



BMJ Open Prevalence and correlates of depressive symptoms among prisoners in Kaliti Federal Prison in Ethiopia: a facility based cross-sectional study

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ABSTRACT

Objective This study intended to examine the prevalence and correlates of depressive symptoms among inmates in Kaliti Prison Centre, Addis Ababa, Ethiopia.

Methods A facility-based cross-sectional study was conducted among 694 randomly selected inmates in Kaliti Federal Prison in Ethiopia. The depressive symptom was examined using the Patient Health Questionnaire (PHQ-9). A binary logistic regression model was fitted to identify correlates of depressive symptoms. A p value <0.05 was considered to declare statistical significance, and an adjusted OR (AOR) with the corresponding 95% CI was computed to determine the strength of association. Data were analysed using SPSS V.20.

Result The prevalence of depressive symptoms among prisoners in the current study was 56.6% (95% CI 53.2 to 60.8). Poor social support (AOR: 3.33, 95% CI 2.03 to 5.458), personal history of mental illness (AOR=3.16, 95% CI 1.62 to 6.14), physical abuse (AOR=2.31, 95% CI 1.41 to 3.78) and comorbid chronic medical illness (AOR=3.47, 95% CI 2.09 to 5.74) were independent correlates of depressive symptoms.

Conclusion Our study shows that around one in two prisoners screened positive for depressive symptoms. There should be a regular screening of depressive symptoms for prisoners, and those screened positive should be linked to proper psychiatric service for early diagnosis and treatment.

BACKGROUND

According to Diagnostic and Statistical Manual of Mental Disorders 5th Version (DSM-5) criteria, depression is defined as having five out of the following symptoms during the same 2-week period: depressed mood, diminished interest, significant weight loss, sleep disturbance, psychomotor agitation, fatigue, feeling of worthlessness, diminished ability to think; or recurrent thought of death.¹ Depression is a common mental illness, with more than 264 million people affected globally and it is one of the most undiagnosed, and under-treated conditions.² Further, it is the second leading cause of disability, with slightly more

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ The sample size of this study is determined using a single population proportion formula by ensuring the recommended assumptions and, participants were selected randomly.
- ⇒ We employed a cross-sectional study design; as a result, the study does not allow inferring causation.
- ⇒ Our study was conducted in a single institution, so it only represents the institution and does not represent prisoners in other prison facilities.

than 4% of the world's population diagnosed with depression.³

Evidence shown that prisoners were five to ten times more likely to develop depression than the general population.⁴ A systematic review that evaluated 62 studies conducted in 12 countries revealed that 10% of men and 12% of women prisoners had major depression.⁵ An extensive literature review done in 24 countries revealed that the prevalence of major depression was around 10.2% and 14.1% in male and female prisoners, respectively.⁶ Further, a global level meta-analysis of 32 studies found a 36.9% pooled prevalence of depression among prisoners.⁷ Epidemiological studies conducted in different countries also reported a higher prevalence of depression among prisoners, such as 49% in the USA,⁸ 35.3% in eastern Nepal,⁹ 20.6% in Brazil,¹⁰ 46.1% in Norwegian,¹¹ 27.1% in England and Wales,¹² 51% in UK,¹² 59.4% in Pakistan¹³ and 29% in Iran.¹⁴

In Africa, depression among prisoners is also prevalent with varying magnitude across the continent. The prevalence of depression was 24.9% in South Africa,¹⁵ 37% in Nigeria,¹⁶ 82.5% in Egypt¹⁷ and 44% in southwestern Uganda.¹⁸ A systematic review and meta-analysis of studies examining depression among prisoners in Ethiopia found a pooled



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prevalence of 53.4%.¹⁹ Individual studies conducted in Ethiopia's low to medium prison security settings reported a substantial number of depression among prisoners. For example, a prevalence of depression was found 44% in Northwest Amhara Regional State,²⁰ 45.5% in Bahir Dar,²¹ 41.9% in Jimma²² and 44.05% in Debre Birhan.²³

Sociodemographic factors such as age, education levels, marital status, residency, income and parenting status significantly correlated with depression among prisoners.^{18 22–26} Besides the security level of the prison environment, and the confined space could also lead to depression.²⁴ Among the major contributing psychosocial risk factors of depression among prisoners includes; remembering past illegal acts, which later makes them feel guilty, and feeling lonely, as they are isolated from their families and loved ones.²⁷ Furthermore, poor social support, substance use, longer stay in the prison, prison service, work within prisons, and comorbid medical and psychiatric illness also have a significant positive association with depressive symptoms among the prison population.^{16 23–28}

Suicide is substantially higher among depressed prisoners as compared with non-depressed prisoners and individuals living outside the prison.^{29 30} A study conducted among Australian prisoners (n=996) indicated that one-third and one-fifth of prisoners reported lifetime suicidal ideation and suicidal attempt, respectively.³¹ However, in many countries, including Ethiopia, prisons did not have adequate mental health service to provide care for prisoners, and only a few had exposure to psychiatrists.³²

Some studies were conducted in low to medium-security prisons in Ethiopia to examine depression. However, no study has yet examined depression among prisoners in federal high-security prisons such as Kaliti Prison Centre. Therefore, our study intended to fill this research gap by examining the prevalence and correlates of depressive symptoms among randomly selected prisoners in Federal Kaliti Prison, Addis Ababa, Ethiopia.

METHODS

Study design, area and study period

A facility-based cross-sectional study design was conducted in Kaliti Federal Prison and reported per the guideline of the Strengthening the Reporting of Observational Studies in Epidemiology checklist (online supplemental file 1). Kaliti Federal Prison is found in Addis Ababa and it serves as a central higher security institution for federal prisoners.³³ The study was conducted from 21 December 2020 to 29 January 2021. Overall, 2000 prisoners were detained in the Kaliti Federal Prison Centre.

Sample size determination and sampling technique

The sample size for the current study was calculated using Epi-Info V.7 statistical software. The sample size for the first specific objective was estimated using a single population proportion formula considering the recommended assumption (ie, standard normal distribution with a 95%

CI) ($Z=1.96$), expected proportion of participants who had depressive symptoms taken from a previous study ($p=56.4\%$)²⁴ and margin of error ($d=0.05$). By adding a 10% non-response rate, the estimated sample size for the first objective was 415. The sample size for the second specific objective was estimated by considering a significant factor associated with depression among prisoners (ie, low social support) from a previous study²² and by taking 95% CI, 80% power assumption. By adding 10% non-response rate the estimated sample size for the second objective was 712. Further detail of sample estimation was presented in online supplemental file 2.

In order to obtain the maximum sample, the sample size estimated for the second objective ($n=712$) was taken. Considering the updated prisoner registration document as a sampling frame, we have selected the estimated 712 study participants through a random lottery. Prisoners whose age is >18 years during the data collection period were eligible to be included in the study. However, prisoners who were critically ill during data collection were excluded from the study.

Data collection and measurement

Data were collected by a trained psychiatry nurses using a pretested interviewer-administered technique. We have collected the sociodemographic variables (ie, age, sex, marital status, educational status, ethnicity and average monthly income) using semi-structured questionnaire.

The current study assessed social support using the 3-item Oslo Social Support Scale (OSS-3). It has a sum score scale ranging from 3 to 14 with three broad categories: poor social support (3–8 OSS score), intermediate social support (9–11 OSS score) and strong social support (12–14 OSS score).³⁴

We used a 9-item Patient Health Questionnaire (PHQ-9) depression screening tool to examine depressive symptoms among prisoners, with a sensitivity of 61% and a specificity of 94% in adults.³⁵ The scale has a category of 0–4 indicates a normal level, and a score >5 out of 27, suggests the presence of depressive symptoms.³⁶

Data processing and analyses

Data were entered and analysed using SPSS V.20. First, the frequency and percentages were computed to show the characteristics of participants and the prison setting. Then, we cross-tabulated the distribution of depressive symptoms across the independent variables. Further, a binary logistic regression analysis was done to see the association of each independent variable with the outcome variable. A potential confounder and variables with a p value <0.25 during a simple logistic regression entered into a multiple logistic regression model.³⁷ In the final model, the regression analysis results were presented using an adjusted OR (AOR) with the respective 95% CI. A p value <0.05 was considered to declare statistical significance. Model fitness was tested by Hosmer and Lemeshow's goodness of fit test³⁷ and found a p value of 0.72.

Table 1 Sociodemographic characteristics of prisoners of Kaliti prison in Ethiopia, from 21 December 2020 to 29 January 2021 (n=694)

Variable	Categories	Frequency (N)	Percentage (%)
Sex	Male	587	84.6
	Female	107	15.4
Age	18–24 years	172	24.8
	25–34 years	269	38.7
	35–44 years	136	19.6
	≥45 years	117	16.9
Marital status	Divorce	28	4.0
	Married	348	50.2
	Single	318	45.8
Ethnicity	Amhara	97	14.0
	Gurage	147	21.2
	Oromo	201	29.0
	Tigray	98	14.1
	Wolaita	49	7.1
	Other*	102	14.7
	Educational status	No formal education	58
Primary school		223	32.1
Secondary		230	33.1
Certificate		97	13.9
Degree		77	11.1
Master and above		10	1.4
Average monthly income	No income	183	26.3
	≤758 ETB	13	1.9
	758–2158 ETB	111	16.0
	≥2158 ETB	387	55.8

*Silte, Somali, Sidama.

Patient and public involvement

No patient or members of the public were involved in this study.

RESULT

Sociodemographic characteristics of the participants

Table 1 presents the sociodemographic characteristics of study participants. Of the total estimated study samples (n=712), 694 prisoners participated in the study, giving a response rate of 97.47% (18 individuals refused to participate). The respondents' mean (\pm SD) age was 33.15 (\pm 12.3) years. Most study participants were male (84.6%), while 50.1% were married, 33.1% attended secondary school and 55.8% had a monthly income of >2158 Ethiopian Birr (ETB).

Psychosocial, clinical and prison-related characteristics

The psychosocial, clinical and prison-related characteristics of study participants are presented in table 2. Nearly 40.2% (279) of prisoners have stayed less than a year

within the prison. The mean (\pm SD) duration of stay in prison was 38.74 (\pm 44.7) months, and about 64.4% (447) did not participate in income-generating activities. About 22.6% of participants face physical and/or verbal abuse by the guard, and 71.8% of prisoners reported poor prison hygiene.

The majority of prisoners (86.7%) reported a personal history of mental illness, while 21.2% had a comorbid medical illness. About 10.01% of the study participants reported substance use within a prison, and 37.8% (262) had poor social support. Based on the PHQ-9 tool, the prevalence of depressive symptoms was 56.6% (95% CI 53.2% to 60.8%). A higher proportion of male inmates screened positive for depressive symptoms (n=333) than their female counterparts (n=60).

Privacy-related response of participants

Of the total study participants, 99.4% reported that privacy is not respected when changing their clothes and 82.6% had no adequate cleaning material within the prison.

Table 2 Psychosocial and clinical characteristics of prisoners in Kaliti Prison Centre, Ethiopia, 2021 (n=694)

Variable	Frequency (N)	Percentage (%)
Duration of stay in prison (years)		
<1	279	40.2
1–5	242	34.9
>5	173	24.9
Participating in income-generating activities		
No	447	64.4
Yes	247	35.6
Availability of prison hygiene		
No	498	71.8
Yes	196	28.2
Reason of imprisonment		
Corruption	24	3.5
Homicide	131	18.9
Stealing and robbery	241	34.7
Rape	64	9.2
Other*	234	33.7
Quality of prison food		
Bad	668	96.3
Good	26	3.7
Abuse by the guard in a prison		
No	537	77.4
Physical abuse	1	0.1
Verbal abuse	75	10.8
Both physical and verbal abuse	81	11.7
Personal history of mental illness		
No	602	86.7
Anxiety	35	5.0
Depression	43	6.2
Other†	14	2.0
Comorbid chronic medical illness		
No	547	78.8
Hypertension	34	4.9
Diabetic	37	5.3
Other†*	76	11
Current substance use		
No	620	89.3
Cigarette	52	7.5
Alcohol	16	2.3
Khat	6	0.9
Social support		
Poor	262	37.8
Moderate	286	41.2
Strong social	146	21.0

Continued

Table 2 Continued

Variable	Frequency (N)	Percentage (%)
Depressive symptoms		
Yes	393	56.6
No	301	43.4
*Drug, check, physical harm. †Epileptic, psychotic disorder. ‡HIV/AIDS, asthma, cardiac disease.		

Also, 57.8% of respondents reported the absence of a screen while taking a shower or using the toilet (table 3).

Factors associated with depressive symptoms

Table 4 shows the association between depressive symptoms and independent variables. In simple logistic regression analysis, marital status, abuse from the guard, quality of food in prison, participation in income-generating activities, personal history of mental illness, chronic medical illness, substance use within the prison, social support, duration of stay in prison, availability of screen placed in shower and toilet, and availability of prison hygiene were factor associated with depressive symptoms.

During the multiple logistic regression analysis; poor social support (AOR: 3.33, 95% CI 2.03 to 5.458), personal history of mental illness (AOR: 3.16, 95% CI 1.624 to 6.14), abuse by the guard (AOR: 2.31, 95% CI 1.41 to 3.77) and comorbid medical illness (AOR: 3.46, 95% CI 2.09 to 5.74) were significant correlates of depressive symptoms among prisoners ($p < 0.05$).

DISCUSSION

Our study demonstrated that the prevalence of depressive symptoms among inmates in Kaliti Central Prison was 56.6%. The current finding is comparable to the report

Table 3 Privacy related response of prisoners in Kaliti Prison Centre, Ethiopia, 2021 (n=694)

Variable	Frequency (N)	Percentage (%)
Respect your privacy during changing clothes		
No	690	99.4
Yes	4	0.6
Have an adequate cleaning material in prison		
No	573	82.6
Yes	121	17.4
Privacy maintained during medication administer		
No	416	59.9
Yes	278	40.1
Availability of screen while you took shower or use a toilet		
No	401	57.8
Yes	293	42.2

Table 4 Simple and multiple logistic regression analysis of correlates of depressive symptoms among prisoners in Kaliti Prison Centre, Ethiopia, 2021 (n=694)

Variables (category)	Depression		COR (95% CI)	AOR (95% CI)
	Yes	No		
Sex				
Male	333	254	1	
Female	60	47	0.97 (0.43 to 2.31)	
Age (years)				
18–24	76	96	1	
25–34	172	97	2.24 (0.74 to 3.16)	
35–44	74	62	1.51 (0.85 to 2.56)	
≥45	71	46	1.95 (0.91 to 3.14)	
Educational status				
No formal education	35	22	0.89 (0.64 to 1.79)	
Primary school	112	111	0.56 (0.36 to 1.14)	
Secondary	130	100	0.73 (0.44 to 2.11)	
College and above	118	66	1	
Duration of stay in prison (years)				
<1	177	96	0.56 (0.391 to 0.818)	1.45 (0.838 to 2.52)
1–5	126	120	1.24 (0.809 to 1.898)	1.97 (1.134 to 3.452)
>5	90	85	1	1
Screen availability in shower and toilet				
No	239	162	0.75 (0.554 to 1.018)	0.71 (0.467 to 1.06)
Yes	154	139	1	1
Average monthly income (ETB)				
≤758	112	84	0.99 (0.94 to 1.04)	
758–2158	62	49	1.05 (0.996 to 1.103)	
≥2158	221	166	1	
Social support				
Poor	71	191	2.6 (1.714 to 3.998)	3.33 (2.03 to 5.45)*
Moderate	250	36	0.14 (0.087 to 0.226)	0.16 (0.098 to 0.277)
Strong	72	74	1	1
Current substance use				
Yes	47	27	1.4 (0.837 to 2.271)	0.93 (0.489 to 1.77)
No	346	274	1	1
Comorbid medical illness				
Yes	107	40	2.4 (1.636 to 3.642)	3.46 (2.09 to 5.74)*
No	286	261	1	1
Personal history of mental illness				
Yes	76	16	0.23 (0.133 to 0.411)	3.16 (1.624 to 6.14)*
No	317	285	1	1
Participating in income-generating activities				
No	283	164	0.46 (0.339 to 0.638)	0.6 (0.375 to 1.970)
Yes	110	137	1	1
Self-report of prison hygiene				
No	291	207	1.41 (1.970 to 1.016)	0.89 (0.569 to 1.416)
Yes	102	94	1	1

Continued

Table 4 Continued

Variables (category)	Depression		COR (95% CI)	AOR (95% CI)
	Yes	No		
Self-reported quality of prison				
Poor	374	295	2.49 (0.985 to 6.333)	2.01 (0.646 to 6.281)
Good	19	6	1	1
Marital status				
Divorce	14	14	1.5 (0.694 to 3.26)	2.40 (0.88 to 6.53)
Married	188	160	1.28 (0.94 to 1.74)	1.31 (0.876 to 1.96)
Single	191	127	1	1
Physical or verbal abuse by the guard				
Yes	115	42	3.77 (1.724 to 2.55)	2.31 (1.41 to 3.77)*
No	278	259	1	1

*Significant association (p value <0.01).
†Significant association (p value <0.05).
AOR, adjusted OR; COR, crudes OR.

from the study conducted in Hawassa, Ethiopia (56.4%)²⁴ and a pooled prevalence from a meta-analysis of nine studies conducted in Ethiopia (53.4%).¹⁹

Additional studies from Nepal (35.3%),⁹ Brazil (20.6%),¹⁰ Taiwan (11.31%),²⁷ Norway (46.1%),¹¹ Iran (29%),¹⁴ South Africa (24.9%),¹⁵ Uganda (44%),¹⁸ Nigeria Port Harcourt Prison (37%),¹⁶ found lower rates of depression among inmates compared with our study. The finding in the current study is also higher compared with studies conducted in different parts of Ethiopia such as Northwest Amhara (44%),²⁰ Debre Birhan (44.05%),²³ Jimma (41.9%)²² and Bahir Dar (45.5%).²¹ Likewise, the reported prevalence rate of depression in the current study was higher than the prevalence of depressive episodes found in the general population of Ethiopia (9.1%).³⁸ However, the current study has a lower prevalence of depression than other studies conducted in Pakistan (85%)¹³ and Egypt (82.5%).¹⁷ The observed discrepancies in the reported prevalence of depression across studies might be due to the difference in the prison setting (low security, medium or high-security prison), sample size, prisoners' demographic characteristics, and the instrument used to examine depression. For example, the study conducted in eastern Nepal,⁹ Taiwan²⁷ and Port Harcourt medium prison in Nigeria¹⁶ used the Centre for Epidemiologic Studies Depression Scale (CESD-20 item), the International Classification of Diseases 9th revision Clinical Modification (ICD-9-CM) and Beck Depression Scale (BDS-21 item), respectively, to assess depression, whereas our study employed PHQ-9. Also, the sample size in the current study (n=694) was higher than that of the study conducted in Egypt (n=80)¹⁷ but lower than the Taiwan nationwide study (n=82 650).²⁷

Prisoners who had a personal history of mental illness were about three times more likely to suffer from depression than their counterparts. This might be due to the recurrence of some mental health problems such as

depression.³⁹ For example, a person once diagnosed with depression will suffer an average of four depressive episodes during his/her life; and also a large proportion of individuals may not have access to mental health problems, and some of them remain untreated and lasts for a long time.³⁹ As a result of these reasons, prisoners with previous episode of mental illness could later develop depression. The current finding is supported by studies conducted in Taiwan,²⁷ Brazil¹⁰ and Jimma, Ethiopia.²²

Prisoners who reported poor social support were three times more likely to be depressed than those with strong social support. This might be due to a lack of social support in prison can trigger the feeling of social isolation and result in a negative impact on their mental well-being which could lead to depression.⁴⁰ The social causation model also assumes that lack of social support, explains the social support-to-distress relationship, and predicts that social support mitigates the likelihood of mental distress such as depression.⁴¹ On the other hand, getting good social support could reduce the risk of depression by enhancing individual self-esteem and decreasing negative thoughts.^{42 43} Our finding is congruent with the study conducted in Jimma, Ethiopia, whereby poor social support is significantly associated with depression.²²

Prisoners experiencing physical and/or verbal abuse had a higher odds suffering from depressive symptoms than their counterparts. Physical abuse can significantly affect the entire course of a person's life by creating stress, leading to feeling worthless, hopeless and the loss of pleasure in regular daily activities, which are among the main depressive symptoms.⁴⁴ Also, evidence indicated that stressors associated with abuse were considered a primary risk factor for the onset of depression.⁴⁵

The odds of depressive symptoms was threefold higher among prisoners with comorbid chronic disease. This might be due to pain related to chronic medical illness, and the thought that the illness can not be cured could

lead to stress and depression. The longer duration of the disease and the number of different pain a person experiences are directly related to the risk of depression. Also, chronic medical illness could lead to functional impairment or disability that significantly increases the risk of depression among prisoners.⁴⁶ Indirectly, depression is linked with poor self-management of chronic physical health problems, leading to a poor prognosis. This finding was supported by the studies conducted in the UK,¹² Debre Birhan²³ and Southern Ethiopia.²⁴

CONCLUSION

The burden of depressive symptoms among prisoners in the current study was high. Poor social support, comorbid chronic medical illness, personal history of mental illness and guard abuse were significant correlates of depressive symptoms among prisoners. There should be a regular screening of depressive symptoms for prisoners. Those who screened positive for depressive symptoms should be linked to proper psychiatric service for early diagnosis and treatment. Finally, action should be taken to decrease social isolation during their prison stay, ensure the continuation of psychiatric care after release and reintegrate prisoners into the community. Reintegration of prisoners into the community helps them get secure employment, create strong and supportive social relationships and be optimistic for the future, which indirectly reduces the risk of depression and reoffending rates.

Limitations of the study

It is worth noting the following potential limitations of our study. First, since we used a cross-sectional study design; the study does not allow inferring the causation. Second, the study was conducted in a single institution, so it only represents the institution and does not represent prisoners in other prison facilities. Third, as the data collection of the current study occurred during the COVID-19 pandemic, the prison had restrictions on visitation to prevent COVID-19 spread throughout prison populations, which might artificially inflate estimates of depression in the current study.

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AB was responsible for drafting the manuscript. All authors contributed to the manuscript and read and approved the final manuscript.

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Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by Ethical clearance was obtained from the Institutional Review Board of St Paul's Hospital Millennium Medical College Department of Public Health (ID: PM25/250). The data collectors clearly explained the aim of the study for every study participant. Information was collected after obtaining written consent from each study participant. Participants were informed that they had the right to refuse or discontinue participation at any time. For the issue of confidentiality, anonymity was maintained, and all other personal information was kept confidential. Study participants who screened positive for depressive symptoms were linked to the clinic available at the prison Centre for further assessment and management. Participants gave informed consent to participate in the study before taking part.

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