Two-third of inmates were depressed among HIV positive prisoners at central prison (Kaliti), Addis Ababa, Ethiopia

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Abstract

Objective: Depression is the most frequently observed psychiatric disorder among HIV positives and it is becoming worse in prisoners. The aim this study was to assess prevalence and associated factors of depression among HIV positive prisoners at central prison (Kaliti) Addis Ababa.

Result: The prevalence of depression was found to be 66.5% (95% CI 62, 71). Primary education [AOR = 4.17, 95% CI (1.648–10.483)], perceived stigma [AOR = 3.88, 95% CI (2.08–7.25)], history of chronic illness [AOR = 2.88, 95% CI (1.34–6.17)] and WHO clinical stage II [AOR = 2.47, 95% CI (1.19–5.12)] and length of stay in prison 4–6 years [AOR = 2.27, 95% CI (1.22–4.23)] and ≥10 years [AOR = 3.53, 95% CI (1.15–10.85)] were factors associated with depression. This study indicated that prevalence of depression among HIV positive prisoners in Addis Ababa prison was high. Educational status, perceived stigma, history of chronic illness, WHO clinical stage and length of stay in prison were factors associated with depression. Establishing psychiatry care to screen and manage mental health disorders at the prison is needed. Special attention has to be given for those with primary in education, advanced disease, perceived stigma, and history of chronic illness and stayed many years in prison.

Keywords: Depression, HIV/AIDS, Prison, Ethiopia

Introduction

According to WHO report, 28% of global burden of disease is due to neuropsychiatric disorder and one-third of it is caused by depression [1]. Depression is common in HIV infected patients and it affects the course of the disease [2, 3]. Depression and HIV/AIDS are projected to be the world’s two leading causes of disability by 2030 [4]. Diagnosis and treatment of depression in HIV/AIDS patients is complicated due to interactions between the disease conditions as well as drug–drug interaction between ART and anti depressants [5]. In 2017, the number of people living with HIV in the world was 36.9 million and 1.8 million were new infections and there were 940,000 HIV/AIDS related deaths in the same year [6]. According to 2016 Ethiopian DHS, the prevalence of HIV was estimated to be 1.1% [7]. However, International data indicates that HIV prevalence among incarcerated persons is 5 times greater than the general population [8]. Previous studies indicated that prevalence of depression among prisoner living with HIV/AIDS was higher than general population, 55.5% in USA, 31.2% in Taiwan, 55.4% in Durban South Africa [9–11]. People living with HIV/AIDS are more stressed with long-term discomfort, physical deterioration and economic dependence [12]. These all my lead them to develop depression. In the context of HIV/AIDS, depression can affect the health seeking behavior and causes poor treatment adherence that leads to treatment failure and rapid progression to AIDS and death [13]. In addition, depression causes decreased natural killer cell level and activity, faster decline in CD4 count and increased risky sexual behavior that results in contracting additional disease that compromise the immune system [14–16].

The federal MoH of Ethiopia prioritizes health care delivery at the community level. However; little attention

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is given for those who are suffering from mental health problem especially in prisons. There is no enough data on the prevalence of depression and associated factors among HIV infected prisoners in Ethiopia. Lack of information about depression in HIV infected prisoners may be a factor that contributes to poor or inexistent mental health care at the prison. Therefore; this study was aimed to investigate the prevalence of depression and associated factors among HIV positive prisoners at Addis Ababa central prison.

**Main text**

**Methods**

**Study design and participants**

Institution based cross-sectional study was conducted at central prison in Addis Ababa. Addis Ababa central prison is one of the Federal prisons located in Akaki Kaliti sub city. A total of 490 HIV positive prisoners had HIV care follow up at ART clinic of the prison during data collection. Of which, 312 of them were on ART. There was no mental health service in the prison. Those HIV infected prisoners incarcerated for more than 3 months were participated in the study. Those seriously ill and not capable to communicate were excluded.

**Sampling and sample size calculation**

Sample size was calculated using single population proportion formula by assuming the prevalence to be 50% due to the absence of similar study in the area. The 95% confidence interval and 5% margin of error were considered. Finally 10% non-response rate was added to get total of 422 samples. Simple random sampling technique was used to select the study participants from May to July 2016.

**Data collection technique and procedures**

Face interviewer administered questionnaire was used to collect data. Trained nurses working in other health institutions were involved in data collection. Participants chart was also reviewed to document their WHO clinical stage, recent CD4 count and ART regimen. In order to avoid double count, charts were labeled with marker once the patient was interviewed. The Amharic version of internationally validated Patient Health Questionnaire (PHQ-9) was used to assess depression. The (PHQ-9) consists of 9 items with ‘0’ = not at all, ‘1’ = several days, ‘2’ = more than half a day and ‘3’ = nearly every day. It has a score of 0 to 29. Depression was considered using a cut point greater than or equal to five [17]. Social support was measured using Oslo-3 Social Support Scale (OSS-3). By adding the three items poor social support was considered when they scored 3−8 while a score of 9−11 and 12−14 were considered to have intermediate and strong social support respectively. Stigma was assessed using a 12 item HIV stigma scale that is feasible, reliable, and valid instrument to assess HIV-related stigma [18].

**Data analysis**

The investigators checked the filled questionnaires for completeness, cleaned and entered to EPI Info version 3.5.3 statistical software and exported to SPSS version 20 for analysis. Descriptive and summary statistics were used to explain the study population with respect to significant variables. Variables with P value less than 0.2 in the bivariate analysis were fitted to multivariable logistic regression model. Odds ratio with their 95% CI was calculated. Statistical significance was considered at P-value < 0.05 in multivariable logistic regression model.

**Result**

In this study, a total of 400 study participants were involved with a response rate of 94.8%. The prevalence of depression among HIV infected prisoners was found to be 66.5% [95% CI 62, 71)]. The mean age of the respondents was 38.9 (SD ± 10.7) years. Majority 378 (94.5%) of the study participants were males. About one-third of the prisoners had primary in their educational status. Large proportion (67.3%) of prisoners disclose their HIV status to their close friends while only 4.5% of disclose to the media. More than half (56.0%) of the HIV positive prisoners had poor social support and (Table 1).

More than one-third of prisoners were stayed in prison for 1−3 years. Twenty-eight (7.0%) of the prisoners had history of any psychiatric illness. Around 60% of study subjects were on WHO clinical stage I (Table 2).

This study indicated that educational status, perceived HIV-stigma, social support, history of known chronic illness, WHO clinical stage and length of stay in prison were significant factors associated with depression. Prisoners with primary educational level were 4.17 times more odds of depression [AOR = 4.17, 95% CI (1.66, 10.16)]. Prisoners with perceived stigma due to HIV status were 3.9 times more likely to be depressed [AOR = 3.88, 95% CI (2.08, 7.25)]. Those having history of chronic illness (such Heart failure, Hypertension, Diabetes mellitus) were 2.9 times more odds of depression than those with no history of chronic illness [AOR = 2.88, 95% CI (1.34, 6.17)]. Those on WHO clinical stage II were 2.5 times more likely to be depressed compared to WHO clinical stage I [AOR = 2.47, 95% CI (1.19, 5.12)]. Prisoners who stayed for 4 up to 6 years in prison were 2.3 times more likely to be depressed [AOR = 2.27, 95% CI (1.22, 4.23)] and those who stayed for more than 10 years were 3.5 times more likely to develop depression than those who stayed less than 1 year [AOR = 3.53, 95% CI (1.15, 10.85)] (Table 3).
In our study the prevalence of depression among HIV positive inmates at central prison was found to be 66.5%, 95% CI (62%, 71%). Compared to studies in health care settings, this finding is higher. This may be due to the fact that majority of prisoners at central prison (Kaliti) were political prisoners and may not handled properly and safely. The finding is also higher than the finding of a study in prisons found in Northwest Ethiopia (43.8%) [19], southern Ethiopia (56.4%) [20] and southwest Ethiopia (41.9%) [21]. This may be due to the fact that the variation in the cut of point used to define depression in public health questionnaire (PHQ 9), variation in the prison setting i.e. central prison is a setting where political prisoners are incarcerated from every direction of the country. This finding was in-line with the study done in Uttar Pradesh (India) (67.3%) [22]. However, this finding is much higher than the lifetime prevalence of depression at Westville Correctional Center (24. 9%) [11]. The observed variation may be due to difference in study subjects. A study in Westville Correctional Center included all the prisoners irrespective of their HIV status and Mini International Nero-psychiatric Interview (MINI) was a tool used to screen depression. Even the way handling inmates may have significant variation. Similarly, our finding is higher than another study conducted in South Africa [13] using Hospital Anxiety and Depression Scale (25.4%) and in Debre Markos referral hospital [23] using SRQ 20 to find (24.3%) of individuals living with HIV were screened positive for common mental disorder. This difference might be due to the fact that the socio-economic variation in study subjects, difference in the way prisoners are handled at correctional institutions and the variation of tool used to screen depression. The finding of this study was higher compared to a study finding in USA (55.5%) [9] Taiwan (31.2%) [10], Westville Correctional Center (10.4%) [11], and North Carolina prison (44.3%) [24]. The observed discrepancy might be due to difference in socio-economic status between the study participants, clinical variation and dissimilarity of tools used to assess depression. The study in USA, Taiwan and North Carolina used Brief Symptom Inventory (BSI), Brief Symptom Rating Scale (BSRS-5) and Center for Epidemiological Studies-Depression Scale (CES-D) respectively.

This study revealed that, those HIV positive prisoners with primary in education were more likely to be depressed. This finding is supported with the finding in Guru Teg Bahadur Hospital Delhi, India [25] where uneducated HIV positive people were highly affected by depression than educated ones. However; another study also showed that education had no association with depression in HIV positives [22]. This discrepancy may be justified by the variation in tools.
used by these different studies. Center for Epidemiologic Studies-Depression (CES-D) and Montgomery-Asberg Depression Rating Scale (MADRS) were used in Guru Teg Bahadur Hospital and South-West part of Uttar Pradesh India respectively. Perceived stigma was positively associated with depression in HIV positive prisoners. This is agreed with a study in Jamaica [26], Debre Markos referral hospital [23] and South Africa [13]. This correlation may be due to the fact that people who perceive stigma may worry about themselves and become depressed. In this study previous history of chronic illness was associated with depression. The finding is consistent with the studies in USA and South Africa [9, 11]. This study also found that those on WHO clinical stage II were more likely to be depressed than WHO clinical stage I. It is supported by studies conducted in Debrebrihan Referral Hospital [27] and California [28]. This may be due to the fact that HIV positive prisoners with more advanced HIV disease are more likely to be diseased with opportunistic infections that cause depression.

This study indicated that age, sex, marital status, social support, history of diagnosis with psychiatric illness, CD4 count and term of sentence were not found to be statistically significant factors to depressive symptoms in HIV positive prisoners at central prison. It was inconsistent with a study conducted in Cameron [29], Harar [30] and India [25], which revealed depression were seen among participant with low CD4 count, unemployed, having poor social support, no or low family income and unmarried. This inconsistence may be due to the fact that our study subjects were HIV positive prisoners. Whereas, the study subjects in Cameron, Harar and India were HIV positive non incarcerated people. This study also showed that length of stay in prison is associated with depression. The odds of depression increased as the length of prison stay increased. This was supported by the study done in United States [31]. This may be due to feelings and disquieting when they stare what their life looks like after long time imprisonment.

### Table 2 Prison related and clinical characteristics of prisoners at central prison (Kaliti), Addis Ababa Ethiopia, 2016, (n = 400)

| Variables                     | Category | Frequency | Percentage |
|-------------------------------|----------|-----------|------------|
| Length of stay in prison (years) | < 1      | 107       | 26.8       |
|                               | 1–3      | 149       | 37.3       |
|                               | 4–6      | 57        | 14.3       |
|                               | 7–9      | 52        | 13.0       |
|                               | 10+      | 35        | 8.8        |
| Ever convicted                | Yes      | 36        | 9.0        |
|                               | No       | 364       | 91.0       |
| How many times ever convicted | Once     | 19        | 52.8       |
|                               | Twice    | 17        | 47.2       |
| History of chronic illness    | Yes      | 91        | 22.8       |
|                               | No       | 309       | 77.2       |
| History of psychiatric illness| Yes      | 28        | 7.0        |
|                               | No       | 372       | 93.0       |
| Family history of psychiatric illness | Yes | 24 | 6.0 |
|                               | No       | 376       | 94.0       |
| Time since patient known his sero-status (years) | < 1 | 29 | 7.3 |
|                               | 1–3      | 69        | 17.3       |
|                               | 3–5      | 82        | 20.5       |
|                               | > 5      | 220       | 55.0       |
| CD4 count                     | ≤ 500    | 62        | 15.5       |
|                               | > 500    | 338       | 84.5       |
| WHO clinical stage            | I        | 241       | 60.2       |
|                               | II       | 95        | 23.8       |
|                               | III      | 56        | 14.0       |
|                               | IV       | 8         | 2.0        |
| On ART                        | Yes      | 254       | 63.5       |
|                               | No       | 146       | 36.5       |
| ART regimen                   | 1c       | 38        | 15         |
|                               | 1d       | 25        | 9.8        |
|                               | 1e       | 136       | 69.3       |
|                               | 1f       | 15        | 5.9        |
| Lost partner related to HIV   | Yes      | 25        | 6.3        |
|                               | No       | 255       | 91.7       |
| Do you have children          | Yes      | 275       | 68.8       |
|                               | No       | 125       | 31.2       |
| Children’s HIV status         | Positive | 23        | 8.4        |
|                               | Negative | 206       | 74.9       |
| Ever hospitalized             | Yes      | 78        | 19.5       |
|                               | No       | 322       | 80.5       |

### Conclusion

The finding of this study showed that prevalence of depression among HIV positive prisoners at central prison (Kaliti) was found to be high. Educational status, perceived HIV-stigma, history of chronic illness, WHO clinical stage and length of stay in prison were significant factors associated with depression. It suggests that there is a need to establish psychiatry care unit in the prison to screen and manage inmates. Special attention need to be given for those with primary educational level, advanced HIV status, who perceived HIV-stigma, with history of chronic illness and who stayed many years in prison. Further study with large sample size by including many prisoners may be needed.
Table 3  Multiple Logistic regression analysis of depression among HIV positive prisoners at central prison (Kaliti) Addis Ababa Ethiopia, 2016, (n = 400)

| Variables                        | Depression |   |   |   |   |   |   |
|----------------------------------|------------|---|---|---|---|---|---|
|                                  | Yes        | No| COR| 95% CI        | AOR| 95% CI        |
| Educational status               |            |   |    |               |    |               |
| No formal education              | 43         | 18| 2.39| 1.085–5.260   | 3.03| 0.902–10.205  |
| Primary                         | 107        | 46| 2.33| 1.199–4.514   | 4.11| 1.66–10.19*   |
| Secondary                       | 92         | 46| 2.00| 1.026–3.898   | 2.28| 0.923–5.624   |
| Tertiary and above              | 24         | 24| 1   |               |    |               |
| Social support                   |            |   |    |               |    |               |
| Poor                             | 162        | 62| 0.55| 0.351–0.855   | 1.14| 0.419–3.098   |
| Moderate                         | 83         | 58| 0.57| 0.275–1.199   | 0.90| 0.333–2.447   |
| Strong                           | 21         | 14| 1   |               |    |               |
| Stigma                           |            |   |    |               |    |               |
| Yes                              | 144        | 32| 3.76| 2.364–5.987   | 3.88| 2.08–7.25**   |
| No                               | 122        | 102| 1 |       |    |               |
| History of chronic illness       |            |   |    |               |    |               |
| Yes                              | 75         | 16| 2.89| 1.611–5.206   | 2.88| 1.34–6.17**   |
| No                               | 191        | 118| 1 |       |    |               |
| WHO clinical stage               |            |   |    |               |    |               |
| Stage I                          | 148        | 93| 1   |               |    |               |
| Stage II                         | 69         | 26| 1.67| 0.991–2.806   | 2.47| 1.19–5.12**   |
| Stage III                        | 44         | 12| 2.30| 1.157–4.589   | 2.10| 0.90–4.88    |
| Stage IV                         | 5          | 3 | 1.05| 0.245–4.486   | 1.23| 0.19–7.67    |
| ART                              |            |   |    |               |    |               |
| Yes                              | 158        | 38| 1   |               |    |               |
| No                               | 108        | 96| 1.727| 1.103–2.704  | 1.30| 0.69–2.45    |
| Length of stay in prison         |            |   |    |               |    |               |
| < 1 year                         | 61         | 46| 1   |               |    |               |
| 1–3 years                        | 100        | 49| 1.54| 0.921–2.571   | 1.949| 0.91–4.20   |
| 4–6 years                        | 46         | 11| 3.15| 1.473–6.750   | 2.27| 1.22–4.23**  |
| 7–9 years                        | 30         | 22| 1.03| 0.526–2.010   | 1.89| 0.49–7.24   |
| ≥ 10 years                       | 29         | 6 | 3.65| 1.397–9.507   | 3.33| 1.15–10.85*  |
| Disclosure of HIV status to partners |        |   |    |               |    |               |
| Yes                              | 89         | 57| 1   |               |    |               |
| No                               | 137        | 50| 1.76| 1.103–2.791   | 1.64| 0.93–2.88    |
| Disclosure of HIV status to friends |        |   |    |               |    |               |
| Yes                              | 144        | 80| 1   |               |    |               |
| No                               | 82         | 27| 1.69| 1.010–2.820   | 1.54| 0.84–2.84    |

NB: *P value < 0.05, * P value < 0.01

Limitations
Some variables that may have associations with depression were not included (such as: frequency of family visit). Since this is cross-sectional study it is difficult to conclude the cause and effect relationship.

Abbreviations
AIDS: Acquired Immune deficiency Syndrome; ART: antiretroviral therapy; BSI: Brief Symptom Inventory; BSRS: Brief Symptom Rating Scale; CES-D: Center for Epidemiologic Studies-Depression; EDHS: Ethiopian Demographic Health Survey; MADRS: Montgomery-Asberg Depression Rating Scale; MoH: Ministry of Health; SRQ: Self Reporting Questionnaire; WHO: World Health Organization.

Authors’ contributions
MG and MMR wrote the proposal, participated in data collection, analysis and prepared manuscript of the paper. DA and ZY approved the proposal with some revisions, participated in data analysis, revised subsequent drafts of the paper and participated in manuscript preparation. DDM participated in the analysis and manuscript preparation. All authors have read and approved the final manuscript.
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Competing interests
The authors declare that they have no competing interests.

Availability of data and materials
The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Consent for publication
Not Applicable.

Ethics approval and consent to participate
Ethical clearance was obtained from Amanuel Mental Specialized Hospital and University of Gondar Institutional review board following the Ethiopian National research Ethics review guideline of the federal ministry of science and technology. Permission letter was obtained from the central prison. Participants were fully informed about the purpose of the study and verbal informed consent was obtained from them before the beginning of the interview.

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References
1. Organization WH. The World Health Report 2001: Mental health: new understanding, new hope. World Health Organization; 2001.
2. Olley BO, Seedat S, Nei DG, Stein DJ. Predictors of major depression in recently diagnosed patients with HIV/AIDS in south africa. AIDS Patient Care STDS. 2004;18(8):481–7.
3. Olutunji BO, Momiga MJ, Cleirigh C, Safren SA. A review of treatment studies of depression in HIV. Topics HIV Med. 2006;14(3):112.
4. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. PLoS Med. 2006;3(11):e442.
5. Sammod VM, Baity LK. Depression in Patients with HIV/AIDS. Kuwait Med J. 2007;39(3):227–30.
6. UNAIDS. Fact Sheet. 2017.
7. Ethiopia CSA, Macro I. Ethiopia Demographic and Health Survey 2011. Addis Ababa, Ethiopia and Calverton, Maryland, USA: Central Statistical Agency (Ethiopia) and ICF International. 2012.
8. Mayer KH, Spaulding A, Stephenson B, Macalino G, Ruby W, Clarke JG, et al. Human immunodeficiency virus in correctional facilities: a review. Clin Infect Dis. 2002;35(3):305–12.
9. Feaster DJ, Reznick OG, Zack B, McCartney K, Gregorich SE, Brincks AM. Health status, sexual and drug risk, and psychosocial factors relevant to postrelease planning for HIV+ prisoners. J Correct Health Care. 2013;19(4):278–92.
10. Peng EY, Lee M-B, Morisky DE, Yeh C-Y, Farabee D, Lan Y-C, et al. Psychiatric morbidity in HIV-infected male prisoners. J Formosan Med Assoc. 2010;109(3):177–84.
11. Naidoo S, Nkize D. Prevalence of mental disorders in a prison population in Durban, South Africa. Afr J Psychiatry. 2012;15(1):30–5.
12. Berhe H, Bayray A. Prevalence of depression and associated factors among people living with hiv/aids in tigray, north ethiopia: a cross sectional hospital based study. Int J Pharm Sci Res. 2013;4(2):765.
13. Pappin M, Wouters E, Booyse FL. Anxiety and depression amongst patients enrolled in a public sector antiretroviral treatment programme in South Africa: a cross-sectional study. BMC Public Health. 2012;12(1):1.
14. Arsenio S, Arvaniti A, Samakouri M. HIV infection and depression. Psychiatry Clin Neurosci. 2014;68(2):96–109.
15. Collins PY, Holman AR, Freeman MC, Patel V. What is the relevance of mental health to HIV/AIDS care and treatment programs in developing countries? A systematic review. AIDS (London, England). 2006;20(2):1571.
16. Scheyett A, Parker S, Golcin C, White B, Davis CP, Wohl D. HIV-infected prison inmates: depression and implications for release back to communities. AIDS Behav. 2010;14(2):300–7.
17. Kroenke K, Spitzer RL, Williams JB. The Phq-9. J Gen Intern Med. 2001;16(9):606–13.
18. Wiklander M, Rydström L-L, Yrge B-M, Navèl L, Wettergren L, Eriksson L.E. Psychometric properties of a short version of the HIV stigma scale, adapted for children with HIV infection. Health Qual Life Outcomes. 2013;11(1):1.
19. Beyen TK, Dadi AF, Dachew BA, Mulunehy NY, Bisetegn TA. More than eight in every nineteen inmates were living with depression at prisons of NorthWest Amhara Regional State, Ethiopia, a cross sectional study design. BMC Psychiatry. 2017;17(1):31.
20. Bedaso A, Kediro G, Veneaat T. Factors associated with depression among prisoners in southern Ethiopia: a cross-sectional study. BMC Res Notes. 2018;11(1):637.
21. Abdu Z, Kabetta T, Dube L, Tessema W, Ahera M. Prevalence and associated factors of depression among prisoners in Jimma Town Prison, South West Ethiopia. Psychiatry J. 2018;10:10.
22. Rai P, Verma BL. A study on depression in people living with HIV/AIDS in South-West part of Uttar Pradesh, India. South East Asia J Public Health. 2015;5(1):12–7.
23. Zewdu S, Abebe N. Common Mental Disorder among HIV infected individuals at comprehensive hiv care and treatment clinic of Debere Markos referral Hospital, Ethiopia. J AIDS Clin Res. 2015;6(2):420.
24. Scheyett A, Parker S, Golcin C, White B, Davis CP, Wohl D. HIV-infected prison inmates: depression and implications for release back to communities. AIDS Behav. 2010;14(2):300–7.
25. Bhatia M, Munjal S. Prevalence of depression in people living with HIV/ AIDS undergoing ART and factors associated with it. J Clin Diagn Res. 2014;8(10):WC01.
26. Clarke T, Gibson R, Barrow G, Abel W, Barton E. Depression among persons attending a HIV/AIDS outpatient clinic in Kingston, Jamaica. West Indian Med J. 2010;59(4):369–73.
27. Eshetu DA, Meseret S, Woldeyohannes MAK, Techane GN, Guzachew KD, Tegegne MT, et al. Prevalence of Depression and Associated Factors among HIV/AIDS Patients Attending ART Clinic at Deberebirhan Referral Hospital, North Showa, Amhara Region, Ethiopia. Clin Psychiatry. 2015.
28. Atkinson JH, Heaton RK, Patterson TL, Wolfson T, Deutsch R, Brown S, et al. Two-year prospective study of major depressive disorder in HIV-infected men. J Affect Disord. 2008;108(3):225–34.
29. Lakoa RM, Noubiap JJ, Fang Y, Ntone FE, Kuaban C. Prevalence and correlates of depressive symptoms in HIV-positive patients: a cross-sectional study among newly diagnosed patients in Yaoundé, Cameroon. BMC Psychiatry. 2013;13(1):1.
30. Mohammed M, Mengiste B, Dessie Y, Godana W. Prevalence of depression and associated factors among HIV patients seeking treatments in ART clinics at Harar Town, Eastern Ethiopia. J AIDS Clin Res. 2015;2015:1–6.
31. Al-Rousan T, Rubenstein L, Sieleni B, Deol H, Wallace RB. Inside the nation’s largest mental health institution: a prevalence study in a state prison system. BMC Public Health. 2017;17:542.