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Research Article

# Prevalence and Associated Risk Factors of Major Depressive Disorder among Jimma University Medical Students, Ethiopia

**Kaleab Tesfaye Tegegne[1*], Tadele Kassahun Wudu[2], Belay Melaku[3]**

*[1]Department of Public Health, College of Health Science, Debark University, Debark, Ethiopia; [2]Department of Statistics, Debark University, Debark, Ethiopia; [3]Department of Public Health, Jimma University Jimma, Ethiopia*

## ABSTRACT

**Background:** By accounting for 4.3% of all disability-adjusted life years, depression ranks third among the world's top causes of illness burden. By the year 2020, it is expected to overtake heart disease as the second-largest cause of disease burden worldwide. In terms of burden, mental illness is the most prevalent non-communicable ailment in Ethiopia. It has been hypothesized that depression rates among university students are markedly higher than those observed in the general population. This study's goal was to determine the prevalence of major depressive illness and its related risk factors among medical students at Jimma University in Ethiopia.

**Methods:** A cross sectional study was conducted among 246 selected Jimma university medical students with stratified random sampling technique. The study was conducted from June 3-10/2021. A self-administered structured questionnaire was used to collect data. PHQ-9 depression screening tool was used Pre-test was conduct 10 days prior to data collection started on (5% of the sample size) before the main study. The association between dependent and independent variable was tested by using x2 test at 95% confidence and a p-value of <0.05 was used to declare the significance of the association. A formal letter was obtained from Jimma University and given for JU registrar office to get permission and some important data.

**Results:** 25.61% of students were screened to have depressive disorder from which 22.36% have mild depression and 3.25 have moderate depression. 26.83% of students have history of stress/tension from which more than halve of them has depressive disorder (13.82%). There is statically significant association between independent variables sex, monthly income, history of stress or tension, performing unprotected sex, sleeping disorder, family history of mental illness, cigarette smoking, faced problem in campus and khat chewing, with depressive disorder.

**Conclusion:** Preventable cause of major depressive disorder in this study are Stress, unprotected sex, cigarettes smoking and khat chewing It is better to have more recreational areas such as gymnasium, functional Digital Satellite Television (DSTV) house, appropriate sport fields (football, basketball and handball) to relax students and to prevent stress or tension which is one of the major risk factor for depression.

**Keywords:** Major depressive disorder; Mental illness

## INTRODUCTION

By accounting for 4.3% of all disability-adjusted life years, depression ranks third among the world's top causes of illness burden. By the year 2020, it is expected to overtake heart disease as the second-largest cause of disease burden worldwide [1]. There have been reports that depression rates among college students

**Correspondence to:** Kaleab Tesfaye Tegegne, Department of Public Health, College of Health Science, Debark University, Debark, Ethiopia, E-mail: kaleabtesfaye35@gmail.com

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are significantly greater than those of the general population [2].

University students in Africa are more likely to experience depression. For instance, a cross-sectional study conducted in 2013 among university students in Egypt found that 37% of them had scores over the cutoff for moderate depression [3]. Suicidal ideation was 0.9% in a cross-sectional survey of undergraduate students at Adama University in 2012 that was conducted. The student population had a 21.6% frequency of mental distress [4].

The morbidity and mortality of Major Depressive Disorder (MDD) are severe; it increases the risk of suicide, the occurrence and unfavorable consequences of medical conditions, the disruption of interpersonal relationships, substance addiction, and lost work time. Numerous persons affected are painfully stigmatized and avoid getting a diagnosis as a result of persistent ignorance and misperceptions of the condition by the general public and many health professionals [5].

In Ethiopia, mental disorders were reported to account for 11% of the total burden of diseases [6]. Though limited and inconclusive, a mental distress prevalence of 32.6% to 49.1%was reported among university students in Ethiopia [7, 8].

Numerous factors have reportedly been linked to the emergence of mental anguish in college students. Teachers reported symptoms of mental discomfort, which could manifest differently in different circumstances, including separation from pre-existing social support, frustration with scholastic hurdles, social problems, and threats owing to high expectations from parents [9, 10].

Socio-demographic factors such as older age or higher study year, female gender, lower socioeconomic status are the factors increasing the risk of depression in university students [11, 3, 12-14].

The associated factors with depression in university students are stressful and traumatic life events including life stressors, gender-based violence, witnessing parental violence, and posttraumatic stress disorder, Addictive behavior including high level of alcohol consumption, smoking, and gambling [12, 14-16, 18, 20].

Other health risk behavior such as physical inactivity, overweight or obesity, Human Immunodeficiency Virus (HIV) risk behavior, sleeping problems, nonfatal unintentional injury, and use of skin lightening products also increasing the risk of depression in university students [21-28].

Social variables that increase risk of depression in university students include social support, religiosity and/or spirituality, low sense of control, and Poor academic performance. Despite mental health problem was included in national health policy of Ethiopia, interventions against the problem are limited. The main reason is the lack of data on the extent of the problem [29-32, 8].

This study was aimed to determine the prevalence of major depressive disorder and identify the contributing factors of it among medical students in Jimma University, Ethiopia. It will use as base line data to create awareness on preventable causes of major depressive disorder and on early health seeking or consulting psychiatrists if any mood change occur. It can also use as a baseline data for further study, as our country being one of the developing countries, which has limited data for further investigation.

## MATERIALS AND METHODS

### Study area and period

The study was conducted in Jimma University. The study was conducted from June 3-10/2021.

### Study design

The study design was cross sectional quantitative study design.

### Source population

All medical students (Preclinical I/PCI/up to medical intern/MI), who attained their education in Jimma University.

### Study population

All selected medical students who attained there education in Jimma University in 2021 and meet inclusion criteria.

### Inclusion and exclusion criteria

**Inclusion criteria:** All medical students (Preclinical I/PCI/up to medical intern/MI), who attained their education in Jimma University in 2021 and present at the time of data collection.

**Exclusion criteria:** Critically ill medical students who can't respond to the question during data collection.

### Sample size

It was calculated using the following formula for the population proportion:

$$n = Z^2_{\frac{\alpha}{2}} \frac{P(1-\mathrm{P})}{d^2}$$

$$= (1.96)^2 \frac{0.126(1-0.216)}{0.05^2}$$

=3.8416 × 67.7336

=260

Where,

n= required sample size,

p= prevalence of MDD in Adama University, according to study done in 2013 (21.6%) [35].33

d= marginal error (0.05),

$Z_{\alpha/2}$ = standard score at CI 95% (=1.96).

N=total population size (1605)

nf=final required sample size

Since the total population is less than 10,000, the final sample size can be calculated by using population correction formula.

$$nf = \frac{n \times N}{n+n}$$

$$= \frac{260 \times 1605}{260 + 224}$$

$nf = 224$

By adding 10% (22) non respondent rate the total sample size required for this study will be 246 JU medical students.

## Sampling method and technique

Sampling technique was stratified random sampling

## Sampling procedure

Jimma university medical school was selected by stratified random sampling as described below (Figure 1).

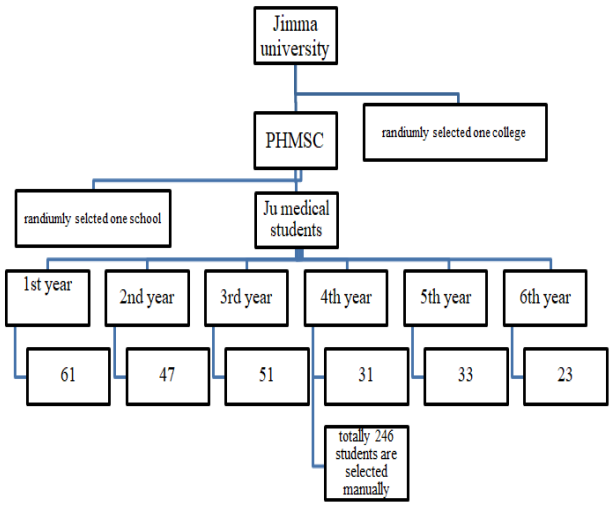


**Figure 1:** Sampling procedure to select each sample.

The required numbers of samples was allocated proportionally among each year of students by using stratified sampling technique as shown in the above Figure 1. A sampling frame of medical students from each year was taken and simple random sampling method was employ to each year-framed student to select 246 students from each year.

## Data collection technique and instruments

Data was collected by using self-administered structured questionnaire. PHQ-9 depression screening tool was used.

Questionnaire was distributed for each selected students in their class room and attachment ward/OPD.

## Variables

**Independent variables:** It includes

- Age
- Sex
- Religion
- Ethnicity
- Marital status
- Monthly income
- Year of study
- Sleeping problems
- Cigarette smoking
- Alcohol drinking
- Khat chewing
- Current Medication for any chronic illness such as epilepsy, DM ...
- Stressful and traumatic life events
- performing unprotected sex

**Dependent variables:** It includes

- Having major depressive disorder

## Data quality control

Self-administered questioner was printed and collected from Community based education office 3 days prior to data collection started.

Pre-test was conduct 10 days prior to data collection started on (5% of the sample size) before the main study to identify potential problems in data collection tools and checked the performance of the data collectors and questionnaires and the pre-test was not included in the analysis as part of the main study.

The principal investigator was made an ongoing checkup each day during the data collection to ensure the quality of data by checking filled questionnaires, for their completeness and internal consistency.

## Operational definition

A major depressive disorder is a mental illness that is defined by a widespread and persistent depressed mood, low self-esteem, and a loss of interest or pleasure in things that are typically rewarding. Using the PHQ-9 self-administered questioner, a person with depression can be screened. There are nine multiple-choice questions in total, each with four options. The points assigned to each option, ranging from zero to three, are added up to determine the severity score. A score of five or higher indicates a diagnosis of MDD. Validity has been evaluated in comparison to an independent, organized MHP interview.

**The PH-9 scores for depression severity are as follows:**

**Depression severity interpretation:** Score 0-4=none, Score 5-9=mild depression, score 10-14=moderate depression, score 15-19 moderately severe depression and score=20-27 severe depression PHQ-9 score ≥ 10 had 88% specificity and sensitivity for major depression.

**Alcohol dependence:** The Alcohol Use Disorders Identification Test (AUDIT), developed by the World Health Organization, is a highly accurate and user-friendly screening tool that is sensitive to the early identification of risky and high-risk (or hazardous and dangerous) drinking. It includes three inquiries about alcohol use (numbers 1 through 3), three inquiries about drinking habits and dependence (numbers 4 through 6), and four inquiries about the effects or issues associated with drinking 7 to 10. It is advised to

consider total scores of 8 or higher as signs of risky and dangerous alcohol usage as well as potential alcohol dependence. If the result is greater than or equal to 8, alcohol dependency is declared.

A person is said to have a sleeping difficulty if their sleep is disrupted in some way, such as by frequent interruptions, early morning awakenings, or nighttime awakenings that leave them unable to fall back asleep.

**Risky sexual behavior:** If a person's sexual conduct puts them at danger of contracting a Sexually Transmitted Infections (STI) like HIV/AIDS, syphilis, gonorrhea, etc., they are said to engage in risky sexual behavior.

**Medical condition:** A person is considered to have a medical condition if they have one or more of the following chronic illnesses: epilepsy, diabetes, high blood pressure, gastritis, HIV/AIDS, or any other psychological disease like depression, manic, or bipolar disorder.

**Stressful/traumatic life event:** A person is said to have experienced a stressful or traumatic life event if they have gone through one or more of the conditions listed below, which might happen occasionally throughout life: losing a loved one, dealing with family issues, having insufficient money, surviving an accident, etc.

**Addictive behavior:** The use of substances that can lead to dependence, such as morphine, heroin, alcohol, smoking cigarettes, and chewing khat, is characterized as addictive behavior.

### Data analysis

The collected data was tallied in the prepared tally sheet. Calculation was calculated by using Microsoft excel and contingency table to calculate $x^2$ and P-value. The association between dependent and independent variable was tested by using $x^2$ test at 95% confidence and a p-value of <0.05 was used to declare the significance of the association.

### Ethical consideration

A formal letter was obtained from Jimma University and given for Jimma University registrar office to get permission and some important data. Confidentiality of the respondents was assured that any person name will not appear on research documents and respondents was informed about the aim of the study and assured to have the right to not responding.

## RESULTS AND DISCUSSION

### Socio-demographic characteristics

Table 1 shows majority of JU medical students are laid on the age of 20- 24 years (74.8%) followed by 25- 29 years (14.3%), most of them are male (84.55%), orthodox (39.43%) in religion followed by Muslim (36.18%), Oromo (42.28%) in ethnicity followed by Amhara (32.93%) and majority of them are single (93.09%).

Which is comparable with a cross sectional study done among Adama university undergraduate students in 2012 leading age group was 20-24 years (80%), male (87.9%), orthodox (42.6%) and Muslim (31.6%) follower [33].

**Table 1:** Socio-demographic characteristics and frequency of depression disorder among JU medical students from June 3-10/2021.

| Role no. | Variable | | | | |
|---|---|---|---|---|---|
| 1 | Age | Frequency | Percentage (%) | Having depression | |
| | | | | Frequency | Percentage (%) |
| | ≤ 19 | 27 | 10.98 | 6 | 2.44 |
| | 20-24 | 184 | 74.8 | 47 | 19.11 |
| | 25-29 | 35 | 14.23 | 10 | 4.07 |
| | Total | 246 | 100 | 63 | 25.61 |
| 2 | **Sex** | | | | |
| | Male | 208 | 84.55 | 47 | 19.11 |
| | Female | 38 | 15.45 | 16 | 6.5 |
| | Total | 246 | 100 | 63 | 25.61 |
| 3 | **Religion** | | | | |
| | Muslim | 89 | 36.18 | 17 | 6.91 |
| | Orthodox | 97 | 39.43 | 29 | 11.79 |
| | Protestant | 54 | 21.95 | 15 | 6.1 |
| | Other | 6 | 2.44 | 2 | 0.81 |
| | Total | 246 | 25.61 | 63 | 25.61 |
| 4 | **Ethnicity** | | | | |
| | Oromo | 104 | 42.28 | 32 | 13.01 |
| | Amhara | 81 | 32.93 | 17 | 6.91 |
| | SNNP | 48 | 19.51 | 4 | 1.63 |
| | Tigri | 13 | 5.28 | 3 | 1.22 |
| | Total | 246 | 25.61 | 63 | 25.61 |
| 5 | **Marital status** | | | | |
| | Single | 229 | 93.09 | 59 | 23.98 |
| | Married | 17 | 6.91 | 4 | 1.63 |
| | Total | 246 | 25.61 | 63 | 25.61 |
| 6 | **Year of education** | | | | |
| | 1st | 61 | 24.8 | 11 | 4.47 |
| | 2nd | 47 | 19.11 | 10 | 4.07 |
| | 3rd | 51 | 20.73 | 12 | 4.88 |
| | 4th | 31 | 12.6 | 9 | 3.66 |
| | 5th | 33 | 13.41 | 11 | 4.47 |
| | 6th | 23 | 9.35 | 10 | 4.07 |
| | Total | 246 | 25.61 | 63 | 25.61 |
| 7 | **Monthly income** | | | | |
| | Not adequate | 66 | 26.83 | 34 | 13.82 |
| | Adequate | 174 | 70.73 | 29 | 11.79 |
| | Excess | 6 | 2.44 | 0 | 0 |
| | Total | 246 | 100 | 63 | 25.61 |

A significant number of JU medical students get inadequate income (26.83%) and from which more than half of them have depressive disorder (13.82%) (Figure 2).

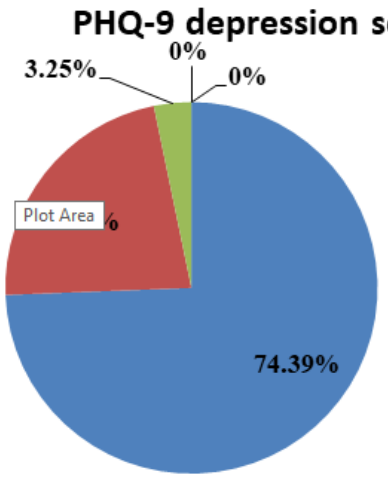


**Figure 2:** PHQ-9 depression score of JU medical students from June 3-10/2021. **Note:** ( ■ ) 0-4, none; ( ■ ) 5-9, mild depression; ( ■ ) 10-14, moderate depression; ( ■ ) 15-19, moderately severe depression; ( ■ ) 20-27, severe depression.

Among 246 JU medical students 25.61% was screened to have depressive disorder from which 22.36% has mild depression and 3.25 students has moderate depression which is slightly higher than Adama university student (21.6%), this deference may be explained by medical students has load of education (Table 2) [33].

**Table 2:** AUDIT alcohol use problem score and frequency of depression disorder among JU medical students from June 3-10/2021.

| Score | Frequency | Percentage (%) | Having depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| <8 | 207 | 84.15 | 43 | 17.48 |
| ≥ 8 (have problem of alcohol use) | 39 | 15.85 | 20 | 8.13 |
| Total | 246 | 100 | 63 | 25.61 |

From those 246 JU medical students 15.85% have alcohol use disorder and more than half of them have depressive disorder (8.13%); but it is much lower than Adama university students (37.9%); this may be due to different method of alcohol use disorder (Table 3) [33].

**Table 3:** Distribution of student have hx of stress/tension throughout life and frequency of depression disorder among JU medical students from June 3-10/2021.

| Have hx of stress/ tension | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 66 | 26.83 | 34 | 13.82 |
| No | 180 | 73.17 | 29 | 11.79 |
| Total | 246 | 25.61 | 63 | 25.61 |

Among 246 JU medical students 26.83% has history of stress/tension from which more than halve of them has depressive disorder (13.82%) (Table 4).

**Table 4:** Distribution of students who has hx of performing unprotected sex throughout life and frequency of depression disorder among JU medical students from June 3-10/2021.

| Perform unprotected sex | Frequency | Percentage (%) | Having depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 18 | 7.32 | 12 | 4.88 |
| No | 228 | 92.68 | 51 | 20.73 |
| Total | 246 | 100 | 63 | 25.61 |

Among 246 JU medical students 7.32% was performed unprotected sexual intercourse from which more than 2nd/3rd has depressive disorder (4.88%) (Table 5).

**Table 5:** Distribution of student who perform unprotected sex as well status of test for HIV/AIDS or other STI and frequency of depression disorder among JU medical students from June 3-10/2021.

| Tested | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 14 | 77.78 | 4 | 22.22 |
| No | 4 | 22.22 | 2 | 11.11 |
| Total | 18 | 100 | 6 | 33.33 |

**Note:** All tested students are negative for both HIV/AIDS and other STI.

From students who perform unprotected sex 22.22% didn't test for HIV/AIDS or other STI and ½ of them has depression (Table 6) [11].

**Table 6:** Distribution of students who have sleeping disturbance and frequency of depression disorder among JU medical students from June 3-10/2021.

| Have hx of sleeping disturbance | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 106 | 43.09 | 54 | 21.95 |
| No | 140 | 56.91 | 9 | 3.66 |
| Total | 246 | 100 | 63 | 25.61 |

Among 246 JU medical students 43.09% has sleeping disorder from which more than half of them have depressive disorder (21.95%) (Table 7).

**Table 7:** Distribution of students who have family hx of mental illness and frequency of depression disorder among JU medical students from June 3-10/2021.

| Have fx hx of mental illness | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 13 | 5.28 | 8 | 3.25 |
| No | 233 | 94.72 | 55 | 22.36 |
| Total | 246 | 100 | 63 | 25.61 |

Among 246 JU medical students 5.28% have family history of mental illness from which more than 2nd/3rd has depressive disorder (3.25%) but this is much lower than Adama university students (19.5%) (Table 8) [33].

**Table 8:** Distribution of students who have hx of smoking and frequency of depression disorder among JU medical students from June 3-10/2021.

| Cigarette smoking | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 57 | 23.17 | 37 | 15.04 |
| No | 189 | 76.83 | 26 | 10.57 |
| Total | 246 | 100 | 63 | 25.61 |

Among 246 JU medical students 23.17% was smoking cigarette from which more than half has depressive disorder (15.04%) but it is much higher than Adama university students (11.4%) (Table 9) [33].

**Table 9:** Distribution of student who face problem in compass and frequency of depression disorder among JU medical students from June 3-10/2021.

| Faced problem | | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|---|
| | | | | Frequency | Percentage (%) |
| Yes | Economical | 8 | 3.25 | 12 | 4.88 |
| | Experiencing dispute with beloved one | 4 | 1.63 | | |
| | Losing beloved one | 1 | 0.41 | | |
| | Experiencing illness | 3 | 1.22 | | |
| | Loneliness | 2 | 0.81 | | |
| | Other | 1 | 0.41 | | |
| | Total | 19 | 7.72 | | |
| No | | 227 | 92.28 | 51 | 20.73 |
| Total | | 246 | 100 | - | 25.61 |

Among 246 JU medical students 7.72% was faced problems in their campus life from which economic problem (3.25%) was the leading one followed by experiencing dispute with family or beloved one (1.63%) and experiencing illness (1.22%); more than 2nd/3rd of them has depressive disorder (4.88%) (Table 10).

**Table 10:** Distribution of student who has hx of khat chewing and frequency of depression disorder among JU medical students from June 3-10/2021.

| Khat chewing | Frequency | Percentage (%) | Have depression | |
|---|---|---|---|---|
| | | | Frequency | Percentage (%) |
| Yes | 52 | 21.13 | 29 | 11.79 |
| No | 194 | 78.86 | 34 | 13.82 |
| Total | 246 | 100 | 63 | 25.61 |

Among 246 JU medical students 21.13% was chew khat and more than half of them have depressive disorder (11.79%) but it is much lower than Adama university students (40.09%).

## Testing association between dependant and independent variable

The below tables explains the testing association between the dependent variables and independent variables like age, sex, religion, monthly income, year of education, stress/tension, sleeping disturbance, mental illness, cigarette smoking, faced problem, Khat chewing, where these all are causing the depression. (Tables 11-22)

**Table 11:** Association between age and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Age | Having depression | | | DF | $X^2$ ($\alpha$ =0.05) | P-value |
| | Yes | No | Row total | | | |
| ≤ 19 | 6 | 21 | 27 | 2 | 0.324 | 0.85 |
| 20-24 | 47 | 137 | 184 | | | |
| 25-29 | 10 | 25 | 35 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| ≤ 19 | 6.91 | 20.1 | | - | - | - |
| 20-24 | 47.1 | 137 | | | | |
| 25-29 | 8.96 | 26 | | | | |

**Note:** Since P-value >0.05 there is no statically significant association between age and depressive disorder.

**Table 12:** Association between sex and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Sex | Having depression | | | DF | $X^2$ ($\alpha$ =0.05) | P-value |
| | Yes | No | Row total | | | |
| Male | 47 | 161 | 208 | 1 | 6.42 | 0.011 |
| Female | 16 | 22 | 38 | | | |
| Column total | 63 | 183 | 246 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Male | 53.3 | 155 | | - | - | - |
| Female | 9.73 | 28.3 | | | | |

**Note:** Since P-value >0.05 there is no statically significant association between age and depressive disorder.

**Table 13:** Association between religious and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Religion | Having depression | | | DF | $X^2$ (α =0.05) | P-value |
| | Yes | No | Row total | | | |
| Muslim | 17 | 72 | 89 | 3 | 3.24 | 0.357 |
| Orthodox | 29 | 68 | 97 | | | |
| Protestant | 15 | 39 | 54 | | | |
| other | 2 | 4 | 6 | | | |
| Column total | 63 | 183 | 246 | Male | Male | Male |
| **Expected value** | | | | | | |
| Muslim | 22.8 | 66.2 | | | | |
| Orthodox | 24.8 | 72.2 | | | | |
| Protestant | 13.8 | 40.2 | | | | |
| other | 1.54 | 4.46 | | | | |

**Note:** Since P-value >0.05 there is no statically significant association between religion and depressive disorder

**Table 14:** Association between monthly income and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Monthly income | Having depression | | | DF | $X^2$(α =0.05) | P-value |
| | Yes | No | Row total | | | |
| Not adequate | 34 | 32 | 47 | 2 | 32.6 | 0 |
| Adequate | 27 | 145 | 130 | | | |
| Excess | 0 | 6 | 6 | | | |
| Column total | 63 | 173 | 246 | | | |
| **Expected value** | | | | | | |
| Not adequate | 16.9 | 49.1 | | | | |
| Adequate | 44.6 | 129 | | | | |
| Excess | 1.54 | 4.46 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between monthly income and depressive disorder.

**Table 15:** shows association between years of education and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Year of education | Having depression | | | DF | $X^2$(α =0.05) | P-value |
| | Yes | No | Row total | | | |
| 1st | 11 | 50 | 61 | 5 | 7.5 | 0.186 |
| 2nd | 10 | 37 | 47 | | | |
| 3rd | 12 | 39 | 51 | | | |
| 4th | 9 | 22 | 31 | | | |
| 5th | 11 | 22 | 33 | | | |
| 6th | 10 | 13 | 23 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| 1st | 15.6 | 45.4 | | | | |
| 2nd | 12 | 35 | | | | |
| 3rd | 13.1 | 37.9 | | | | |
| 4th | 7.94 | 23.1 | | | | |
| 5th | 8.45 | 24.5 | | | | |
| 6th | 5.89 | 17.1 | | | | |

**Note:** Since P-value >0.05 there is no statically significant association between year of education and depressive disorder.

**Table 16:** shows association between have hx of stress/tension and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Have hx of stress/ tension | Having depression | | | DF | $X^2$(α =0.05) | P-value |
| | Yes | No | Row total | | | |
| Yes | 34 | 32 | 66 | 1 | 31.8 | 0 |
| No | 29 | 151 | 180 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 16.9 | 49.1 | | | | |
| No | 46.1 | 134 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between hx of stress or tension and depressive disorder.

**Table 17:** Association between performing unprotected sex and have depression among JU medical students from June 3 - 10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Performing unprotected sex | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | 1 | 17.2 | 0 |
| Yes | 12 | 6 | 18 | | | |
| No | 51 | 177 | 228 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 4.61 | 13.4 | | | | |
| No | 58.4 | 170 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between performing unprotected sex and depressive disorder.

**Table 18:** Association between sleeping disturbance and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Have sleeping disturbance | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | 1 | 62.7 | 0 |
| Yes | 54 | 52 | 106 | | | |
| No | 9 | 131 | 140 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 27.1 | 78.9 | | | | |
| No | 35.9 | 104 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between have sleeping disorder and depressive disorder.

**Table 19:** Association between have family hx of mental illness and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Fx hx of mental illness | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | 1 | 10.1 | 0.002 |
| Yes | 8 | 5 | 13 | | | |
| No | 55 | 188 | 233 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 3.2 | 9.8 | | | | |
| No | 59.8 | 183 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between family history of mental illness and depressive disorder.

**Table 20:** shows association between cigarette smoking and have depression among JU medical students from June 3 - 10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Cigarette smoking | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | 1 | 60.2 | 0 |
| Yes | 37 | 20 | 57 | | | |
| No | 26 | 163 | 189 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 14.6 | 42.4 | | | | |
| No | 48.4 | 141 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between cigarette smoking and depressive disorder.

**Table 21:** Association between facing problem in campus life and have depression among JU medical students from June 3-10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Faced problem | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | 1 | 17.1 | 0 |
| Yes | 12 | 6 | 19 | | | |
| No | 51 | 176 | 227 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 4.63 | 13.4 | | | | |
| No | 58.4 | 169 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between faced problem in campus and depressive disorder.

**Table 22:** Association between khat chewing and have depression among JU medical students from June 3 - 10/2021.

| Observed value | | | | | | |
|---|---|---|---|---|---|---|
| Khat chewing | Having depression | | | DF | $X^2(\alpha=0.05)$ | P-value |
| | Yes | No | Row total | | | |
| Yes | 29 | 23 | 52 | 1 | 31.5 | 0 |
| No | 34 | 160 | 194 | | | |
| Column total | 63 | 183 | 246 | | | |
| **Expected value** | | | | | | |
| Yes | 13.3 | 38.7 | | - | - | - |
| No | 49.7 | 144 | | | | |

**Note:** Since P-value <0.05 there is statically significant association between khat chewing and depressive disorder.

## CONCLUSION

Twenty five percent (25.61%) of students were screened to have depressive disorder from which 22.36% have mild depression and 3.25 have moderate depression. Forty three percent (43.09%) of students have sleeping disorder from which more than half of them have depressive disorder (21.95%). Twenty one (21.13%) of students were chew khat and more than half of them have depressive disorder (11.79%). There is statically significant association between independent variables sex, monthly income, history of stress or tension, performing unprotected sex, sleeping disorder, family history of mental illness, cigarette smoking, faced problem in campus and khat chewing, with depressive disorder.

It is better to have more recreational areas such as gymnasium, functional DSTV house, appropriate sport fields (football, basketball and handball) to relax students and to prevent stress or tension which is one of the major risk factor for depression. It is better to have psychiatric consultant and psychologist at JU student clinic.

It is better to have more recreational areas such as gymnasium, functional DSTV house, appropriate sport fields (football, basketball and handball) to relax students and to prevent stress or tension which is one of the major risk factor for depression. It is better to have psychiatric consultant and psychologist at JU student clinic.

## DECLARATION

### Ethics approval and consent to participate

A formal letter was obtained from Jimma University and given for Jimma University registrar office to get permission and some important data. Confidentiality of the respondents was assured that any person name will not appear on research documents and respondents was informed about the aim of the study and assured to have the right to not responding.

### Consent for publication

Not applicable.

### Availability of data and materials

The paper includes all data.

## CONFLICT OF INTERESTS

There are no conflicts of interests stated by the authors.

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For this project, there was no financing available.

## CONTRIBUTIONS OF THE AUTHORS

KTT was responsible for conceptualization, methodology, analysis, supervision, and report writing, TKW was responsible for conceptualization, methodology, analysis, supervision, and report writing, BM was responsible for analysis, report writing and methodology.

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