

# Assessment of the Prevalence of Depression and Associated Factors in Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia

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## Abstract

**Background:** It is presumed that depression is the major psychological problem among inmates as they are believed to be under a vast mental and physical stress compared to the general population. **Objective:** The aim of this study is to assess the prevalence of depression and associated factors in Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia. **Method:** An institutional based cross-sectional study was conducted to assess the prevalence of depression. The samples were selected by systematic random sampling technique and data was collected by using structured questionnaire in accordance with PHQ-9 screening and scoring Scale. The sample was calculated by using sample size calculating formula and correction formula. The data was coded and entered into computer and analyzed by using SPSS version 20. Bivariate and multivariate logistic regressions were done for association, and finally frequencies and other descriptive statistics were computed. **Result:** The overall prevalence of depression among inmates was 54.4%, of which 53 (15.4%), 31 (9%), 29 (8.4%), and 74 (21.5%) met the criteria for mild, moderate, moderately severe, and severe depression respectively. Factors associated with depression were future apprehension and the environments of the prison. However, multiple logistic regression analysis revealed that the strongest predictor of depression was suicidal ideation [AOR= 25.547; 95% CI: 12.166, 53.648,  $p < 0.01$ ]. **Conclusion:** In conclusion, the prevalence of depression among inmates in Ambo Prison were found to be high, in which most of them met the criteria for severe depression contributing to suicidal ideation and actual attempts.

**Keywords:** Associated factors, Ambo, Depression, Prevalence, Severity

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## INTRODUCTION

Prison is an institution, usually under state control, where sentenced prisoners and accused persons incarcerated in custody are legally held as a punishment or while awaiting trial. The prison system is under a considerable pressure making it more difficult to manage prisoners' mental well-being by annulling the formation and development of basic human values, which in turn may contribute to stigmatization and disruption of conducts that may lead to temporary or even irreversible psychological sequel (1, 2, 3).

Evidences suggest that captivity settings lead to anxiety, depression, self-harming or hetero-aggressive behavior, obsessions, psychoactive substance abuse, and suicide by reducing a person's bio-psychosocial balance to such a degree that the memory of a individual negative event dominates all other experiences and disturb the ability to cope with reality (2, 4, 5). Furthermore, anticipated suffering in life outside of incarceration, fear of family abandonment, guilt for being absent from raising and educating their children, losing their right to the social importance of work, identity loss, social discrimination that impairs prospects for working outside of the criminal context, and social recognition also contribute to psychiatric problems among this population (6).

From the realistic mental health problems that can be acquired while incarcerated, depression has an overriding prevalence. It refers to a wide range of mental health problems characterized by a loss of interest and entertainment in normal activities, exhausted mood, and a range of associated emotional, cognitive, physical, and behavioral symptoms (7).

According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition, five or more of the following symptoms have been present during the same 2 weeks period and represent a change from previous functioning: at least one of the symptoms is either (1) depressed mood (e.g., feels sad, empty, hopeless) most of the day, nearly every day or (2) loss of interest or pleasure in all, or almost all, activities most of the day, nearly every day. The remaining 7 symptoms include (3) significant weight loss when dieting or weight gain (e.g., a change of more than 5% of body weight in a month), or decrease or increase in appetite nearly every day, (4) insomnia or hypersomnia nearly every day, (5) psychomotor agitation or retardation (feelings of restlessness or being slowed down) nearly every day, (6) fatigue or loss of energy nearly every day, (7) feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day, (8) diminished ability to think or concentrate, or indecisiveness, nearly every day, and (9) recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan or a suicide attempt or a specific plan for committing suicide are the symptoms that indicate the presence of depression in an individual (8).

Globally, depression is a common disorder with more than 300 million persons affected. It is different from

conventional fluctuation and short-lived emotional disorder in response to difficult challenges and dilemmas of everyday life. Obviously, when long-lasting and with moderate/severe intensity, it may become a dangerous health condition. It has a substantial potential morbidity and mortality, contributing to an incidence and adverse results of medical illness, disruption in interpersonal relationships, substance abuse, and lost work time. At its worst, depression can lead to suicide; close to 800,000 people die of suicide every year. Suicide is the second leading cause of death in 15-29 years olds (9, 10).

In developing countries, the prevalence rates of depression are higher (11). Gender differences exist with respect to effects of imprisonment on both male and female inmates. Mental health problems have been observed to be higher among incarcerated inmates compared to the general population and are a significant source of morbidity among prisoners (12, 13, and 14).

Depression is a significant contributor to the global burden of disease and affects people in all communities across the world. Lifetime prevalence estimates vary widely from 3% in Japan to 17% in the US. However, epidemiology data have shown higher rates in the Middle East, North Africa, and Russia than other countries (15). By 2020, depression is set to become the second largest cause of disease burden and the third most common reason for primary care consultation (16).

In Ethiopia, depression contributes to about 6.5% of burden of disease; the highest share of burden compared to other form of mental disorders (17, 18). WHO has identified strong links between depression and other Non-communicable Disorders and Diseases like substance abuse, HIV/AIDS, Diabetes, Asthma, and heart diseases; the opposite is also true; meaning that people with these other condition have a higher risk of depression. Depression is also an important risk factor for suicide which claims hundreds of thousands of lives each year (9).

Among the world's population, prisoners are more prone to depression than other groups. Once prisoners are incarcerated, they will not have the freedom to execute their own decisions; communication and relationships with families and friends are circumscribed. While it is understandable that any imprisoned individual would be foreseeably depressed, it is important to comprehend depression from the perspective of a mental illness (19).

Recognition and treatment of depression often take place in primary, secondary, and tertiary healthcare with trained and qualified personnel (20). However, this level of personnel are lacking among prisons. Hence, the conspicuous difficulty in the assessment and treatment of individuals in such category. Furthermore, this condition is worsened by the fact that the proportions of the prisoners with possible clinically diagnosable psychiatric morbidity and significant depressive symptoms are quite high. This could be because the health systems in developing countries is poorly organized and poorly funded as compared with the health care system in industrialized countries (21, 22, 23).

Ethiopia, as in most countries, prison systems shoulder the burden of providing healthcare service. They are, however, ill-equipped to perform this responsibility due to limited resources (human and capital), corruption, and the ever-increasing number of inmates. In many countries (including Ethiopia), prison establishments are struggling to provide minimal mental health services to prisoners and only a few have acquainted with psychiatrists. The provisions for the mentally disordered prisoners have also been observed to be inadequate. Given the limited resources of most prisons, it seems doubtful whether most prisoners with these illnesses receive appropriate care. In Ethiopia, mental health has been one of the most disadvantaged health programs both in terms of facilities and trained manpower. But during the last decades, encouraging efforts have been taken to expand services throughout the country (24, 25).

The experience of incarceration appears to influence the physical and mental health of inmates as self-reported health problems increase with inmate duration of incarceration (26). The impact of marital status, parental status, and social support (both inside and outside of the jail) on various dimensions of mental health has also been examined in studies. Available data indicate that imprisonment is severely stressful for many inmates. This may be because prisons were not set up to be corrective. Rather, they were punitive in the criminal justice system. Prison environments, which are often characterized by gross infrastructural decay and poor amenities, are potentially damaging situations. Thus, their negative psychological effects must be taken seriously, carefully evaluated, purposefully regulated, and controlled. To this end, incarcerations should be viewed, not only as a correctional opportunity, but also as an opportunity to engage clinical and social resources for the full benefit of these inmates (27, 28, 29).

Education and the implementation of specific stress-management programs to the inmates and officials may be beneficial to ensure that stress within prisons is confined to tolerable limits. This study will be undertaken to provide information on the prevalence, burden, and associated factors of depression in the population of the prisoners in Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia. The study is also believed to provide data that may assist in the formulation of the necessary preventive and treatment strategies on the target population. To the best knowledge of the researcher and to the extent of available literature reviews, this study will be the first to be conducted on the prevalence of depression and associated factors among prisoners in Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia. Therefore the aim of this study was to assess the prevalence of depression disorder and associated factors among inmates in Ambo Prison, Ambo Town, West

Shewa Zone, Oromia Region, Ethiopia, 2018 G.C.

## METHODS AND MATERIALS

### Study Period and Area

The study was conducted from April – May 30, 2018 in Ambo Prison which is situated 114 k.m. west of the capital city of Ethiopia, Addis Ababa, in the town of Ambo. The prison located in Kebele 06 is one of the several prisons in the area which holds unlawful individuals.

The town has one Referral Hospital, One General Hospital, one MCH special Clinic, and two Health Centers in addition to many other private facilities.

### Study Design

An institutional based cross-sectional study was conducted among inmates in Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia, 2018 G.C.

### Population

#### Source Population

The source population was all inmates of Ambo Prison, Ambo Town, West Shewa Zone, Oromia Region, Ethiopia, 2018 G.C.

#### Study Population

The study population was every 5<sup>th</sup> inmates in Ambo Prison on the register in both the male and female sections of the prisons.

#### Inclusion Criteria

- Inmate who were acquiescent to give verbal informed consent regardless of their age and sex.

#### Exclusion Criteria

- Inmates who declined to give consent to participate in the study.
- Inmates who were too ill to participate in the study.
- New inmates (< 2 weeks).

#### Sample Size and Sampling Technique

The study sample was determined according to the finite population correction (fpc) principle, where sample size for a study with a source population greater than 10,000 is calculated with the formula:

$$n = \frac{Z^2pq}{d^2}$$

Where,

n= is the sample size,

Z<sup>2</sup>= is the abscissa of the normal curve that cut off an area at the tail (1- equals the desired confidence level, e.g., 95%), usually set at 1.96.

d= is the desired level of precision,

p= is the estimated proportion of an attribute that is present in the population (0.5), and

q= 1 – p (0.05), which corresponds to the degree of accuracy desired.

$$n = \frac{Z^2pq}{d^2} = \frac{(1.96)^2(0.5)(0.05)}{(0.05)^2} = 384$$

If the study population was greater than 10,000, the required sample size would have been 384. However, in this study, the population was 1,800 (less than 10,000), the required sample size was therefore calculated using the Finite Population Correction for Proportions formula.

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Where,

n= the desired sample size when population is < 10,000,

n<sub>0</sub>= the desired sample size when population is > 10,000, and

N= is the estimated study population.

$$n = \frac{384}{1 + \frac{(384 - 1)}{1800}}$$

This gave a sample size of 317.

Using an assumed non-response rate of 15%, a corrected sample size was calculated with the formula:

$$\frac{\text{sample size}}{100 - 15} \times 100 = \frac{317}{0.85} = 372.9$$

Approximately, 373 was obtained to make room for non-responders.

A systematic random sampling was done by using the prisons register (sampling frame) and the sampling interval size was calculated by using the formula:

$$N/n = k$$

Where,

N= is the total population (1800),

n= is the sample size (373), and

k= is the sampling interval size.

$$\frac{1800}{373} = 4.8 \text{ (approximately 5)}$$

Therefore, every 5<sup>th</sup> inmate on the register in both the male and female sections of the prison was selected.

### Data Collection

Relevant information was collected by using structured questionnaire prepared to be filled by prison inmates. The questionnaire that was designed comprised of questions pertaining to socio-demographic data, clinical information, and penal characteristics.

### Study Variables

#### Dependent Variables

- Prevalence of depression

#### Independent Variables

- Socio-demographic characteristics of prison inmates
- Penal characteristics of prison inmates
- Health related characteristics of prison inmates
- Discontinuation of substance use due to incarceration

### Data Quality Assurance

To ensure the quality of data, the questionnaire was pretested by taking 5% of the total sample size, and imperative corrections were done after the pretest prior to the actual data collection. The data was also authenticated for completeness and any missing information at each point. Furthermore, data was validated during entry and compilation before analysis.

### Data Analysis

Data was entered into a micro-computer and analyzed using Statistical Package for Social Sciences (SPSS) software for windows version 20. Data handling was confidential.

### Ethical Consideration

Ethical clearance was requested and obtained from the research ethical review committee of College of Medicine and Health Science, University of Ambo. Subsequently, an official letter was prepared to get authorization to collect data at respective faculties. Verbal consent was sought from concerned staffs and confidentiality of the information was assured in such a way that no disclosure of any name of the participants in relation to finding will be made.

### Operational Definitions

**Depression:** A mental condition characterized by feelings of severe despondency and dejection, typically also with feelings of inadequacy and guilt, often accompanied by lack of energy and disturbance of appetite and sleep.

**Incarceration:** The state of being confined in prison.

**Offense afflicted:** The type of offense that the inmate afflicted (the type of crime the inmate was convicted with). It was classified into violent crime (murder, female trafficking, and kidnapping), sexual offense (forced sexual intercourse (rape), and attempted rape), drug crime (use, possession, manufacture, or distribution of drugs classified as having a potential for abuse), property crime (burglary, robbery, motor vehicle theft, and theft), and other crimes (fraud, wildlife and forest crime, and other non-violent crimes).

**Prison:** A building in which people are legally held as a punishment for a crime they have committed or while awaiting trial.

**Sentence served:** Type of punishment assigned to a defendant found guilty by a court, or fixed by law for a particular offense. It was classified into EPP (Extended Sentence for Public Protection), IPP (Indeterminate Sentence for Public Protection), Simple Imprisonment Sentence, Life sentence, and Suspected in Remand.

**Suspect in Remand:** A defendant in custody while awaiting trial.

## RESULT

From the 373 subjects involved in the study, 344 (92.2%) had given complete information by filling in the provided questionnaires appropriately, while 29 (7.8%) had failed to do so. Thus, declared ineligible.

### Socio-demographic characteristics of study participants (prison inmates) in Ambo Prison

The 344 (92.2%) study participants (prison inmates) ranged in age from 16 to 78 years, with a mean age of 24.1 (50±11.32), most of whom were between the age of 18 and 25 years (53%). 15 inmates, representing 4.4% of the study population, were found to be underage, having ages below the legal age of 18 years and 28 inmates, representing 8.1 % of the study population, their ages were found to be unknown. From the 344 (92.2%) study participants, 341 were males representing 99.1% of the sample population, while 3 were females (0.9%)(see Table 2.

Out of 344(92.2%) inmates 216 followed Christianity accounting for 62.8%, while 12 (3.5%), 106 (30.8%), 4 (1.2%), and 6 (1.7%) followed, Islamism, Wa'aqefeta, Atheism, and other unspecified religions respectively; 340 (98.8%) were among the Oromo ethnic group, 2 (0.6%) were among the Amhara ethnic group, while 2 (0.6%) were mixed; 16 (4.7%) were illiterates (unable to read or write), 15 (4.4%) had only reached pre-primary education level, 119 (34.6%) had only reached primary education level, 142 (41.3%) had only reached secondary education level, while 52 (15%) had reached higher education levels (Universities or colleges); 203 (59%) were singles, 129 (37.5%) were married, 9 (2.6%) were divorced, and 3 (0.9%) were widowed; 135 (39.2%) had children, 1 (0.3%) had a deceased child, while 208 (60.5%) didn't have children; 72 (20.9%) were farmers for own consumptions prior to incarceration, 12 (3.5%) were farmers for commercial products, 36 (10.5%) were government employees, 26 (7.6%) were private employees, 15 (4.4%) were engaged in family businesses, while 177 (51.5%) were unemployed.

**Table 1 Socio-demographic characteristics of study participants (prison inmates) in Ambo Prison, Ethiopia. [Descriptive statistics: n = frequency, % = percentage]**

| Variable                | N (%)      |
|-------------------------|------------|
| <b>Sex</b>              |            |
| Male                    | 341 (99.1) |
| Female                  | 3 (0.9)    |
| <b>Age</b>              |            |
| < 18 years              | 15 (4.4)   |
| 18-25 years             | 182 (53)   |
| 26-33 years             | 70 (20.3)  |
| 34-41 years             | 28 (8.1)   |
| 42-49 years             | 11 (3.2)   |
| 50-57 years             | 6 (1.7)    |
| 58-65 years             | 3 (0.9)    |
| > 65 years              | 1 (0.3)    |
| Unknown                 | 28 (8.1)   |
| <b>Religion</b>         |            |
| Orthodox                | 106 (30.8) |
| Muslim                  | 12 (3.5)   |
| Catholic                | 6 (1.7)    |
| Protestant              | 104 (30.2) |
| Wa'aqefeta              | 106 (30.8) |
| Atheist                 | 4 (1.2)    |
| Others                  | 6 (1.7)    |
| <b>Ethnic Group</b>     |            |
| Oromo                   | 340 (98.8) |
| Amhara                  | 2 (0.6)    |
| Mixed                   | 2 (0.6)    |
| <b>Education Status</b> |            |
| Illiterate              | 16 (4.7)   |
| Pre-primary education   | 15 (4.4)   |
| Primary education       | 119 (34.6) |
| Secondary education     | 142 (41.3) |
| Higher education levels | 52 (15.1)  |

| Variable                                 | N (%)      |
|--|------------|
| <b>Marital Status</b>                    |            |
| Single                                   | 203 (59)   |
| Married                                  | 129 (37.5) |
| Divorced                                 | 9 (2.6)    |
| Widowed                                  | 3 (0.9)    |
| <b>Parenthood</b>                        |            |
| Have children                            | 135 (39.2) |
| Don't have children                      | 208 (60.5) |
| Deceased children                        | 1 (0.3)    |
| <b>Occupation Prior to Incarceration</b> |            |
| Unemployed                               | 177 (51.5) |
| Farmer for own consumption               | 72 (20.9)  |
| Farmer for commercial products           | 12 (3.5)   |
| Government employee                      | 36 (10.5)  |
| Private employee                         | 26 (7.6)   |
| Self-employed                            | 15 (4.4)   |
| Family business                          | 6 (1.7)    |

### Penal characteristics of study participants (prison inmates) in Ambo Prison

Out of 344 (92.2%) inmates, 154 were serving an Extended Sentence for Public Protection (EPP) representing 44.8% of the study population, 151 were serving an Indeterminate Sentence for Public Protection (IPP) representing 43.9%, 16 were serving a Simple Imprisonment Sentence representing 4.7 %, 14 were serving Life Sentence representing 4.1%, and 9 were Suspects in Remand representing 2.6% of the study population in which 324 (94.2%) were first-time offenders, while 20 (5.8%) were previously incarcerated; 7 (2%) of the study participants had stayed from 2 weeks – 1 months, while 54 (15.7%), 45 (13.1%), 80 (23.3%), and 158 (45.9%) had stayed from 1 - 6 months, 7 – 12 months, 1 – 2 years, and > 2 years respectively; 23 of the inmates were convicted of property crime accounting for 9.4%, 206 (59.8%) of violent crime, 19 (5.5%) of sexual offense, 1 (0.3%) of drug crime, and 86 (25%) of other crimes; 209 (54.4%) committed the offense unintentionally, 56 (16.3%) had reasons that remained unspecified, 6 (1.7%) committed the offense prevailed upon existing mental illness that remained unspecified in which 1 (16.7%) acknowledged the presence of mental illness because of the society's insistence, 4 (66.6%) were diagnosed at a health center, and 1 (16.7%) was diagnosed traditionally (2 (33.3%) were taking medications that remained unspecified, 3 (50%) had discontinued their medications after being incarcerated, and 1 (16.7%) was not taking any medication for that matter), while 73 (21.2%) supposed unjust incarceration, thus, no justification needed; 131 (38.1%) received visits while in prison, and 213 (61.9%) didn't; 82 (23.8%) had a work performance while in prison, while 262 (76.2%) didn't have.

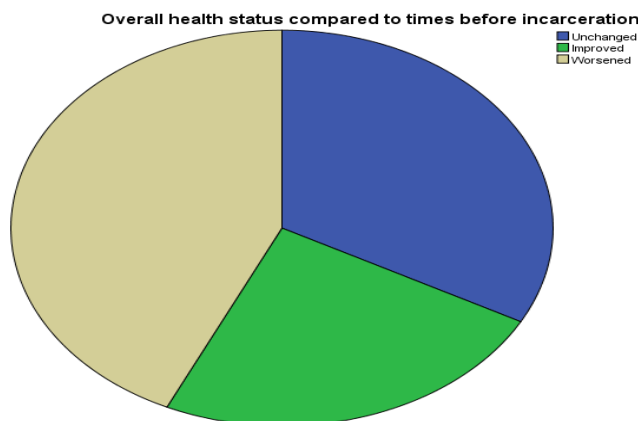
**Table 2: Penal characteristics of study participants (prison inmates) in Ambo Prison, Ethiopia. [Descriptive statistics: n = frequency, % = percentage.]**

| Variable                      | N (%)      |
|-------------------------------|------------|
| <b>Incarceration Period</b>   |            |
| 2 weeks - 1 months            | 7 (2.0)    |
| 1 – 6 months                  | 54 (15.7)  |
| 7 – 12 months                 | 45 (13.1)  |
| 1 – 2 years                   | 80 (23.3)  |
| > 2 years                     | 158 (45.9) |
| <b>Previous Incarceration</b> |            |
| No                            | 324 (94.2) |
| Yes                           | 20 (5.8)   |
| <b>Sentence Served</b>        |            |
| EPP                           | 154 (44.8) |
| IPP                           | 151 (43.9) |
| Simple Imprisonment Sentence  | 16 (4.7)   |
| Life Sentence                 | 14 (4.1)   |
| Suspects in Remand            | 9 (2.6)    |

| Variable  | N (%)      |
|---|------------|
| <b>Offense Afflicted</b>  |            |
| <b>Property crimes</b>  |            |
| Theft   | 23 (6.7)   |
| Robbery   | 3 (0.9)    |
| Motor Vehicle Theft   | 1 (0.3)    |
| Burglary  | 5 (1.5)    |
| <b>Violent crimes</b>   |            |
| Murder  | 127 (36.9) |
| Attempted Murder  | 17 (4.9)   |
| Female Trafficking  | 19 (5.5)   |
| Physical Abuse  | 43 (12.5)  |
| <b>Sexual offenses</b>  |            |
| Forced Sexual Intercourse (Rape)                                | 9 (2.6)    |
| Attempted Forced Sexual Intercourse                             | 10 (2.9)   |
| <b>Drug crimes</b>  |            |
| Drug Crimes   | 1 (0.3)    |
| <b>Other crimes</b>   |            |
| Corruption  | 3 (0.9)    |
| Wildlife and Forest Crimes                                      | 1 (0.3)    |
| Politics Related Issues   | 7 (2.0)    |
| Supposed Unjust Imprisonment                                    | 73 (21.2)  |
| Others/unspecified  | 2 (0.6)    |
| <b>Reasons For Afflicting Offense</b>                           |            |
| It was not intentional  | 209 (60.8) |
| It was not unintentional  | 56 (16.3)  |
| Prevailed upon existing mental illness                          | 6 (1.7)    |
| Supposed unjust imprisonment. Hence, no justification required. | 73 (21.2)  |
| <b>Visits While in Prison</b>                                   |            |
| Receive visits  | 131 (38.1) |
| Do not receive visits   | 213 (61.9) |
| <b>Work performance while in prison</b>                         |            |
| Present   | 82 (23.8)  |
| Absent  | 262 (76.2) |

**Health-related characteristics of study participants (prison inmates)**

Out of 344 (92.2%) inmates, 13 had an unchanged overall health status compared to times before incarceration representing 32.8% of the sample population, 83 had an improved overall health status compared to times before incarceration representing 24.1% of the sample population, and 148 had a worsened overall health status compared to times before incarceration representing 43% of the sample population.



**Figure 1 Overall health status compared to times before incarceration of study participants (prison inmates) in Ambo Prison, Ambo Ethiopia**

Out of 344 (92.2%) inmates, 71 had a very good self-rated overall health status representing 20.6% of the sample population, 154 had a good self-rated overall health status representing 44.8% of the sample population, 90 had a bad self-rated overall status representing 26.2% of the sample population, and 29 had a very bad self-rated overall health status of the sample population; 201 (58.4%) were healthy at the time of the study period, and 143 (41.6%) were ill among which 50 were treated for their illness that remained unspecified and unrated as chronic or acute illness representing 35%, while 93 (65%) were not.

**Table 3 Health characteristics of study participants (prison inmates) in Ambo Prison, Ethiopia. [Descriptive statistics: n = frequency, % = percentage.]**

| Variable  | N (%)      |
|---|------------|
| <b>Self-rated overall health status</b>                             |            |
| Very good   | 71 (20.6)  |
| Good  | 154 (44.8) |
| Bad   | 90 (26.2)  |
| Very bad  | 29 (8.4)   |
| <b>Overall health status compared to times before incarceration</b> |            |
| Unchanged   | 113 (32.8) |
| Improved  | 83 (24.1)  |
| Worsened  | 148 (43)   |
| <b>Current health status</b>  |            |
| Healthy   | 201 (58.4) |
| Ill   | 143 (41.6) |
| <b>Hospital visits</b>  |            |
| Sought treatment  | 50 (15)    |
| Didn't seek treatment   | 93 (27)    |
| Not ill   | 201 (8)    |

**Discontinuation of substance use of study participants (prison inmates) due to incarceration**

Out of 344 (92.2%) of inmates, 61 (17.7%), 10 (2.9%), 18 (5.2%), 7 (2%), 19 (5.5%), 2 (0.6%), 2 (0.6%), and 4 (1.2%) discontinued alcohol consumption, cigarette smoking, khat chewing, alcohol, cigarette, and khat use altogether, alcohol, khat, and illicit drugs use altogether, and all said substances altogether respectively, while 221 (64.2%) didn't discontinue any substance use.

**Table 4: Discontinued substance use due to incarceration of study participants (prison inmates) in Ambo Prison, Ethiopia. [Descriptive statistics: n = frequency, % = percentage.]**

| Variable  | N (%)      |
|---|------------|
| <b>Discontinued substances due to incarceration</b> |            |
| Alcohol   | 61 (17.7)  |
| Tobacco/cigarette                                   | 10 (2.9)   |
| Khat  | 18 (5.2)   |
| Illicit drugs                                       | 7 (2)      |
| Alcohol, cigarettes, and khat                       | 19 (5.5)   |
| Alcohol, khat, and illicit drugs                    | 2 (0.6)    |
| Cigarettes and khat                                 | 2 (0.6)    |
| All   | 4 (1.2)    |
| None  | 221 (64.2) |

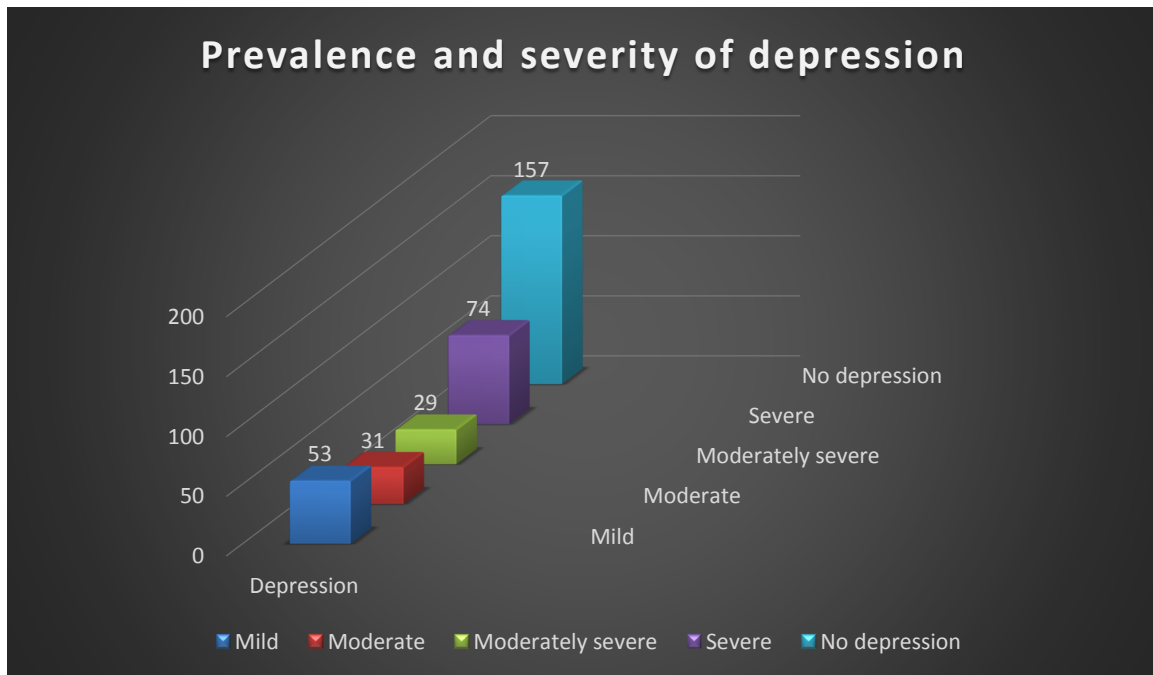
**Factors associated with depression**

From 344 (92.2%) inmates, 229 (66.6%) were influenced by factors associated with disconcerting sentiments that developed after incarceration while 115 (33.4%) were not; 222 (64.5%) were influenced by factors associated with circumscribed affairs while 122 (35.5%) were not; 273 (79.4%) were influenced by factors associated with future apprehension while, 71 (20.6%); 201 (58.4%) were influenced by factors associated with the environment of the prison while 143 (41.6%) were not.

**Prevalence and severity of depression and suicidal ideation among study participants (prison inmates)**

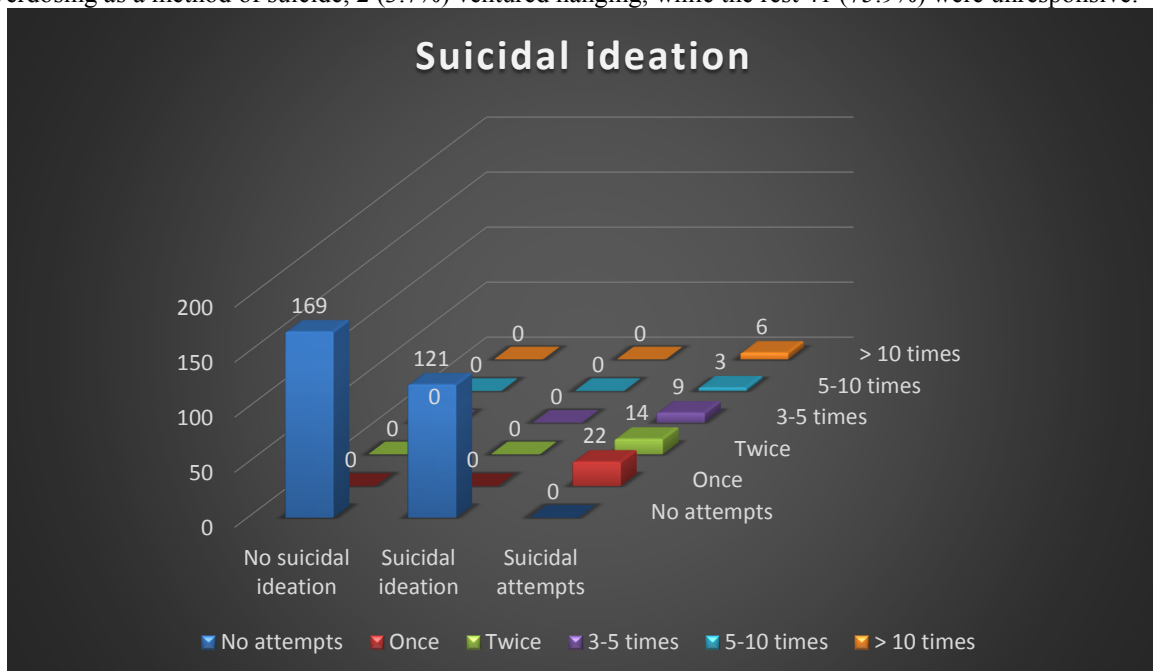
Out of 344 (92.2%) inmates, 187 (54.4%) had depression, of which 53 (15.4%) met the criteria for mild depression, 31 (9%) for moderate depression, 29 (8.4%) for moderately severe depression, and 74 (21.5%) for severe depression, and 157 (45.6%) didn't have depression.





**Figure 2: prevalence and severity of depression among study participants (prison inmates) in Ambo Prison, Ethiopia**

Out of 344 (92.2%) inmates 273 had acquaintance on depression representing 79.4% of the study population, while 71 (20.6) didn't; 121 (35.2%) had suicidal ideation, 54 (15.7%) had attempted an actual suicide among which 22 (40.7%) had attempted suicide only once, while 14 (25.9%), 9 (16.7%), 3 (5.6%), and 6 (11.1%) had attempted suicide twice, 3-5 times, 5-10 times, and > 10 times respectively, while 169 (49.1%) had no thoughts of suicide. From these 54 (15.7%) prison inmates who had attempted suicide, 11 accounting for 20.4% ventured drug overdosing as a method of suicide, 2 (3.7%) ventured hanging, while the rest 41 (75.9%) were unresponsive.



**Figure 3: Suicidal ideation, suicidal attempts and frequency of attempts among study participants (prison inmates) in Ambo Prison, Ethiopia**

### Distribution of association

**Table 5 Distribution of association between socio-demographic characteristics, penal characteristics, health related characteristics, and associated factors by binary and multinomial logistic regression.**

| Variables  | Depression |     | COR (95% CI)         | P-value | AOR (95% CI)            | P-value |
|--|------------|-----|----------------------|---------|-------------------------|---------|
|  | Yes        | No  |                      |         |                         |         |
| <b>Suicidal ideation</b>                                     |            |     |                      |         |                         |         |
| <b>Present</b>   | 150        | 37  | 0.47 (0.027, 0.082)  | <0.01   | 25.547 (12.166, 53.648) | <0.01   |
| <b>Absent</b>  | 25         | 132 | 1                    |         |                         |         |
| <b>Factors associated with future apprehension</b>           |            |     |                      |         |                         |         |
| <b>Yes</b>   | 161        | 26  | 0.402 (0.234, 0.690) | 0.001   | 2.818 (1.184, 6.704)    | 0.019   |
| <b>No</b>  | 112        | 45  |                      |         |                         |         |
| <b>Factors associated with the environment of the prison</b> |            |     |                      |         |                         |         |
| <b>Yes</b>   | 110        | 77  | 5.368 (3.315, 8.69)  | <0.01   | 0.043 (0.003, 0.564)    | 0.017   |
| <b>No</b>  | 33         | 124 |                      |         |                         |         |

### Discussion

This study disclosed the overall prevalence of depression among prisoners to be 54.4%, in which 53 (15.4%) met the criteria for mild depression, 31 (9%) for moderate depression, 29 (8.4%) for moderately severe depression, and 74 (21.5%) for severe depression, and 157 (45.6%) didn't have depression. The prevalence estimates were higher than the results of studies done in Port Harcourt prison, Northwest Amhara Regional State, Jimma Town Prison, and Nepal, where the prevalence rate of depression was 37%, 43.8%, 41.9%, and 35.3% respectively. The study that was done in Port Harcourt Prison showed that 14.2% met the criteria for mild depression, 16.8% for moderate, 9.2% for severe and 2% for extreme depression (31, 32, 33). Several explanations can be suggested for the discrepancy observed. First, the instruments used in the studies were different. The socio-demographic characteristic, prison status, and cultural differences between this study population and the listed studies may have contributed to the variation. The studies were conducted many years ago and prevalence of depression may have changed within the period. The harsher prison condition heeded in the locale of the prison for this study may also have contributed to the higher prevalence observed.

The youngest and oldest inmates in this study were 16 and 78 years respectively, with a mean age of 24.1. This finding is close to a study done in Jimma Town Prison, Southwest Ethiopia, where the median age of the respondents was 26 years, and to a study done in Northwest Amhara Regional State, Ethiopia, where the median age of the respondents was 27.75 (33). Participants in a prison study conducted in Iran were aged from 17 to 76 years with a mean age of 32.7 years. While the minimum and maximum ages of the respondents were comparable with this study, the mean age was not (30).

Out of 344 inmates in this study, 341 (99.1%) were males and 3 (0.9%) were females with a male to female ratio of 0.009. This finding is comparable with other studies in various areas. In a study done in Port Harcourt Prison, of 400 respondents, 392 (98%) were males and 8 (2%) were females with male to female ratio of 0.02. From 649 respondents in a study done in Northwest Amhara Regional State, 583 (89.8%) were males and 66 (10.2%) were females with male to female ratio of 0.11 (51). It is also in line with a study done in Jimma Town Prison, where out of 332 respondents, 311 (93.7%) were males and 21 (6.3%) were females with male to female ratio of 0.006 (33).

The study showed that inmates who were influenced by factors associated with future apprehension were more likely to show signs of depression when compared to their counterpart [AOR= 2.818; 95% CI: 1.184, 6.704, p=0.019]. In line with this finding, a study conducted in Northwest Amhara Regional State suggested that respondents who thought that they would face difficulties of running life as before after being free of imprisonment were 47% more likely to develop depression when compared to their counterpart (30). This could be because of the inmates' constant engagement in negative contemplations about their future's inconceivability and losing hope in the process which may in return result in depression. They are also the most stigmatized segments of the population in the society because of the offense they have afflicted and this may compliment their future apprehension. Aligned with this, inmates who were influenced by factors associated with the environment of the prison were more prone to the development of depression when compared to those who weren't [AOR= 0.043; 95% CI: 0.003, 0.564, p= 0.017]. The possible reason for this could be living with other prisoners who may be violent which may in return arouses serious feelings of insecurity and fear in the minds of the inmates. The prison environment is also unfitting and may lead to discomfort and disconcert; both advancing the genesis of development of depression.

The study also revealed that the odds of developing depression among inmates who had plans to commit suicide were more than 25 times more likely to develop depression compared to prisoners who didn't have plans to commit suicide [AOR= 25.547; 95% CI: 12.166, 53.648, p<0.01]. This finding is comparable with the reports

of World Health Organization and American Psychiatric Association which stated that mental health disorders (especially depression) were related to more than 90% of all cases of suicide (10). This finding is also comparable with a study conducted in Nepal (31).

### Limitations of the study

Although the study addressed very important factors associated with depression, it is still not free of limitations. The study didn't collect information on the injury and trauma as they might be other factors associated with depression and the areas that are yet to be studied in this population include socio-economic and life style conditions of prisoners in prison like food, place of sleep, and recreational activity.

### Conclusion

In conclusion, the prevalence of depression among inmates in Ambo Prison was found to be high, in which most of them met the criteria for severe depression contributing to suicidal ideation and actual attempts. Inmates who stayed in prison for more than a year, whose overall health status worsened compared to times before incarceration, who afflicted offenses unintentionally, who were influenced by factors associated with disconcerting sentiments, factors associated with future apprehensions, and factors associated with the environment of the prison, and inmates who had attempted suicide were more likely to have depression. Therefore, urgent attention should be issued to address the prevalence, severity, and associated factors of depression of the inmates through proper diagnosis and inmates should receive an equivalent mental health and well-being service to that available to the general population with access to services based on need.

### Recommendations

1. Legislation should be introduced by the concerned bodies which allows for screening and referring of prisoners to general hospital psychiatric facilities.
2. Prisoner's mental disorder should be taken as one of public health problem and be prevented by creating conducive environment
3. Training on depression issues should be provided to all people involved in prisons including prison administrators, prison guards, and health workers in order to increase recognition and prevention of suicides.
4. Prisoners and their families should receive information and education on the nature of depression to promote mental health.
5. Prisons should find a way to maintain high observance, daily head counts and less access to any means of suicide.
6. Further studies investigating the negative consequence of depression among prisoners might be relevant.

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