social Sciences
SRQ	Self Reporting Questionnaire
SRQ-20	(The 20-item) Self Reporting Questionnaire
TASH	Tikur Anbessa Specialized Hospital
WHO	World Health Organization
χ^2	Chi-square

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ABSTRACT

Introduction

Numerous studies have shown that mental distress is a common problem among medical students. Factors associated varied across studies, however, the negative impact of mental distress on medical students has been shown to be manifold. Mental distress profiles may show variation over time, requiring periodic assessments so as to tailor interventions that best suit the current situation.

Objective

The objective of this study is to assess the level of mental distress and associated factors among medical students of Addis Ababa University.

Methods

A facility-based, cross-sectional, quantitative study was conducted on medical students of Addis Ababa University. Stratified random sampling was employed & data was collected from consenting medical students (preclinical year 1 to internship) using a 2-part structured, self-administered questionnaire (Part I: Background Data & Part II: The 20-item Self Reporting Questionnaire [SRQ-20] English version). SPSS version 20 was used for data entry and univariate and multivariate analyses were carried out to assess factors associated with mental distress.

Results

A total of 291 medical students participated in the study. The one-month prevalence of mental distress among medical students of Addis Ababa University was 64.9%, which is nearly double the prevalence 12 years ago. Suicidal ideation was reported by 14.1% of the respondents (6% in the original study). Female sex (AOR=2.187, 95% CI=1.131- 4.231), current feelings of dissatisfaction about having joined Medicine (AOR=2.839, 95% CI=1.278- 6.302) and having experienced a challenging life event in the preceding 30 days (AOR= 3.787 95% CI=1.179- 12.167) were associated independently with greater odds of mental distress. Lifetime substance use ($\chi^2= 10.658$, $df= 1$, $p=0.001$) and current substance use ($\chi^2=4.080$, $df=1$, $p=0.043$) had significant associations with mental distress but no such association was present in multivariate analysis. Other variables including age and year of study showed no (significant) association with mental distress in univariate or multivariate analyses.

Conclusion

The study shows that the prevalence of mental distress among medical students of Addis Ababa University is higher than that reported 12 years ago. Continued supportive interventions for medical students and studies of a qualitative nature are recommended.

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1. INTRODUCTION

1.1. Background:

1.1.1. Medical Education in Ethiopia:

As in many parts of the world, medical education is among the most highly sought-after disciplines in Ethiopia. Until recent times, Ethiopian medical schools were few in number and the number of students recruited for the training extremely limited. In 2012, the government established 13 new medical schools, which more than doubled the preceding number in the country. This was coupled with increased enrollment at existing schools. (Kelto, 2012) Currently, there are 35 medical schools in Ethiopia, 28 of which are run by the government and the remaining 7 are privately owned. Of these, 3 government-owned teaching hospitals (including Addis Ababa University) and 5 private medical schools are located in Addis Ababa. (FMOH, 2017)

1.1.2. Medical Education at the Addis Ababa University

Addis Ababa University (AAU) was established in 1950 as the University College of Addis Ababa and later renamed Haile Selassie I University in 1962 after the Ethiopian Emperor Haile Selassie I. The institution received its current name in 1975. It is the oldest and largest higher learning and research institution in Ethiopia. In recent years, the university has been undertaking various reform schemes in order to respond to the fast-changing national and international educational dynamics. At present the university has 10 colleges, 6 research institutes and 4 institutes that run both teaching and research. Within these academic units, there are 55 departments, 12 centers, 12 schools, and 2 teaching hospitals. (AAU, 2017)

The AAU School of Medicine (SoM), previously called Faculty of Medicine, was established in 1964. Prior to 1972, the SoM was located at the main campus for

preclinical trainings and the then Princess Tsehay Memorial Hospital (now, Armed Forces General Hospital) for clinical trainings. Following the establishment of Tikur Anbessa Specialized Hospital (TASH) in 1972, the hospital became the only site for training of medical doctors.

In 1998, TASH was transferred to the SoM by the Federal Ministry of Health (FMOH), and has since become the affiliate hospital to AAU. It is currently the main teaching hospital for both clinical and preclinical trainings of most medical disciplines. (AAU, 2013) Undergraduate medical school training lasts around six years which is organized as follows: i.e. six months of pre-medical, two years of pre-clinical, about two and a half years of clinical trainings and a year-long internship program.

1.2. Literature Review

1.2.1. The Concept of Mental Distress

Mental distress, also referred to as psychological distress, has been a term used to describe a range of symptoms and experiences that are generally considered troubling, confusing or frustrating. Literature shows that the expression mental (psychological) distress is often applied to the undifferentiated combinations of symptoms ranging from symptoms of depression and generalized anxiety to personality traits, functional disabilities and behavioral problems (Drapea et al, 2012; cited in Girma, 2015). According to Ridner (2004; cited in Girma, 2015), it is conceptually defined as a unique, discomforting emotional state experienced by an individual in response to a specific stressor or demand that results in harm, either temporary or permanent, to the person.

In another study psychological distress is defined as a continuous experience of unhappiness, nervousness, irritability and problematic interpersonal relationships, and physical symptoms such as stomach upset and headache (Challfant et al, 1990; cited in Girma, 2015). Yet others depict it as a mental health problem which encompasses

anxiety, depression, and somatic symptoms such as sleep problems, headache and backache. (Gianget al, 2010 & Rocha et al, 2010; cited in Dachew et al, 2015)

Life situations such as bereavement, stress, lack of sleep, use of drugs or alcohol, assault, abuse or accident can induce mental distress. This may be something which resolves without further medical intervention, though people who endure such symptoms for extended periods are more likely to be diagnosed with mental illness. (Goldberg, 2000; cited in Wikipedia, 2016)

However, the distinction between mental distress and mental illness is not without controversy, as some mental health practitioners would use the terms interchangeably. (Goldberg, 2000; cited in Wikipedia, 2016) Others argue that mental distress has a wider scope than mental illness, which refers to a specific set of medically defined conditions. A person in mental distress may exhibit some of the symptoms described in psychiatry, such as anxiety, confused emotions, hallucination, rage, depression and so on without actually being 'ill' in a medical sense. (Anon; cited in Wikipedia, 2016)

Similarly, mental distress has also been used often synonymously with the term stress, which can be defined as a condition or feeling experienced when a person perceives that the demands placed on them exceed the resources the individual has available (American Institute of Stress, 2016; cited in Heinen et al, 2017). Stress can therefore be understood as a perceived imbalance between the demands encountered in daily living and a person's capability to respond (Lazarus, 1984 & Antonowsky, 1979; cited in Heinen et al, 2017). One study depicts stress as a manifestation of distress (Dyrbye et al, 2005), whereas others show it to be its precursor. (Bahere et al, 2011; cited in Eva et al, 2015)

1.2.2. Mental Distress and Related Mental Health Problems among College and University Students

Mental health aspects of college and university students have been assessed in different parts of the world. The WHO World Mental Health Surveys were used to examine the associations of mental disorders with college entry and attrition by comparing college students (n=1,572) and non-students in the same age range (18–22; n= 4,178, including those who recently left college without graduating) based on surveys in 21 countries (4 low/lower-middle income, 5 upper middle-income, 1 lower/upper-middle [classified differently at two different times of survey administration], and 11 high income). With the assessment of lifetime and 12-month prevalence and age-of-onset of Diagnostic and Statistical Manual (DSM)-IV anxiety, mood, behavioral and substance disorders using the Composite International Diagnostic Interview (CIDI), it was seen that in the 12 months preceding the studies one-fifth (20.3%) of college students had DSM-IV/CIDI disorders, 83.1% of which had pre-matriculation onsets. Disorders with pre-matriculation onsets were more important than those with post-matriculation onsets in predicting subsequent college attrition. Substance disorders and, among women, major depressive disorder were the individual disorders implicated in this association. (Auerbach et al, 2016)

Studies in High Income Countries (HICs) highlight the importance of mental health evaluation in colleges and university students. A study done on 483 French college students indicated that 72.9, 86.3, and 79.3% of them were suffering from psychological distress, anxiety and depressive symptoms, respectively. Regression analyses revealed that life satisfaction, self-esteem, optimism, self-efficacy and psychological distress were the most important predictors of stress, which was assessed using the Perceived Stress Scale.(Saleh et al, 2017)Similarly, El Ansari et al (2011) conducted a study which assessed perceived health status and a range of physical and psychological wellbeing indicators of 3,706 undergraduate students from seven universities in the United

Kingdom (England, Wales and Northern Ireland). The level of health complaints and psychological problems/burdens was said to be relatively high, with females generally reporting more health problems and psychological burdens.

Various studies in Middle Income Countries (MICs) have also explored factors associated with students' psychological wellbeing as part of the national General Student Health Survey. In an Egyptian study that examined perceived health status, physical and psychological well-being of 3,271 undergraduate students attending 11 faculties in a university, it was demonstrated that women were consistently more likely to feel burdened, which was similar to the UK (El Ansari et al, 2011). In contrast, however, they watched and rated their health more favorably in comparison to their male counterparts. Exams, presentations, and the lack of time for studies were the frequently reported burdens. (El Ansari et al, 2013)

A sample of 2,100 undergraduate students from 9 Libyan institutions (6 universities, 3 colleges) was evaluated with the General Health Questionnaire. The majority (62%) reported having had three or more symptoms sometimes or very often in the 12 months preceding the study, the most prevalent symptoms being headache, depressed mood, difficulties in concentration and sleep disorder/insomnia (reported by 50%–60% of the students). There was a positive association between perceived stressors and health symptoms, which remained significant after adjustment for gender and other relevant factors for headache (OR 1.52; 95% CI 1.15–2.02), depressive mood (OR 2.20; 95% CI 1.64–2.94) and sleep problems/ insomnia (OR 1.55, 95% CI 1.19–2.03). Being female and having poor self-perceived health were other factors independently associated with most health symptoms. (El Ansari et al, 2014)

Studies in Low Income Countries (LICs) had variable findings. An institution-based cross-sectional study conducted on a sample of 570 undergraduate students at the University of Hargeisa, Somaliland, showed that the point prevalence of mental distress (i.e. a score of ≥ 11 on the Self Reporting Questionnaire [SRQ-20]) was found to be 19.8%.

Mental distress was associated with being female (AOR = 3.52, 95% CI 1.94, 6.39), having a monthly income of \leq 100 United States dollars (AOR = 2.19, 95% CI 1.12, 4.28), and not having a satisfying relationship with family (AOR = 11.52, 95% CI 3.18, 41.72) and friends (AOR = 7.33, 95% CI 2.83, 18.93). Khat use was also associated with greater likelihood of mental distress (AOR = 2.87, 95% CI 1.26, 6.56). In addition, financial difficulties and the poor prospect of finding a job were common sources of stress among the students. (Hersi et al, 2017)

A number of studies were also conducted in Ethiopia. Haile et al (2017) performed an institution-based cross-sectional study at Debre Berhan University students (n=422) to assess for common mental disorders (CMD) using Kessler Psychological Distress Scale and its association with academic performance. At least three out of five students fulfilled CMD diagnostic criteria for which field of study, worshipping, insomnia, alcohol drinking, and headache were identified to be statistically significant risk factors. No statistically significant association was found between CMD and academic performance.

A study done in Adama University involving 413 randomly selected students showed that the prevalence of mental distress (defined as a score of \geq 11 on the SRQ-20) was 21.6%. Family history of mental illness (AOR=2.30, 95%CI: 1.10 - 4.81), frequent conflicts with fellows (AOR=2.26, 95%CI: 1.10 - 4.85), khat chewing (AOR=2.23, 95% CI: 1.14 - 4.35) and not attending religious services regularly were factors associated with mental distress. Being in second year of training was found to be less likely associated with mental distress (AOR=0.41, 95%CI: 0.18 - 0.91). (Dessie et al, 2013)

A cross-sectional study conducted on 861 randomly selected students at Alemaya University showed the prevalence of mental distress (i.e., a score of \geq 11 on the SRQ-20) to be 19.3%. Students from minor ethnic groups were at a lower risk for experiencing mental distress compared to other ethnic groups [AOR= 0.43; 95 % CI, (0.22, 0.85)]. Sedative users were more at risk of having mental distress compared to non-users

[AOR=3.01, 95% CI (1.41, 6.44)]. But there was no statistically significant association between mental distress and age, sex, and marital status. (Galnessa, 2005)

In a study done by Dachew et al (2015) on undergraduate students of Gondar University, it was demonstrated that the prevalence of mental distress (i.e., a score of ≥ 8 on the SRQ-20) among students was found to be 40.9%, which is significantly higher than was reported in Adama and Alemaya (cut off point of ≥ 11 on the SRQ-20). Female sex (AOR= 1.65; 95% CI 1.17–2.30), lack of interest towards their field of study (AOR= 2.28; 95% CI 1.49–3.50), not having close friends (AOR= 1.48; 95% CI 1.03–2.14), not attending religious programs (AOR=1.58; 95% CI 1.02–2.46), conflict with friends (AOR= 1.93; 95% CI 1.41–2.65), financial distress (AOR=1.49 = 95% CI 1.05, 2.10), family history of mental illness (AOR= 2.12; 95% CI 1.31–3.45), khat use (AOR= 1.71; 95% CI 1.12–2.59), achieving lower grades than anticipated (AOR= 2.07; 95% CI 1.51–2.83), insufficient vacations or breaks (AOR= 1.46; 95% CI 1.06–2.02), and low social support (AOR= 2.58; 95% CI 1.58–4.22) were significantly associated with mental distress.

1.2.3. Mental Distress among Medical Students

Medical students are known to be at high risk for mental health problems. (Dyrbye et al, 2006) They are stressed by the demands to acquire an overwhelming amount of knowledge and the impossibility of learning everything, the occasional abuse on clinical rotations, and experiences with patients' suffering & death. (Silver et al, 1990, Burgeois, 1993 & Lubitz, 1996; cited in Novack, 1999)

Various studies over the years have compared the prevalence of mental health problems among medical students to those in selected populations; the results were conflicting. Levels of depression, anxiety and other measures of psychological distress in medical students were found to be higher than in the general population (Dyrbye et al, 2005). A study conducted by Zoccolillo et al, (1986; cited in Hsieh, 2011) showed that

the prevalence of depression among medical students was three times higher than the general population. The results from other studies indicated otherwise.

Bacchi et al (2015) did a qualitative literature review of 12 studies published in English between the years 2000–2014 on the prevalence of depression in medical students compared to students in non-medical degrees (dentistry, business, humanities, nursing, pharmacy, and architecture). The review suggests that medical students have similar or lower rates of depression compared to certain groups of non-medical students. A study done in the United Arab Emirates on a sample of undergraduate health professions students (first- and second-year medicine, dentistry, pharmacy and physiotherapy; N=212) has shown that there was no significant difference in the stressors between programs or genders. Major stressors in this group were found to be worries regarding the future (54.2%), parental expectations (40.1%), poor diet (36.8%) and a lack of exercise (36.3%). It was noted that first-year students (62.5%) relied on emotional support significantly more than second-year students (48.5%). (Gomathi et al, 2013)

Similarly, a cross-sectional survey of medical students at a university in Thailand showed the level of psychological burden for medical students to be similar to that of adult health care workers. The prevalence of depressive symptoms was similar in both. (Angkurawaranon et al, 2016)

A review of the literature by Fares et al (2016) has shown that the level of stress varied among different samples of preclinical medical students, ranging between 20.9% and >90%. High stress and burnout levels were shown to be associated with decreased life satisfaction, serious thoughts of dropping out and suicidal ideations, which lead to poorer performance, reduced commitment and higher levels of stress.

A cross-sectional study on 321 first year medical students in Germany indicated higher levels of perceived stress (assessed by the Perceived Stress Questionnaire), anxiety and depression than reference samples. No statistically significant differences in stress levels were found within the sample according to gender, migration background or

employment status. Students reported more self-efficacy, optimism, and resilient coping and higher emotional distress compared to validation samples and results in other studies. (Heine et al, 2017)

A study from Australia, a HIC, showed the most consistent significant predictors of psychological distress among undergraduate medical students (assessed by Kessler Psychological Distress Scale) to be social support and the personality traits of emotional resilience and self-control. Females were found to have higher levels of psychological distress than males but in regression analysis, the effect of sex was reduced to non-significance when other variables were included as predictors of psychological distress. (Bore et al, 2016)

High levels of stress were reported in medical students of MICs. Results from a Pakistani study on a representative sample of 264 medical students demonstrated that nearly half (49%) think that they have been stressed at one time or another. Low mood, inability to concentrate, loss of temper were the most common symptoms. Although 90% of males have experienced stress, females reported more symptoms. Academics and exams were the most powerful stressors, and senior students in their fourth and final years of study were found to be more stressed (95% and 98% respectively). (Shaikh et al, 2004)

Another study involving 3rd and 4th year medical students (n= 1,363) at 2 public and 6 private medical-schools in Bangladesh showed the overall prevalence of stress (assessed by the General Health Questionnaire) to be 54%. The prevalence of stress was comparable between the sexes (53% of males and 55% of females) and the years of study (54% of 3rd and 55% of 4th year students). There was also a statistically significant ($p = 0.005$) difference in the levels of stress between public (2.84 ± 0.59) and private (2.73 ± 0.57) medical school students. (Eva et al, 2015).

Studies in LICs concerning mental distress in medical students are limited and fewer still in Ethiopia. A study conducted by Alem et al (2005) to estimate the prevalence of mental distress among medical students of Addis Ababa University showed the one

month prevalence of mental distress (i.e., a score of ≥ 4 on the SRQ-20) to be 32.6%. Over 6.0% reported that they had suicidal ideation in the preceding one month. Age ($X^2=20.88$, $df =2$, $p<0.001$) and year of study ($X^2= 32.04$, $df =4$, $p<0.001$) were shown to have significant association with mental distress, with those aged ≤ 20 years and those in the preclinical years of training found to be more likely to report symptoms of mental distress. Even though the study showed that the risk of mental distress decreases with increasing years of study, aberrance in the pattern was found in the year of internship. While not statistically significant, females and students who use substances reported symptoms of mental distress more often than males and non-users, respectively.

A comparable level of mental distress (i.e. a score of ≥ 8 on the SRQ-20) was obtained from a cross-sectional study of 240 medical students of Hawassa University. 30% of them were found to suffer from mental distress. There was no significant difference in mental distress between males and females (COR = 1.18, 95% CI = 0.62–2.25). Bivariate analysis showed that students aged ≤ 21 years had higher odds of having mental distress (COR = 2.3, 95% CI: 1.26–4.22). Multivariate analysis (excluding age) showed that being a pre-medical student (AOR = 3.61, 95% CI: 1.45–8.97), perceiving medical school as very stressful (AOR = 3.89, 95% CI: 1.52–9.94), perceiving living environment as very crowded (AOR = 2.43, 95% CI: 1.24–4.77) and having a feeling of insecurity about one's safety (AOR = 2.93, 95% CI: 1.51–5.68) had statistically significant association with mental distress. (Melese et al, 2016)

1.3. Significance of the Study

It has been over a decade since a study assessing mental distress among medical students of Addis Ababa University (AAU) has been conducted. There have since been significant changes in the School of Medicine and its campus in Tikur Anbessa Specialized Hospital, such as a significant increase in the number of students leading to crowded lecture halls, dormitories, etc..., changes in the curriculum to a modular system, introduction of additional qualification exams (i.e. in the pre-clinical year 2 and internship), removal of some recreational facilities (the soccer and basketball fields), introduction of regulations that prohibit cooking in the dormitories and conducting religious ceremonies and group prayers on campus. On the other hand, measures to facilitate learning by providing more resources such as better equipped library service, tablet computers for student use, etc... and availability of a student clinic for counseling (which has given service to 15 students since its opening 6 months ago) have also been put to practice.

In the presence of all these and other changes that may in one way or another affect the experience of medical students, this follow-up study is planned in order to assess the changes in the mental distress profile and devise interventions that can be integrated into the present-day system.

1.4. Research Questions

1. What is the level of mental distress among medical students of AAU?
2. What are the factors associated with their mental distress?

2. OBJECTIVES

2.1. General Objective

To assess mental distress among medical students of AAU

2.2. Specific Objectives

1. To determine the one-month prevalence of mental distress among medical students of AAU
2. To describe the socio-demographic & other characteristics (study, lifestyle, support, substance use, stressful life events and mental illness) of the medical students of AAU
3. To identify variables associated with mental distress among medical students of AAU

3. HYPOTHESIS

There continues to be a high level of mental distress among medical students of AAU.

4. METHODOLOGY

4.1. Study Design

A facility-based, cross-sectional quantitative study design was employed.

4.2. Study Setting

The study was conducted at the School of Medicine, College of Health Sciences, Addis Ababa University.

4.3. Study Period

Data collection was done from September to November, 2017 G.C.

4.4. Study Population

The study population is medical students attending AAU. There were 1,749 undergraduate medical students enrolled in the 2016/2017 academic year at the initiation of the study.

Table 1: Number of Medical Students in AAU – June, 2017 G.C

YEAR OF STUDY	PRECLINICAL YEAR 1	PRECLINICAL YEAR 2	CLINICAL YEAR 1	CLINICAL YEAR 2		INTERNSHIP	GRAND TOTAL
				BATCH 1 ("OLD")	BATCH 2 ("NEW")		
FEMALE	171	133	63	92	81	71	611
MALE	181	220	176	186	184	191	1,138
TOTAL	352	353	239	278	265	262	<u>1,749</u>
				543			

Source: The AAU, SoM Registrar Office

N.B.

1. There were no Premedical (Pre-med) students during the time this data was obtained.
2. Clinical Year 2 extends over a year; two batches coincide for a few months.

Inclusion Criteria:

- Medical students (Pre-clinical Year I– Internship) who were available during the time of study
- Those who gave informed written consent

Exclusion Criteria:

- Pre-medical students (not available in the study period)
- Medical students from other years who were not available during the time of study
- Those who did not give consent

4.5. Sampling Technique

Stratified random sampling technique was employed in order to include a proportional number of participants at different stages in their medical training.

4.6. Sample Size

(a) Sample size (n) was determined using single population formula with the following assumption:

Confidence Interval=95%

Z-Score = 1.96

Margin of error (E) = 5%

Prevalence (p) = 32.6% (Alem et al, 2005)

n = required sample size

$$n = \frac{[Z^2 \times p \times (1-p)]}{E^2}$$

$$n = \frac{1.96^2 \times 0.326 \times (1- 0.326)}{0.05^2} = 337.64$$

$$n \approx 338$$

Note: The total number of medical students at AAU (N) = 1749 [See Table 1]

$$\begin{aligned} \text{Required sample size for } N < 10,000 &= \frac{n}{1 + n/N} \\ &= \frac{338}{1 + 338/1749} \\ &= 283.26 \\ &\approx \underline{284} \end{aligned}$$

Therefore, a minimum of 284 medical students were required to conduct the study.

(b) Sample stratification was done using the following formula:

$$\text{Required sample size of stratum} = \frac{\text{Total sample size}}{\text{Population size}} \times \text{Total size of stratum}$$

Table 2: Required Sample Size from each Year of Study vs. Obtained Sample Size

YEAR OF STUDY		REQUIRED SAMPLE SIZE	OBTAINED SAMPLE SIZE
Preclinical Year 1		57	58
Preclinical Year 2		57	61
Clinical Year 1		39	39
Clinical Year 2	Batch 1 ("New")	45	47
	Batch 2 ("Old")	43	43
Internship		43	43
TOTAL		284	291

Therefore, data was collected from 291 subjects, which is in excess of the minimum required sample size (284).

4.7. Data Collection

Data was collected from 291 consenting medical students using two-part structured, self-administered questionnaires by class representatives, other voluntary medical students, psychiatry residents) and the Principal Investigator.

The Data Collection Instrument:

The first part comprises questions concerning participants' background data (i.e. socio-demographic, study, lifestyle, support, substance use-related and other factors) while the second part consists of the 20-item Self Reporting

Questionnaire (SRQ-20): English version. [Appendix III]. The English version was chosen because the medium of instruction at AAU is English and the same has been done in the preceding study involving the same population. (Alem et al, 2005)

SRQ:

The SRQ is a tool that was developed by the World Health Organization (WHO) as part of a collaborative study on strategies for extending mental health care. It originally consisted of 25 questions, 20 related to neurotic symptoms, 4 concerning psychotic symptoms and one asking about fits (convulsions) and was referred to as the SRQ-25. (WHO, 1994)

The SRQ-20 is a modified version of the original SRQ-25, comprising only neurotic symptoms. Its administration time is 5-10 minutes. The instrument's questions are written in simple, easy to understand language and cover relevant areas of psychopathology. The SRQ-20 has been used in many community-based surveys conducted in developing countries, including Ethiopia.(Harding et al, 1980; Rumble et al, 1996; Bhagwanjee et al, 1998&Ventevogel et al, 2007; cited in Scholte, 2011; Dessie et al, 2013; Asrat et al, 2015; Girma, 2015; Dachew et al, 2015;Hersi, 2017) It has also been translated in Amharic and validated. (Kortmann, 1988; cited in Alem et al, 2005)

SRQ-20 Scoring:

The SRQ-20 items are scored 0 ('no', symptom absent in the past 30 days) or 1 ('yes', symptom present in the past 30 days). Item scores are summarized to obtain a total score (maximum of 20). A score above the cut-off point indicates the existence of a probable mental disorder. A cut-off score of 8 is widely used. However, optimal cut-off scores are shown to vary considerably across cultures, languages, settings, gender etc... (Mari et al, 1986; Upadhyaya et al, 1989;

Kortmann et al,1990; Araya et al,1992; Ghubash et al, 2001; Pollock et al, 2006&Giang et al, 2006 cited in Scholte, 2011)

In the SRQ-20 validation study done in Ethiopia by Kortmann (1990), the cut-off points were suggested to be 8/9 in clinic attendants (outpatient setting) and 4/5 in non-attendants (community setting).(WHO, 1994) A cut-off point of 4 was used in the study conducted by Alem et al (2005) assessing mental distress among medical students of AAU. As a follow-up of the latter, this study will also adopt the same cut-off point.

4.8. Operational Definition

Mental distress: a total score on the SRQ-20 of ≥ 4 in reference to the 30 days preceding data collection.

4.9. Study Variables:

(a) Independent Variables: socio-demographic, study, lifestyle, support, substance use, stressful life events and mental illness profiles of the medical students of AAU

(b) Dependent Variable: Mental distress (SRQ-20 score ≥ 4)

4.10. Data Processing and Analysis

The collected data was coded. Data entry, cleaning and analysis was done with the Statistical Package for the Social Sciences (SPSS) version 20.0. Descriptive statistics was computed for socio-demographic, behavioral, support, substance use, stressful life events and mental illness profiles of participants. Chi-square and Fisher's exact tests were used for statistical comparisons. Multivariate regression analysis was done for effect estimation of the factors that were found to be significantly associated to mental distress and of other factors that had strong support for such association in the

retrieved literature. Odds ratio (OR) and 95% CIs were calculated. Statistical significance was determined by $p < 0.05$.

4.11. Ethical Considerations

Before this follow-up study was designed permission was sought (verbally) from one of the principal investigators of the previous study assessing mental distress among medical students of the AAU. Ethical clearance was obtained from the Department of Psychiatry, School of Medicine, College of Health Sciences, Addis Ababa University prior to the initiation of the study.

Once that was achieved, participants were informed of the purpose and nature of the study and written consent was sought. [Appendices I & II] All efforts were made to maintain confidentiality of the gathered data; filled questionnaires were collected in sealable envelopes in a timely manner. Each questionnaire was then numbered and the subjects were treated anonymously for the remainder of the study.

5. RESULTS

5.1. Sociodemographic Characteristics of Participants

A relatively higher number of respondents (57%) were males and an overwhelming number (95.9%) were single. The age of participants ranged from 18 - 31 years, with the mean age being 21.9 years with a standard deviation (SD) of ± 2.1 years. Most (60.8%) came from other parts of Ethiopia and the majority (60.1%) were Orthodox Christians.

Table 3: Sociodemographic Characteristics of Participants

Variables	N	%
Age (years)		
≤ 20	88	30.2
21-25	190	65.3
≥ 26	13	4.5
Sex		
Male	166	57.0
Female	125	43.0
Marital status		
Single	279	95.9
Married	5	1.7
Separated/Divorced/Widowed	7	2.4
Address prior to joining university		
Addis Ababa	112	38.5
Other part of Ethiopia	177	60.8
Abroad	2	0.7
Religion		
Orthodox Christian	175	60.1
Protestant	59	20.3
Muslim	24	8.2
Catholic	4	1.4
Adventist	3	1.0
Jehovah Witness	1	0.3
Other	1	0.3
Not affiliated to any religion	24	8.2

5.2. Study-related Characteristics of Participants

Stratified random sampling allowed a reasonable representation of participants from all years of study, the majority (21.0%) of which were pre-clinical year 2 (year 2) students, followed closely by pre-clinical year 1 (year 1) students. From those in their clinical years of study (including internship), most (14.4%) were in their pediatrics rotation in the 30 days preceding data collection. (See Table 4)

Table 4: Study-related Characteristics of Participants

Variables	N	%
Year of study		
Pre-clinical year 1 (Year 1)	58	19.9
Pre-clinical year 2 (Year 2)	61	21.0
Clinical year 1(Year 3)	39	13.4
Clinical year 2 (Year 4), New	47	16.2
Clinical year 2 (Year 4), Old	43	14.8
Internship	43	14.8
Clinical rotations (in the last 30 days)		
Internal Medicine	29	10.0
Surgery	26	8.9
Gynecology/Obstetrics	24	8.2
Pediatrics	42	14.4
Other	12	4.1
None, on a study break	38	13.1
None, on vacation	1	0.3
Not applicable*	119	41.0
Duration of academic &/or clinical work/ Day		
≤ 8 hours	199	68.4
> 8 hours	92	31.6
Subjective rating of current academic performance (compared to fellow students)		
Above average	59	20.3
Average	200	68.7
Below average	32	11.0
Medicine as first choice of study		
Yes	250	85.9
No	41	14.1
Current feelings about Medicine		
Satisfied	114	39.2
Dissatisfied	93	32.0
Neither/ Indifferent	82	28.2
Other	2	0.7

* Not applicable for pre-clinical students

As depicted in Table 4, most of the students (68.7%) study and/or do clinical activities for ≤ 8 hours per day and about the same number (68.7%) rated their current performance to be average compared to that of their fellow students. A great majority (85.9%) claimed that Medicine was their first choice of study upon joining university but only 39.2% reported satisfaction about having joined Medicine, while 32% reported dissatisfaction. (See Table 4)

5.3. Lifestyle-related Variables of Participants

A great majority (80.4%) of the study participants spend most (>50%) of their nights at the dormitories and most (62.5%) sleep for <8 hours per day. With regards to how often they set aside time to do something they enjoy, most responses were split between rarely (48.1%) and often (44%).

Table 5: Lifestyle-related Variables of Participants

Variables	N	%
Where one spends most (>50%) of nights		
Dormitory	234	80.4
Home	54	18.6
Other	3	1.0
Duration of sleep/ Day		
< 8 hours	182	62.5
≥ 8 hours	109	37.5
Time set aside for enjoyment		
Often	128	44.0
Sometimes	6	2.1
Rarely	140	48.1
Never	17	5.8

5.4. Support Profile of Participants

The support profile of medical students was assessed and the results showed that slightly less than half (46%) of them have support with regards to academic issues and most (63.6%) have support on personal matters. Most chose their friends/ peers (50.9%) and family (46%) as sources of support while 2.4% opted to have support from mental health professionals. A marginal majority (37.5%) reported that they carry out religious practices in a regular manner. (See Table 6)

Table 6: Support Profile of Participants

Variables	N	%
Support on academic problems		
Yes	134	46.0
No	157	54.0
Support on personal matters		
Yes	185	63.6
No	106	36.4
Preferred source of support *		
Friends/ Peers	148	50.9
Family	134	46.0
Religious Seniors	24	8.2
Mental Health Professionals	7	2.4
Teachers	4	1.4
Others	2	0.7
Frequency of religious practice		
Regularly	109	37.5
Sometimes	102	35.1
Rarely	56	19.2
Not applicable	24	8.2
Main source of financial support		
Self	11	3.8
Family	263	90.4
The University	15	5.2
Other	2	0.7
Current Financial Problems		
Yes	68	23.4
No	223	76.6

*The total numbers (N) & percentages (%) do not add up as some participants gave more than one response.

Most of the students reported their families to be their main source of financial support and a relatively small number of respondents (23.4%) reported current financial strain.

5.5. Substance Use Profile of Participants

A total of 111 (38.1%) of the medical students claimed to have used at least one substance (alcohol, khat, tobacco, cannabis or psychotropic medications for non-medical purposes) at some point in their lives and 62 (21.3%) of them reported that they have used at least one substance in the last 30 days. Of those who reported current substance use (i.e. use in the preceding 30 days), 72.6% were males and 27.4% were females.

As demonstrated in Table 7, alcohol is the most widely used substance (ever use 35.7%; current use 19.6%) followed by tobacco (ever use 11.3%; current use 8.2%), khat (ever use 14.4%; current use 7.6%) and cannabis (ever use 10%; current use 5.2%). Non-medical use of psychotropic medications was the least reported substance use problem (ever use 1.7%; current use 1%).

Table 7: Substance Use Profile of Participants

Substance	Ever Use	N	%	Last 30 Days	N	%
Alcohol	Yes	104	35.7	Yes	57	19.6
	No	187	64.3	No	234	80.4
Khat	Yes	42	14.4	Yes	22	7.6
	No	249	85.6	No	269	92.4
Tobacco	Yes	33	11.3	Yes	24	8.2
	No	258	88.7	No	267	91.8
Cannabis	Yes	29	10.0	Yes	15	5.2
	No	262	90.0	No	276	94.8
Psychotropic Medications (Non-medical Use)	Yes	5	1.7	Yes	3	1.0
	No	286	98.3	No	288	99.0

The frequency of substance use was also assessed in the respondents who reported current use, revealing that tobacco was used by 15 (5.2%), alcohol by 9 (3.1%), khat similarly by 9 (3.1%) and cannabis by 2 (0.7%) of the respondents daily or almost daily. In addition, the results showed that a total of 21 (7.2%) of the respondents have hazardous use of alcohol as defined by the use of > 4 standard drinks per occasion or > 14 standard drinks per week for men, and > 3 standard drinks per occasion or > 7 standard drinks per week for females). (NIAAA, 2005) [**Note:** A standard drink is defined any drink that contains half an ounce or about 14 grams of pure alcohol].

5.6. Other Characteristics of Participants

Of the 291 study participants, 96 (33%) claimed to have experienced sexual, physical or emotional abuse at some point in their lives, while 25 (8.6%) reported such experience in the preceding 30 days. In addition, 31 respondents reported having had a challenging life event such as a serious physical illness, death of a loved-one, significant relational problems, etc... in the same period of time.

Upon evaluation of the mental illness profile of medical students of AAU, 10 (3.4%) admitted to having a diagnosis of mental illness either now or in the past while 47 (16.2%) expressed thoughts of having an undiagnosed mental illness. In addition, a total of 37 (12.7%) reported family history of mental illness.

As the results show, 188 (64.6%) of the respondents are not aware of the student counseling services being provided at Tikur Anbessa Hospital, which has been utilized by 11 (3.8%) of them. Regarding their plans to use the service if the need arises knowing that the treatment would be carried out in strict confidence, 179 (61.5%) gave an affirmative response while the remaining replied negatively.

5.7. Self Reporting Questionnaire (SRQ)-20 Results of Participants

Participants' SRQ-20 scores ranged from 0- 18, making the mean score 6.1 with a standard deviation (SD) of 4.6. The most highly reported (49.5%) item on the SRQ-20 was item 15 (Have you lost interest in things?). 30.6% of the respondents reported that they have had trouble thinking clearly, 40.2% that they have had difficulty making decisions and 38.5% that their daily work is suffering, in reference to the preceding 30 days. In addition, 14.1% (41) of the respondents admitted to having thoughts of ending their lives in the same period of time.

A total of 64.9% (189) of the respondents had a score of ≥ 4 on the SRQ-20, i.e. have experienced mental distress in the 30 days preceding data collection. (**Note:** For the sake of comparison with other studies the prevalence of mental distress was also calculated at cut-off points of ≥ 8 and ≥ 11 and the value declined to 33.3% (97) and 18.6 (57), respectively).

5.8. Factors Associated With Mental Distress of Participants

Bivariate analysis was done using Chi-square & Fisher's Exact test to look for associations between mental distress (SRQ-20 score ≥ 4) and various characteristics of medical students at the AAU. Females reported mental distress more often than males, but the difference was not statistically significant ($X^2= 1.428$, $df= 1$, $p=0.23$). Students aged ≥ 26 reported mental distress more often than younger ones but the difference was not statistically significant ($X^2= 0.988$, $df= 2$, $p=0.61$). Similarly, married students, those from Addis Ababa and those who are not affiliated to any religion had higher reports of mental distress than their respective counterparts but the differences were not statistically significant ($X^2= 0.650$, $df= 2$, $p=0.72$; $X^2= 4.443$, $df= 2$, $p=0.11$; $X^2= 2.700$, $df= 4$, $p= 0.61$, respectively). (See Table 8)

Table 8: Association of Sociodemographic Characteristics with Mental Distress

Variables	N (%)	Mental Distress (SRQ-20 Score \geq 4)	%	p- Value
Age (years)				
\leq 20	88 (30.2)	58	65.9	0.610
21-25	190 (65.3)	121	63.7	
\geq 26	13 (4.5)	10	76.9	
Sex				
Male	166 (57.0)	103	62.0	0.232
Female	125 (43.0)	86	68.8	
Marital status				
Single	279 (95.9)	180	64.5	0.723
Married	5 (1.7)	4	80.0	
Separated/Divorced/Widowed	7 (2.4)	5	71.4	
Address prior to joining university				
Addis Ababa	112 (38.5)	81	72.3	0.108
Other part of Ethiopia	177 (60.8)	107	60.5	
Abroad	2 (0.7)	1	50.0	
Religion				
Orthodox Christian	175 (60.1)	118	67.4	0.609
Protestant	59 (20.4)	34	57.6	
Muslim	24 (8.2)	14	58.3	
Other*	9 (3.2)	6	66.7	
Not affiliated to any religion	24 (8.2)	17	70.8	

* Catholics, Adventists, Jehovah Witnesses & Others were merged and presented as “Other” because of their small number

The first (“older”) batch of clinical year 2 (year 4) students reported mental distress more often than other students from other batches (31; 72.1%) while interns were less likely to report it (25; 58.1%), but the difference was not statistically significant ($\chi^2=3.320$, $df=5$, $p=0.651$). In addition, clinical year students who stated pediatrics as their most recent clinical rotation were more likely to report mental distress (32; 76.2%) but the difference was not of statistical significance. In addition, students who claimed to do an average of ≤ 8 hours of study and/or clinical activity per day, those who rated their academic performance as ‘below average’ compared to that of their fellow students,

and those who expressed current dissatisfaction about having joined Medicine had higher reports of mental distress than their respective counterparts, but none of these differences were shown to be statistically significant. (See Table 9) However, there was a statistically significant association between mental distress and having Medicine as one's first choice of study upon joining university ($X^2= 5.062$, $df=1$, $p=0.02$) wherein students who did not have Medicine as their first choice of study reported mental distress more often (33; 80.5%) than those who did (156; 62.4%).

Table 9: Association of Study-related Characteristics with Mental Distress

Variables	N (%)	Mental Distress (SRQ-20 Score ≥ 4)	%	p- Value
Year of study				
Pre-clinical year 1 (Year 1)	58 (19.9)	35	60.3	0.651
Pre-clinical year 2 (Year 2)	61 (21.0)	42	68.9	
Clinical year 1 (Year 3)	39 (13.4)	27	69.2	
Clinical year 2 (Year 4), New	47 (16.2)	29	61.7	
Clinical year 2 (Year 4), Old	43 (14.8)	31	72.1	
Internship	43 (14.8)	25	58.1	
Clinical rotations (in the last 30 days)				
Internal Medicine	29 (10.0)	13	44.8	0.142**
Surgery	26 (8.9)	17	65.4	
Gynecology/Obstetrics	24 (8.2)	16	66.7	
Pediatrics	42 (14.4)	32	76.2	
Other	12 (4.1)	8	66.7	
None, on a study break	38 (13.1)	26	68.4	
None, on vacation	1 (0.3)	0	0	
Not applicable*	119 (41.0)	-	-	
Duration of academic &/or clinical work/ Day				
≤ 8 hours	199 (68.4)	134	67.3	0.209
> 8 hours	92 (31.6)	55	59.8	
Subjective rating of current academic performance (compared to fellow students)				
Above average	59 (20.3)	39	66.1	0.409
Average	200 (68.7)	126	63.0	
Below average	32 (11.0)	24	75.0	

Medicine as first choice of study					
Yes	250 (85.9)	156	62.4	0.024	
No	41 (14.1)	33	80.5		
Current feelings about Medicine					
Satisfied	114 (39.2)	64	56.1	0.008**	
Dissatisfied	93 (32.0)	73	78.5		
Neither/ Indifferent	82 (28.2)	51	62.2		
Other	2 (0.7)	1	50.0		

* Not applicable for pre-clinical students;

** >20% Expected values < 5

Although students who spend most (>50%) of their nights at home (43; 79.6%), those who get < 8 hours of sleep (120; 65.9%) and those who reported to rarely set aside time to do things they enjoy (103; 73.6%) reported symptoms of mental distress more often than their respective counterparts, none of these associations were found to be statistically significant. (See Table 10)

Table 10: Association of Lifestyle-related Characteristics with Mental Distress

Variables	N (%)	Mental Distress (SRQ-20 Score \geq 4)	%	p-value
Where one spends most (>50%) of nights				
Dormitory	234 (80.4)	144	61.5	0.043*
Home	54 (18.6)	43	79.6	
Other	3 (1.0)	2	66.7	
Duration of sleep/ Day				
< 8 hours	182 (62.5)	120	65.9	0.649
\geq 8 hours	109 (37.5)	69	63.3	
Time set aside for enjoyment				
Often	128 (44.0)	73	57.0	0.027*
Sometimes	6 (2.1)	4	66.7	
Rarely	140 (48.1)	103	73.6	
Never	17 (5.8)	9	52.9	

* >20% Expected values < 5

As presented in Table 11, there was a statistically significant difference in the mental distress profile of students who reported current financial strain than those who did not, the former group having higher reports of it ($\chi^2= 3.938$, $df=1$, $p=0.047$). (See Table 11)

Table 11: Association of Support Profile with Mental Distress

Variables	N (%)	Mental Distress (SRQ-20 Score ≥ 4)	%	p-value
Support on academic problems				
Yes	134 (46.0)	80	59.7	0.083
No	157 (54.0)	109	69.4	
Support on personal matters				
Yes	185 (63.6)	68	36.8	0.421
No	106 (36.4)	34	32.1	
Frequency of religious practice				
Regularly	109 (37.5)	62	56.9	0.096
Sometimes	102 (35.1)	72	70.6	
Rarely	56 (19.2)	38	67.9	
Not applicable	24 (8.2)	-	-	
Current Financial Problems				
Yes	68 (23.4)	51	75.0	0.047
No	223 (76.6)	138	61.9	

There was a statistically significant difference ($\chi^2= 10.658$, $df= 1$, $p=0.001$) in mental distress profile between respondents who reported substance use (alcohol, khat, tobacco, cannabis or psychotropic medications for non-medical purposes) (85; 76.6%) than those who never used any (104; 57.8%). Similarly, those who reported substance use in the last 30 days (47; 75.8%) reported mental distress more often than those who never used substances (142, 62.0%) and the difference was statistically significant ($\chi^2=4.080$, $df=1$, $p=0.043$). The association results of lifetime & 30-day use of each class of substance is presented in Table 12.

Table 12: Association of Substance Use Profile with Mental Distress

Substance	Ever Use	N (%)	Mental Distress /SRQ-20 Score \geq 4/ (%)	p- value	Last 30 Days	N (%)	Mental Distress /SRQ-20 Score \geq 4/ (%)	p- value
Alcohol	Yes	104 (35.7)	79 (76.0)	0.003	Yes	57 (19.6)	42 (73.7)	0.123
	No	187 (64.3)	77 (41.2)		No	234 (80.4)	147 (62.8)	
Khat	Yes	42 (14.4)	31 (73.8)	0.193	Yes	22 (7.6)	17 (77.3)	0.208
	No	249 (85.6)	158 (63.5)		No	269 (92.4)	172 (63.9)	
Tobacco	Yes	33 (11.3)	25 (75.8)	0.167	Yes	24 (8.2)	19 (79.2)	0.127
	No	258 (88.7)	164 (63.6)		No	267 (91.8)	170 (63.7)	
Cannabis	Yes	29 (10.0)	22 (75.9)	0.194	Yes	15 (5.2)	10 (66.7)	0.886
	No	262 (90.0)	167 (63.7)		No	276 (94.8)	179 (64.9)	
Psychotropic Medications (Non-medical Use)	Yes	5 (1.7)	1 (20.0)	0.660	Yes	3 (1.0)	2 (66.7)	0.718*
	No	286 (98.3)	101 (35.3)		No	288 (99.0)	187 (64.9)	

* >20% Expected values < 5

In addition, having a (lifetime) history of sexual, physical or emotional abuse showed a statistically significant association with mental distress ($X^2=5.108$, $df=1$, $p=0.024$), with those with such history (71; 74.0%) having a greater chance of experiencing distress than those who do not (118; 60.5%). The results also show that students who reported a challenging life event in the preceding 30 days (26; 83.9%) reported mental distress more often than those who did not (163; 62.7%), the difference of which was statistically significant ($X^2=5.457$, $df=1$, $p=0.019$).

Although students having a known mental illness (now or in the past) (8; 80.0%) and those with family history of mental illness (26; 70.3%) were seen to have a greater likelihood of reporting mental distress than their respective counterparts, the differences were not statistically significant ($p=0.502$ & $p=0.468$, respectively).

5.9. Regression Analysis of Factors Associated with Mental Distress of Participants

Table 13 presents the univariate and multivariate analyses showing the association between mental distress and variables that were found to have significant association with Chi-square and Fisher's Exact tests (i.e. Having medicine as one's first choice of study, current financial problems, lifetime substance use, substance use in the last 30 days, lifetime history of abuse and challenging life event in the last 30 days) and additional variables that were found to have association with mental distress in literature review. (**Note:** Although lifetime use of alcohol had statistically significant association in the Chi-square test, it was excluded from the regression analysis because it was judged to likely be accounted for by lifetime substance use.)

Univariate analysis was done on the 17 selected variables (Table 13) and showed that having Medicine as one's first choice of study ($COR=0.402$, 95% $CI=0.178-0.908$) to be negatively associated with mental distress, while current dissatisfaction about having joined Medicine ($COR=2.852$, 95% $CI=1.538-5.289$), practising religious activities

sometimes (COR=1.819, 95% CI=1.029- 3.218), having current financial problems (COR=1.848, 95% CI=1.002- 3.407), lifetime as well as current substance use (COR=2.389, 95% CI= 1.407- 4.057 & COR=1.920, 95% CI= 1.013- 3.639, respectively), having a history of abuse (physical, sexual or emotional) (COR=1.853, 95% CI=1.081- 3.176) and having experienced a challenging life event in the preceding 30 days (COR=3.094, 95% CI=1.150- 8.324) have positive associations with mental distress.

Table 13: Regression Analysis of Factors Associated With Mental Distress among Medical Students (AAU)

Variables	Crude Odds Ratio (95% CI)	Adjusted Odds Ratio (95% CI)
Age		
21-25 vs. \leq 20	0.907 (0.533- 1.542)	0.805 (0.297- 2.181)
\geq 26 vs. \leq 20	1.724 (0.441- 6.741)	2.070 (0.283- 15.129)
Sex		
Female vs. Male	1.349 (0.825- 2.205)	2.187 (1.131- 4.231)
Year of Study		
PC2 vs PC1	1.453 (0.683- 3.091)	1.322 (0.535- 3.264)
C1 vs PC1	1.479 (0.626- 3.493)	1.114 (0.303- 4.095)
C2 (N) vs PC1	1.059 (0.481- 2.331)	1.105 (0.307- 3.979)
C2 (O) vs PC1	1.698 (0.726- 3.968)	1.792 (0.498- 6.451)
I vs PC1	0.913 (0.409- 2.036)	0.830 (0.225- 3.056)
Duration of academic &/or clinical work/ Day		
>8 hours vs. \leq 8 hours	0.721 (0.432- 1.202)	0.765 (0.395- 1.480)
Subjective rating of current academic performance (compared to fellow students)		
Average vs. Above average	0.873 (0.474- 1.608)	0.958 (0.459- 1.999)
Below average vs. Above average	1.538 (0.586- 4.037)	0.613 (0.174- 2.156)
Medicine as first choice of study		
Yes vs. No	0.402 (0.178- 0.908)	0.474 (0.175- 1.283)
Current feelings about Medicine		
Dissatisfied vs. Satisfied	2.852 (1.538- 5.289)	2.839 (1.278- 6.302)
Neither/ Indifferent vs. Satisfied	1.285 (0.720- 2.295)	1.119 (0.566- 2.210)
Duration of sleep/ Day		
\geq 8 hours vs. < 8 hours	0.891 (0.543- 1.463)	0.628 (0.342- 1.152)

Support on academic problems		
Present vs. Absent	0.652 (0.402- 1.059)	0.796 (0.423- 1.497)
Support on personal matters		
Present vs. Absent	0.813 (0.490- 1.347)	0.926 (0.471- 1.820)
Frequency of religious practice		
Sometimes vs. Regularly	1.819 (1.029- 3.218)	1.304 (0.674- 2.521)
Rarely vs. Regularly	1.600 (0.813- 3.149)	1.018 (0.451- 2.301)
Current Financial Problems		
Present vs. Absent	1.848 (1.002- 3.407)	1.940 (0.891- 4.222)
Substances_ Ever Use		
Present vs. Absent	2.389 (1.407- 4.057)	1.505 (0.625- 3.622)
Substance Use_ Last 30 days		
Present vs. Absent	1.920 (1.013- 3.639)	1.289 (0.443- 3.749)
Abuse_ Lifetime		
Present vs. Absent	1.853 (1.081- 3.176)	1.578 (0.811- 3.072)
Challenging life event_ Last 30 Days		
Present vs. Absent	3.094 (1.150- 8.324)	3.787 (1.179- 12.167)
Family History of Mental Illness		
Present vs. Absent	1.320 (0.623- 2.794)	1.200 (0.457- 3.152)

Note: PC= Pre-clinical, C= Clinical, N= New, O= Old, I= Internship

All 17 variables were entered into multivariate regression model to determine factors independently associated with mental distress. After adjustment, female sex (AOR=2.187, 95% CI=1.131- 4.231), current feelings of dissatisfaction about having joined medicine (AOR=2.839, 95% CI=1.278- 6.302) and having experienced a challenging life event in the preceding 30 days (AOR= 3.787 95% CI=1.179- 12.167) were associated independently with increased odds of mental distress. Other variables that had association in the univariate analysis (Table 13) including substance use as well as other variables such as age and year of study showed no association with mental distress in multivariate analysis.

6. DISCUSSION

According to this study, the prevalence of mental distress (SRQ-20 score ≥ 4) among medical students of AAU is 64.9%, which is nearly twice the prevalence reported 12 years ago in the same population, using the same tool and measure. (Alem et al, 2005) This may have been the result of the interplay between a number of changes that have taken place since then. One is the considerably increased student number, potentially depriving students of the close follow-up and assistance (both academic and personal) that may have been more feasible with the smaller group of students at the time of the original study. The increasing number may have also led to more crowded dormitories which could have had negative impacts on the living condition of students and contributing to the mental distress, as was the case in the study in Hawassa wherein a significant association was shown to exist between mental distress and perceiving one's living environment as very crowded (Note: 80.4% of the respondents in this study reported that they spend $> 50\%$ of their nights at the dormitories). In addition, changes in the curriculum to a modular system which entails frequent (often weekly) evaluations may have also contributed to the increased rates of mental distress in the current medical student population.

The prevalence of mental distress in this study is also higher than those reported in university students of Hargeisa (19.8%; Hersi et al, 2017), Adama (21.6%; Dessie et al, 2013) and Alemaya (19.3%; Galmessa, 2005) where mental distress was defined as SRQ-20 score ≥ 11 . This may be attributed to the different cut-off points used to define mental distress. However, when the cut-off point was raised to 11, the prevalence decreased to 18.6%, which is slightly lower than the above studies.

Similarly, the prevalence of mental distress in this study (64.9%; SRQ-20 Score ≥ 4) was higher than that reported for undergraduate university students in Gondar (40.9%; Dachew et al, 2015) and medical students in Hawassa (30%; Melese et al, 2016). This can, again, be related to the differences in the definition of mental distress. When the cut-off point for this study is set at 8, the prevalence decreases to 33.3%, which is slightly higher than what was

reported in Hawassa and lower than that of Gondar. This may be attributed to differences in population composition and study settings (institutions).

The study also showed a higher rate (14.1%) of suicidal ideation among medical students than the study done by Alem et al (2005). This difference may reflect or be attributed to the difference in prevalence of mental distress reported in the two studies. This is also a higher rate than that reported in a study in Chinese medical students (7.5%) (Sobowale K et al, 2014). However, it is comparable to that reported in medical students in the UK (15%). (Student BMJ, 2015)

The study also showed a 3.4% prevalence of self-reported mental illness (past or present), while 16.2% of the respondents reported perceptions of having mental illness that has not yet been diagnosed. These figures may have contributed to the high mental distress profile reported in this study as the assessed mental distress parameters (symptoms) have a considerable overlap with those of known mental illnesses, indicating the prevailing controversies in the delineation of these two concepts. (Goldberg, 2000)

The Student BMJ Survey indicated that 80% of medical students with mental health issues feel under-supported. (BMJ, 2015) Although such comparison is difficult to make from the results of this study, the support profile of the study participants differed in academic (46%) vs. personal matters (63.6%); In addition, 2.4 % indicated mental health professionals as their preferred sources of support.

Despite the high prevalence of mental distress, only 35.4% of the respondents were aware of the student counseling services being provided at Tikur Anbessa Hospital, which has only been used by 3.8% of the study participants; 38.5% of the students claimed they would not use the services even if confidentiality was not an issue. This may have emanated from beliefs that one's mental distress is a normal experience in a demanding training such as Medicine or from fears of being seen as weak and unfit to take on the role of the care provider (i.e. doctor) if they themselves become clients of mental healthcare services. There may also be concerns about confidentiality and associated stigma that may prevent medical

students from making use of such services. Givens et al (2002) outlined the barriers to mental health care utilization by medical students suffering from depression to be were lack of time (48%), lack of confidentiality, (37%), stigma associated with using mental health services (30%), cost (28%), fear of documentation on academic record (24%), and fear of unwanted intervention (26%). Yoga and meditation were shown to be effective practices in reducing stress levels and improving aspects of personal wellbeing in medical students by a number of studies. (Prasad et al, 2016; Danilewits et al, 2016) These methods may be more acceptable to students who may refrain from getting counseling services for the aforementioned reasons.

The study showed that female sex, current feelings of dissatisfaction about having joined Medicine and having experienced a challenging life event in the preceding 30 days to be the variables associated with mental distress after controlling for other variables of significance importance. These associations were also seen in other studies. Being a female was shown to be a predictor for mental distress in studies in Hargeisa (Hersi et al, 2017), and Gondar (Dachew et al, 2015) while the study done by Alem et al (2005) showed no significant association between sex and mental distress. This may have been accounted for by differences in variables explored that may have been answered differently by the two sexes and the differences in the proportion of females represented in the respective samples. However, all these studies and others (El Ansari et al, 2011; El Ansari et al, 2013, Bore et al, 2016) showed that females are more likely to report symptoms of mental distress.

The study by Dachew et al (2015) on medical students in Gondar showed lack of interest towards one's field of study to be one of the predictors of mental distress, which can loosely be taken to be comparable to the association of current feelings of dissatisfaction with Medicine with mental distress established in this study. In addition, the association between challenging life events (which included significant relational problems) in the 30 days preceding data collection with mental distress is, more or less, in agreement with the study in Hargeisa (Hersi et al, 2017) where not having a satisfying relationship with family

and friends was found to be associated and with the study in Gondar (Dachew et al, 2015) where conflict with friends was shown to be one of the predictors for mental distress.

Substance use did not show association with mental distress in multivariate analysis which is similar to the finding by Alem et al (2005) but in contrast to the findings in Adama (Dessie et al, 2013) and Gondar (Dachew et al, 2015) where khat use was found to be a predictor of mental distress and that of Alemaya (Galmessa) in which sedative use was shown to increase the risk of mental distress. The reason for these differences may lie in the differences in the prevalence of (specific) substance use in the study subjects as well as in the methodologies utilized to assess substance use patterns.

Contrary to the study in 2005 by Alem et al, age and year of study did not show significant association with mental distress in the current study. Although results differed, year of study was also found to be predictor of mental distress in various other studies. (Dessie et al, 2013; Shaikh et al, 2004; Melese et al, 2016) Still, the findings of this study were similar to what was reported in Alemaya (Galmessa, 2005). The aforementioned differences, however, may be have been influenced by differences in population composition (namely in age and year of study) influencing the resulting effect size, the kind of academic activity students were having during the time of data collection (i.e. regular classes, exam season, break, etc...) as well as in the resulting impact of the peculiarities of the studies in variable selection.

7. STRENGTHS & LIMITATIONS

The study had a reasonable sample size and the stratified random sampling technique employed allowed for a good representation of students from all levels of medical training. Mental distress was assessed with the SRQ-20, a locally validated tool. Although a follow-up study, considerable modifications were made to include as many variables that may be associated to mental distress as possible in order to establish associations. However, factors were shown to have association with mental distress such as personality were not assessed

in this study. Having a great number of variables may have also compromised the depth of exploration of some of the variables (e.g. substance use pattern, type of mental illness, nature of abuse experienced, etc...)

Differences in sampling from the original study where the entire medical student population was included in the study may have brought about some differences in finding. Although self-administration of the questionnaires may have given participants a sense of privacy which might have encouraged more honest responses especially with more sensitive matters, it might have also left room for misinterpretation of questions that may have led to different responses than would have been given if the questions were to be explained by data collectors.

Selection of participants from each year of study was mostly on the basis of availability, which may have left out a group of students who may have been on a break and overly representative of those who were available in certain places and situations. It may have also left out extreme groups (those who are not distressed and may not see the need to take part in such a study and those who experience a high degree of distress and may not have been willing or able to participate because of it.) In addition, recent academic activities (such as the presence of exams) were not assessed in pre-clinical year students, which may have been important in explaining the results.

8. CONCLUSION

The one-month prevalence of mental distress (SRQ-20 score ≥ 4) among medical students of AAU was 64.9%, which is almost twice the prevalence reported in the original study 12 years ago. Female sex, current feelings of dissatisfaction with Medicine and having experienced a challenging life event in the preceding 30 days were significant predictors of mental distress among medical students.

9. RECOMMENDATION

It is recommended to continue to strengthen support services that are available for medical students, e.g. increasing student clinic/ counseling hours and efforts made to advertise the services in order to encourage better utilization. It would also be important to introduce mentorship programs starting from lower levels of training as well as facilitating peer-to-peer support systems in academic matters and otherwise. There can also be ways to integrate meditation and/ or yoga as part of extra-curricular activity options or prepare periodic sessions for such practices in an effort to help medical students to cultivate the habit of attending to their psychological wellbeing.

Qualitative studies are encouraged in order to explore the subjective experiences of medical students and identify gaps in care from which possible areas for intervention can be devised in a way that is more meaningful. The particular experiences and challenges faced by female students can also be assessed in such ways.

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APPENDICES

APPENDIX I

PARTICIPANT INFORMATION SHEET

Hello, my name is Meron Getachew. I am a final year psychiatry resident at the Addis Ababa University (AAU). As part of my training, I am conducting a study to assess mental distress among medical students at the AAU.

Aim: The study aims to determine the level of mental distress & associated factors among medical students at the AAU.

Benefits: The study may not have any direct and/ or immediate benefit to you, but your participation is very important for the outcome of the study and the positive impact it aims to create.

Risks: You do not have to take part in this research if you do not wish to do so, and your decision to participate or not will not have any consequence – academic or otherwise. Confidentiality will be maintained at all stages of the study.

Incentives: No incentive or compensation fee will be provided for participating in the study.

If you have any questions or concerns about the study, you may contact the Principal Investigator with the following address: Meron Getachew, smilymer@gmail.com

Thank you very much for your time & contribution.

APPENDIX II

PARTICIPANT CONSENT FORM

I have read the preceding information. I have had the opportunity to ask questions about it and all questions I asked have been answered to my satisfaction.

I **consent** voluntarily to participate in this study.

Yes No

Signature of Participant _____

Date _____ (DD/MM/YYYY)

APPENDIX III: QUESTIONNAIRE

PART I: BACKGROUND DATA

A. SOCIO-DEMOGRAPHIC DATA:	
1. Age (in years): _____	
2. Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	
3. Marital status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Separated/ Divorced/ Widowed	
4. Address prior to joining university: <input type="checkbox"/> Addis Ababa <input type="checkbox"/> Other part of Ethiopia <input type="checkbox"/> Abroad	
5. Religion: <input type="checkbox"/> Orthodox Christian <input type="checkbox"/> Adventist <input type="checkbox"/> Muslim <input type="checkbox"/> Jehovah Witness <input type="checkbox"/> Protestant <input type="checkbox"/> Not affiliated to any religion <input type="checkbox"/> Catholic <input type="checkbox"/> Other _____ (Please specify)	
6. <i>If affiliated to a religion, how often to do you perform religious activities (e.g. going to worship centers, praying, reading holy books, etc.)?</i> <input type="checkbox"/> Regularly <input type="checkbox"/> Rarely <input type="checkbox"/> Sometimes <input type="checkbox"/> Other _____ (Please specify)	
B. STUDY- RELATED FACTORS	
7. Current year of study: <input type="checkbox"/> Pre-clinical year 1 (Year 1) <input type="checkbox"/> Clinical year 1 (Year 3) <input type="checkbox"/> Pre-clinical year 2 (Year 2) <input type="checkbox"/> Clinical year 2 (Year 4) <input type="checkbox"/> Internship	

8. (For clinical years) What rotation(s) have you had in the last 30 days?

- Internal Medicine Gynecology/Obstetrics
 Surgery Pediatrics
 None, on a study break None, on vacation
 Other _____ (Please specify)

9. On average, how many hours per day do you spend studying and/ or doing clinical work?

10. How would you rate your current academic performance compared to that of your fellow students?

- Above average
 Average
 Below average

11. Was Medicine your first choice of study upon joining university?

- Yes No

12. How do you feel NOW about having joined medicine?

- Satisfied Dissatisfied Neither/ Indifferent
 Other _____ (Please specify)

C. SOCIAL SUPPORT-RELATED FACTORS

13. Is there anyone in your life you meet regularly or can access easily should you need to seek support or advice about:

13.1. Academic problems/ issues

- Yes No

13.2. Personal matters

- Yes No

14. If needed, whom would you prefer to talk to/ seek help from?

- Peers/ friends Family Teachers Mental Health Professionals
- Religious seniors
- Other _____ (Please specify)

15. What is your main source of income?

- I work to support myself.
- My family provides me with financial support.
- The university provides it.
- Other _____ (Please specify)

16. How worried do you feel about your current financial situation?

- Cannot manage at all
- Can hardly manage
- Doing okay
- Not worried at all
- Other _____ (Please specify)

D. LIFE STYLE-RELATED FACTORS

17. Where do you spend most (> 50%) of your nights?

- Dormitory Home Other _____

18. On average, how many hours of sleep do you get per day? _____

19. How often do you set aside time to do something you enjoy (EXCLUDING academic activities, sleep and substance use)?

- Often Sometimes Rarely Never Other _____

E. SUBSTANCE USE-RELATED FACTORS

20. Have you EVER used substances (alcohol, khat, tobacco, cannabis OR prescription medications for non-medical purposes) IN YOUR LIFE?

- Yes No

If no, please proceed to Q.26.

21. *If yes to Q. 20, which one(s) have you used?*

- Alcohol Tobacco
 Khat Cannabis
 Psychotropic/prescription medications for non-medical purposes
 Other _____ *(Please specify)*

22. *If yes to Q. 20, have you been using substances (alcohol, khat, tobacco, cannabis OR prescription medications for non-medical purposes) IN THE LAST 30 DAYS?*

- Yes No

23. *If yes to Q. 22, which one(s) have you used (IN THE LAST 30 DAYS)?*

- Alcohol Tobacco
 Khat Cannabis
 Psychotropic/ prescription medications for non-medical purposes
 Other _____ *(Please specify)*

24. *If yes to Q.22, how often have you been using the stated substances (IN THE LAST 30 DAYS)?*

24.1. Alcohol

- Once or twice Weekly
 Daily/ almost daily Other _____

24.2. Khat

- Once or twice Weekly
 Daily/ almost daily Other _____

24.3. Tobacco

- Once or twice Weekly
 Daily/ almost daily Other _____

24.4. Cannabis

- Once or twice Weekly
 Daily/ almost daily Other _____

24.5. Psychotropic/ prescription medications for non-medical purposes

- Once or twice Weekly
 Daily/ almost daily Other _____

24.6. Other _____ (Please specify)

- Once or twice Weekly
 Daily/ almost daily Other _____

25. If you have used alcohol IN THE LAST 30 DAYS, how many drinks have you been having?(A drink being defined as half an ounce (Oz) of absolute alcohol, e.g. 1 bottle of beer, a single[normal pour] of wine, or a drink containing 1 shot of liquor).

25.1. Number of drinks per week _____

25.2. Number of drinks per occasion _____

F. OTHER FACTORS

26. Have you ever been in your opinion sexually, physically OR emotionally abused:

26.1. At any point in your life?

- Yes No

26.2. In the last 6 months?

- Yes No

26.3. In the last 30 days?

- Yes No

27. Have you had a challenging life event (e.g. serious physical illness, death of a loved one, significant relational problems, etc.):

27.1. In the last 6 months?

- Yes No

27.2. In the last 30 days?

- Yes No

28. Do you have a diagnosis of mental illness now or in the past?

Yes

No

29. Do you think you have a mental illness that has not yet been diagnosed by a doctor?

Yes

No

30. Do you have family history of mental illness?

Yes

No

31. Are you aware that there is a student clinic for stress-related issues and student counseling services provided at Tikur Anbessa Hospital?

Yes

No

32. Have you ever used these services?

Yes

No

33. Would you use such services if need be, knowing that whatever you talk about would be held in strict confidence?

Yes

No

PART II: SELF-REPORTING QUESTIONNAIRE (SRQ)-20

A. ENGLISH VERSION:

The following questions are related to certain pains & problems that may have bothered you in the last 30 days.

If you think the question applies to you and you had the described problem **IN THE LAST 30 DAYS**, mark (✓) **YES**.

On the other hand, if the question does not apply to you and you did not have the stated problem **IN THE LAST 30 DAYS**, mark (✓) **NO**.

Please do not discuss the questions with anyone while answering the questionnaire. If you are unsure about how to answer a question, please give the best answer you can.

	HEALTH PROBLEMS IN THE LAST 30 DAYS:	YES	NO
1	Do you often have headaches?		
2	Is your appetite poor?		
3	Do you sleep badly?		
4	Are you easily frightened?		
5	Do your hands shake?		
6	Do you feel nervous, tense or worried?		
7	Is your digestion poor?		
8	Do you have trouble thinking clearly?		
9	Do you feel unhappy?		
10	Do you cry more than usual?		
11	Do you find it difficult to enjoy your daily activities?		
12	Do you find it difficult to make decisions?		
13	Is your daily work suffering?		
14	Are you unable to play a useful part in life?		
15	Have you lost interest in things?		
16	Do you feel that you are a worthless person?		
17	Has the thought of ending your life been on your mind?		
18	Do you feel tired all the time?		
19	Do you have uncomfortable feelings in your stomach?		
20	Are you easily tired?		
	TOTAL		