

Prevalence of Symptoms of Depression among Inpatients with Substance Use Disorders in Drug Rehabilitation Centres in Nairobi, Kenya

Audrey Onyango, PsyD Candidate; Michael Kihara, PhD., and Stella Nyagwencha, PhD., United States International University - Africa

Abstract

Substance Use Disorders are patrimonial psychiatric disorders with global health concerns connected to many clinical correlations and mental health comorbidities. This study aimed to investigate the prevalence of symptoms of depression in a sample of SUD patients. The study adopted a correlational design using the quantitative research method involving 178 participants, 91% male and 9% female, in drug rehabilitation centres in Nairobi, Kenya. The Self-Medication and Substance-Induced Enhancement theories guided the study. A researcher developed a socio-demographic questionnaire, and the BDI II were used to collect data. Data were analysed using the Statistical Package for Social Scientists version 23 (SPSS v. 23.0). Findings from the study established that 45.5% of the respondents had symptoms of depression. The study recommends a regular assessment of symptoms of depression among clients in inpatient and outpatient treatment centres for successful treatment outcomes.

Keywords: Substance Use Disorders, Symptoms of Depression, Prevalence, Drug Rehabilitation, Inpatient.

Introduction and Background

Substance Use Disorder (SUD) is an acute relapsing disorder, defined by compulsive use of substances regardless of harmful sequel to the individuals and society (APA, 2013; El Dardiri et al., 2023). The DSM 5 identifies 10 classes of substances and prescribes that two of eleven criteria are met within 12 months for a SUD diagnosis. Further, the number of criteria met determines the severity of the SUD which exists on a spectrum from mild to severe (APA,2013). Fernàndez-Castillo et al.(2022) postulate that SUDs are characterized by accelerated and unrelenting drug intake, craving, over-drug intake and loss of control. SUDs ensue simply in individuals whose drug-use prospects advance into a maladaptive pattern of drug-taking and pursuit (APA, 2013).

Assorted literature on drug use and abuse claims that even though there exists well-documented evidence of the adverse inferences and consequences, drug use and abuse has remained substantially high worldwide and is a public health concern (Kaburia et al., 2022; Wanjiru et al., 2022). A report by the United Nations Office On Drugs and Crime (UNODC) indicates that worldwide, approximately 269 million people used at least one substance in 2017 (UNODC, 2021). A World Health Organization (WHO) report mentions Substance Use Disorders and other mental disorders as non-communicable illnesses accounting for 70 % of the 56 million deaths worldwide (WHO, 2018). WHO Regional Committee for Africa (2017) shows that during the year 2015, 34% of the deaths in sub – Saharan Africa were a result of NCDs. Studies conducted in Kenya have demonstrated that substance use is associated with a heavy psychological burden (Githae, 2019) and financial burden (Kamenderi et al., 2019) which severely threatens the family, community and country in general).

Mood disorders have been identified as some of the most common and incapacitating psychiatric disorders. The DSM 5 classifies the following under depressive disorders; Major Depressive Disorder, Persistent depressive disorder, Disruptive mood dysregulation disorder, Premenstrual dysphoric disorder, Substance/medication-induced depressive disorder, Depressive disorder due to another medical condition and Unspecified depressive disorder (APA, 2013). Major Depressive Disorder commonly referred to as depression is the most common mood disorder (Ferrari et al, 2013). It brings about recurrent feelings of sadness and loss of interest (APA, 2013). Depressive symptoms are varied and their presentation varies in individuals. Males often display physical symptoms of depression while females display emotional ones. Furthermore, two individuals may be diagnosed with depression and not share any symptoms (Thapar et al., 2022). Twice the number of women are diagnosed with depression compared to men (Kundakovic & Rocks, 2022; Weissman & Klerma, 1977). Diverse studies postulate that depression is a mental health concern in developed and developing countries (Atwoli, 2022; MoH, 2020). Depression has been associated with disability and plays a significant role in the overall problem of disease globally (Kamacooko et al., 2022). Depression is an episodic and recurrent disorder. The chances of recurrence after one, two and three episodes are 50%, 70% and 90% respectively (Ratheesh, et al., 2017).

A WHO (2020) study estimates that over 300 million people globally suffer from depression. Worldwide, 2021 statistics indicate that approximately 3.8% of individuals suffer from depression (WHO, 2021). The results of a study carried out by Villarroel and Terlizzi (2020) on a sample of adults in the US found that approximately 18.5% of them indicated symptoms of depression. The study conducted in 2019 showed that the highest percentage (21%) of these adults were aged between 18 and 29 years, followed by 18.4% (45 to 64 years and, 65 years old and above) and 16.8% in those between 30 to 44 years old.

A systemic literature review of 46 studies on depression published between 1st January 2020 and 29th January 2021 found that the prevalence rates of depression increased during the COVID-19 pandemic by about 27.6% globally and about 23% in sub-Saharan Africa (Santomauro et al, 2021). Gbadamosi et al. (2022) report that many depressed individuals in sub-Saharan Africa are not diagnosed nor treated for it due to factors like the lack of awareness and resources. An estimated 29.19 million people in Africa suffer from depression while lifetime prevalence rates are between 3.3% and 9.8% (Esan & Esan, 2016).

A secondary analysis of 127 papers published between 2004 and 2021 in Uganda involved 123,859 participants. The pooled prevalence of depression in this study was 30.2%. The research established that the prevalence of depression varied in different populations. In the general population, the pooled prevalence was 20.8%. However, the highest rates were among refugees (67.6%), war victims (36.0%), and those living with HIV (28.2%) (Kaggwa et al., 2022). Amongst African countries, Kenya has been graded high as one of the countries recording an elevated number of depression cases (Evans-Lacko et al., 2018). A survey carried out by a National Taskforce in Kenya shows that 1 out of 4 people seeking healthcare services has a mental disorder and that depression as an ailment has been documented as being among the leading mental illnesses (MoH, 2020).

While comorbidity occurs between depression and innumerable mental disorders, the most frequently mentioned are comorbidities with substance use and SUDs (APA, 2013; Tirado-Muñoz et al., 2018). Additionally, drug and substance use has been identified as a critical risk

factor for depressive disorders. Global studies indicate a strong link between mental health disorders and substance use (Kaburia et al., 2022; Ndetei et al., 2023; Substance Abuse and Mental Health Services Administration [SAMHSA], 2020). Findings reveal statistically significant associations between substance use and depressive disorders.

Further, a study by Davis et al. (2022) in Australia found that depression was high among patients seeking treatment for SUD's. In Nigeria, a study carried out at the Center for Addiction Treatment and Research (CATR) with inpatients in SUD treatment centres found out the prevalence rate of depression was 29% (Makput, 2020).

In Kenya, a study carried out at the Kenyatta National Hospital established that 40.6% of the patients seeking services indicated moderate to severe symptoms of depression (Iheanacho et al., 2022). Further, another study carried out on mental disorders and SUDs with inpatients at the Alcohol and Drug Abuse Rehabilitation Unit (ADAR), Moi Teaching and Referral Hospital (MTRH), indicated that the prevalence rate of symptoms of depression was 47.2% (Jaguga et al., 2022). The results of a study further affirm this finding carried out in Kenya by Kaburia et al. (2022) on the link between depressive disorders and substance use, with results indicating that symptoms of depressive disorder correlate significantly with substance abuse.

Globally, empirical evidence indicates that even though some interventions for SUD patients have indicated a good treatment outcome, no tested psychological treatment qualifies for the universally recognized criteria for well-entrenched and authentic treatments (Deak, 2017). Further, studies claim it is challenging to treat patients with co-morbid SUDs and depression since symptoms of one disorder are likely to aggravate the symptoms of the other disorder (Hunt et al., 2020). This background, therefore, justifies the need for further probe into depression as a mental disorder co-occurring with SUD among SUD inpatients in Nairobi, Kenya.

Methodology

The current study was conducted in eleven drug rehabilitation centres in Nairobi, Kenya. A correlational design using the quantitative method of research was employed. The principal

researcher conducted a census, non-probability sampling technique that entailed contacting each rehabilitation centre listed. The existing status of individuals struggling with SUDs nationally and residential treatment informed the choice of the study site for cases of mental disturbance to SUD in Nairobi County. This state created a justification for further probing through scientific investigation.

The study had a total of 178 respondents. Ninety- one percent were male and one percent was female. It comprised all inpatients admitted at the treatment centres within 90 days. They had to be aged ≥ 18 years, and be free from any illnesses that would hamper their participation and were willing to participate in the study. Four questionnaires were incomplete and therefore were not analyzed.

The BDI II, was used to assess for symptoms of depression. This tool assesses symptoms of Major Depressive Disorder (Beck et al., 1996). It has 21 items and each item is rated from 0 to 3 on a Likert with a total possible sum of 63. A score of 0 and 13 was taken to show insignificant symptoms of depression, whereas a score of 14 or more indicated the presence of symptoms of depression. The higher scores indicated severe depression. Data was analyzed using the IBM Statistical Package for Social Sciences (SPSS) for Windows Version 23.

The researcher sought ethical approval from the Institutional Review Board (IRB) of the United States International University - Africa (USIU-A), and obtained a permit from the National Commission for Science and Technology (NACOSTI), the Ministry of Education and Ministry of Health (Nairobi County). The approval of the rehabilitation centre's administrators was sought to gain entry into the treatment centers was also obtained through telephone and written communication. Study participants possessing the inclusion criteria requirements signed informed consent forms before participation. Any personal information that would identify participants was excluded from the questionnaire for anonymity.

Results

BDI II was used to assess the symptoms of depression. The study respondents were asked to report their general feelings in the two weeks preceding the study. Findings from the study indicated that 54.5% of the study respondents reported insignificant or no symptoms of depression, whereas 45.5 % reported substantial symptoms of depression.

Regarding the type of substance used, Alcohol Use Disorder (69.1%) was found to be the most common SUD followed by Cannabis Use Disorder (25.3%) as presented in Table 1.

Table 1: Type of Substance Used.

Substance used	YES		NO	
	n	%	n	%
Alcohol	123	69.1	55	30.9
Cannabis (Marijuana)	45	25.3	133	74.7
Khat (Miraa)	19	10.7	159	89.3
Tobacco	24	13.5	154	86.5
Other (narcotics, pills, etc)	20	11.2	158	88.8
More than one substance	36	20.2	142	79.8

To determine the distribution of symptoms of depression according to socio-demographic characteristics, a chi-square statistic was carried out (Table 2).

Table 2: Depression and associated socio-demographic characteristics

Covariate	Prevalence of Depression		χ^2 Statistic	p-value
	Absent (54.5%) Frequency (%)	Present (45.5%) Frequency (%)		
Gender				
Male	87(53.7%)	75(46.3%)	.454	.500
Female	10(62.5%)	06(37.5%)		
Age				
18-27yrs	23(54.8%)	19(45.2%)	.426	.935
28-37yrs	40(55.6%)	32(44.4%)		
38-47yrs	26(55.3%)	21(44.7%)		
47<	08(47.0%)	09(53.0%)		
Marital status				
Single	51(50.0%)	37(42.0%)	2.658	.447
Widowed	03(75.0%)	01(25.0%)		
Married/ cohabiting	27(46.6%)	31(53.4%)		
Separated/ divorced	16(57.1%)	12(42.9%)		
Highest level of education				
Less than high school	05(41.7%)	07(58.3%)	1.983	.576
High school graduate	23(62.2%)	14(37.8%)		
Completed college	41(55.4%)	33(44.6%)		
University degree	28(50.9%)	27(49.1%)		
Employment status				
Unemployed	31(51.7%)	29(48.3%)	1.139	.888
Student	10(62.5%)	06(37.5%)		
Self-employed	02(40.0%)	03(60.0%)		
Employed full-time	52(55.9%)	41(44.1%)		
Retired	02(50.0%)	02(50.0%)		

According to Table 2, there was a higher prevalence of depression in males (46.3%) than in females (37.5%). The result of a chi-square analysis conducted to examine the association between the two categorical variables in the dataset consisting of 178 valid cases did not reveal any statistically significant differences between the gender and prevalence of depression in this ($\chi^2 (1, N = 178) = 0.454, p = .500$).

Results in Table 2 show that the prevalence of symptoms of depression was highest in those aged 47 years and above (53.0%). The other age groups did not differ significantly regarding the prevalence of symptoms of depression. The prevalence of symptoms of depression ranges from 44.4% (28-37 years) to 45.2% (18-17 years). The chi-square analysis was conducted to establish the differences between age and prevalence of symptoms of depression. The results indicated that there were no statistically significant differences as evidenced by the high p-values (.935) obtained ($\chi^2(3, N = 178) = 0.426, p = .935$).

The group of participants with the highest prevalence of symptoms of depression regarding marital status was those who were married or cohabiting (53.4%). The group with the lowest prevalence of symptoms was widowed (25%). The findings of this study show that there was no statistically significant association between marital status and the prevalence of symptoms of depression. This was indicated by the non-significant p-values for ($p = .447$) obtained ($\chi^2(3, N = 178) = 2.658, p = .447$) as a result of a chi-square test conducted.

The findings of this study indicate that the participants with less than a high school level of education had the highest prevalence of symptoms of depression (58.3%). They were followed by those with a university degree (49.1%), those who have completed college (44.6%) and high school graduates (37.8%). Further analysis using chi-square indicated that none of the chi-square tests yielded statistically significant associations between the categorical variables, as all the p-values were greater than .05. The results indicate that there was no evidence to support relationships between the highest level of education and prevalence of depression in the dataset ($\chi^2(3, N = 178) = 1.983, p = .576$).

The self-employed participants in this sample were found to have the highest prevalence of symptoms of depression (60.0%). They were followed by the retired (50.0%), unemployed (48.3%), employed full-time (44.1%) and students (37.5%). According to the chi-square test, there is no evidence to support relationships between employment status and the prevalence of symptoms of depression in the dataset ($\chi^2(4, N = 178) = 1.139, p = .888$).

Discussion

The most abused substance in this study was alcohol (69.1%) this is comparable to a study on 456 patients at an addiction and detoxification facility in Australia which also found that alcohol was the most abused substance (Davis et al., 2022). In contrast, a study in Northern India established that cannabis was the most abused substance in those who sought treatment for SUD treatment. In the Indian study, the prevalence of alcohol use was 3%. The significantly low percentage is attributed to the Muslim community in which the study was conducted since Islam does not advocate for alcohol intake (Gania et al., 2017). In Kenya, the most abused substance is alcohol followed by tobacco (NACADA, 2022).

Findings from the current study show that the prevalence rate for depression amongst respondents in this sample was 45.5%. This finding is in tandem with the results of other studies. For instance, a similar range of 27% to 85% comorbidity for current depression has been reported in a study by Kingston et al. (2017). A study carried out in Australia in a systematic review involving 18 studies on the prevalence of symptoms of depression emphasized the need for a complete range determination of mental disorders in all SUD populations. Research conducted in Guilan province, Iran using a descriptive-analytic approach by Novin et al. (2018) found that the prevalence of symptoms of depression using the BDI at the methadone treatment facility was 48.96%. This result is almost similar to that of this study.

In contrast to the results of this study, the prevalence rate of depression was lower than 45.5 % in some studies carried out in different parts of the world. For example, in Sri Nager, India, a study on inpatient and outpatient participants seeking treatment for Opioid Use Disorder (OUD) found the prevalence rate of depression as 10.81% (Bhat et al., 2019). Subramanian et al. (2021) conducted a 4-month research on 152 patients at a psychiatric hospital in Sabah, Malaysia. Their study determined the prevalence rate of depression as 20%. The study in Malaysia used the Mini-International Neuropsychiatric Interview (MINI) to assess for symptoms of depression. Another study on 320 participants with comorbid SUDs carried out in an Iranian Psychiatric Hospital in 2020 results indicated a prevalence rate of 16.9%. It used the Persian version of the Structured Clinical Interview for the DSM 5 Disorders–Clinician Version (SCID-5-CV) to determine the

symptoms of depression (Oladikalarijani et al, 2023). At an addiction centre in Vom, Plateau State in Nigeria, using case notes of 48 patients admitted at the treatment facility in the first three months of 2019, Makput (2020) established the prevalence rate of depression was 29% which was lower than those reported by this study.

The differences in prevalence rates could be attributed to the varying tools used to assess depression. The tools focus on different levels of symptomatology. They also vary in levels of specificity (fewer false positives) and sensitivity (fewer false negatives) (Ren et al., 2015). The site of study also differed with some studies being conducted in a hospital setting while others were at drug rehabilitation facilities.

In Egypt, the prevalence of depression was high at 93% in a psychiatric hospital. This study by Mohamed et al. (2020) found a remarkably higher prevalence of symptoms of depression compared to this study (45.5%). The Egyptian study reported a large number (83%) of polydrug users, using up to six substances. This is in contrast to the 20.2% reported to be using more than one substance in this study. The polydrug use could be attributed to patients attempting to self-medicate and relieve symptoms of depression (Mohamed et al., 2020).

A study by Jaguga et al. (2022) at Moi Referral Teaching Hospital in Kenya obtained similar results for the prevalence of depression (47.2%). This study was carried out for 12 months from June 2019. The 12-month prevalence of co-morbid depression in the community was estimated at 15.5% (Knoll., 2017), and this prevalence was even greater among those receiving treatment for an alcohol use disorder (32.8%) or drug use disorder (44.3%). In Kenya, Iheanacho et al. (2022) at Kenyatta National Hospital in Nairobi using the PHQ -9 found the prevalence rate in 734 patients for moderate and severe depression was 40.6% in patients with SUD accessing treatment at the hospital.

According to Table 2, 9% (16) constituted female respondents, and 91.0% (162) respondents, thereby demonstrating that males were the more noteworthy percentage constituted male respondents. This is similar to the distribution of gender in treatment centres catering for both

genders for drug rehabilitation (Githae, 2019). In a study by Jaguga et al. (2022), 81.1% of the respondents were male. Similarly in the study by Makput (2020), 94% of the study sample were males and 6% were females. Females with SUDs are often stigmatized by society and therefore shy away from seeking treatment. They also often lack the financial capacity to seek treatment while fearing the repercussions of the same on their role in the family (Jackson & Shannon, 2012).

Results of this study have demonstrated that the prevalence of depression in females in this sample is 37.5% compared to 46.3% in males. This is contrary to studies done in the United States of America that indicated that the prevalence of depression is twice that of males (Kundakovic & Rocks, 2022; Thapar et al., 2022). This inconsistency could be attributed to the significantly low percentage of females (9%) in this study compared to males (91%). The results of this study indicated that the highest prevalence of depression was in individuals aged 47 years and above (53 %) followed by those that are aged between 18 – 27 years old (45.2%), 38 – 48 years (44.7%) and 28- 37 years old (44.4%). Marital status has been linked to the prevalence of depression. Being without a marriage partner has been cited as a risk factor for depression (Thapar et al., 2022). This contrasts with the results of this study which have indicated that the highest prevalence of depression was found among participants that were married or cohabiting. These results suggest that there could be other factors associated with SUDs that affect the relationship between married/ cohabiting partners making them more depressed compared to relationships that partners do not have SUDs.

The high prevalence rate of symptoms of depression emphasizes the need for healthcare providers to recognize the existence of comorbidities and take action for more comprehensive diagnosis during the treatment of SUDs. According to the prevalence results from other studies (Jaguga et al., 2022; Kamacooko et al., 2022) it is crucial to comprehend the factors behind persistent symptoms and recurrent treatment episodes. Additionally, the severity and costs associated with managing comorbidities further underscore the importance of this research. Comparatively, individuals without any comorbid illnesses are less prone to severe complications related to drug abuse when seeking treatment, in contrast to those who have

comorbid depression. The high levels of depression among SUD patients appear to be consistent with previous studies (Bergman et al., 2014; Castaldelli-Maia, & Bhugra, 2022; Jaguga et al., 2022). This study's findings could indicate that most patients are emotionally unhealthy and unstable.

Conclusion

The current study's findings indicated noteworthy areas for clinical mediation for patients with comorbidity. Comorbid depression could influence patients' treatment trajectories. The results showed a statistically significant association between depression and SUD's. It is critical for mental health practitioners such as psychologists and psychiatrists to take note of the vital link between mental disorders and SUD which is often ignored. It is an important requirement for mental health care practitioners to screen patients with co-occurring depression to inform treatment planning. This assessment allows for integrated treatment, which means a comprehensive treatment for both SUD and co-occurring disorders. Patients with depression often suffer severe damage in multiple areas, including social, medical, and legal glitches. Based on the presence, severity, and costs of managing co-occurring mental health symptoms, it is imperative to take note of aspects causing the enduring symptoms and continual treatment to help the construction of upgraded therapies. Literature in the field of clinical psychology could benefit from the findings of this study. Additional research could be conducted with a larger population which may include a larger number of females. Other counties may be included to determine the trends of depression in different areas of the country.

References

- Atwoli, L., Muhia, J., & Merali, Z. (2022). Mental health and climate change in Africa. *The British Journal of Psychiatry International*, 1-4
- Beck AT, Steer RA, Brown G. Beck depression inventory–II. *Psychological assessment*. 1996
- Bergman, B. G., Greene, M. C., Slaymaker, V., Hoepfner, B. B., Kelly, J. F. (2014). Young adults with co-occurring disorders: substance use disorder treatment response and outcomes. *Journal of Substance Abuse Treatment*; 46(4):420–8. <https://doi.org/10.1016/j.jsat.2013.11.005>.
- Castaldelli-Maia, J. M., & Bhugra, D. (2022) Analysis of global prevalence of mental and substance use disorders within countries: focus on sociodemographic characteristics and income levels, *International Review of Psychiatry*, 34:1, 6-15, DOI: 10.1080/09540261.2022.2040450
- Davis, A., McMaster, P., Christie, D. C., Yang, A., Kruk, J. S., & Fisher, K. A. (2022). Psychiatric comorbidities of substance use disorders: does dual diagnosis predict inpatient detoxification treatment outcomes? *International Journal of Mental Health and Addiction*, 1-15.
- Deak, T., Kudinova, A., Lovelock, D. F., Gibb, B. E., & Hennessy, M. B. (2017). A multi-species approach for understanding neuroimmune mechanisms of stress. *Dialogues in clinical*
- Düring, S. W., Nordgaard, J., & Mårtensson, S. (2021) Stability of admission diagnoses; data from a specialized in-patient treatment facility for dual diagnosis, *Nordic Journal of Psychiatry*, 75:1, 54-62, DOI: 10.1080/08039488.2020.1793381
- Eddie, D., Hoffman, L., Vilsaint, C., Abry, A., Bergman, B., Hoepfner, B..., & Kelly, J. F. (2019). Lived experience in new models of care for substance use disorder: a systematic review of peer recovery support services and recovery coaching. *Frontiers in Psychology*, 10, 1052.
- El Dardiri, M., El-Tantawy, A., Abd Elmoez, K., Sayed, H. H., Elbadry, H., & Ibrahim, O. (2023). Suicide Risk among Patients with Substance Use Disorders, A Cross-Sectional Study In Suez Canal Area Hospitals.
- Esan, O., & Esan, A. (2016). Epidemiology and burden of bipolar disorder in Africa: a systematic review of data from Africa. *Social Psychiatry and Psychiatric Epidemiology*; 51(1):93-100. doi: 10.1007/s00127-015-1091-5.
- Evans-Lacko, S., Aguilar-Gaxiola, S., Al-Hamzawi, A., et al. (2018). Socio-economic variations in the mental health treatment gap for people with anxiety, mood, and substance use

disorders: results from the WHO World Mental Health (WMH) surveys.
Psychological Medicine; 48(9):1560-1571.

- Fernández-Castillo, N., Cabana-Domínguez, J., Corominas, R. *et al.* (2022). Molecular genetics of cocaine use disorders in humans. *Molecular Psychiatry*; 27,624–639. <https://doi.org/10.1038/s41380-021-01256-1>
- Gania, A. M., Margoob, M. A., Shah, H. U., Khan, A. W, Ghosh, A., & Basu, D. (2017). Psychiatric comorbidity in patients with substance use disorder: A hospital-based study. *Indian Journal of Social Psychiatry*; 33:63-6.
- Gbadamosi, I. T., Henneh, I.T., Aluko, O.M., Yawson, E.O., Fokoua, A. R., Koomson, A., Torbi, J., Olorunnado, S. E., Lewu, F. S., Yusha'u, Y., Keji-Taofik, S. T., Biney, R. P., Tagoe, T. A. (2022). Depression in Sub-Saharan Africa. *IBRO Neuroscience Reports*, 12, Pages 309-322, <https://doi.org/10.1016/j.ibneur.2022.03.005>
- Githae, E. N. (2019). Psychosocial Burden among Close Family Members of Individuals with Alcohol Use Disorder in Inpatient Treatment Centers in Kenya. *African Journal of Educational & Social Science Research* 7(2)60-65.
- Hunt, G. E., Malhi, G. S., Lai, H. M. X. & Cleary, M. (2020). Prevalence of comorbid substance use in major depressive disorder in community and clinical settings, 1990–2019: systematic review and meta-analysis. *Journal of Affective Disorders*; 266, 288–304.
- Iheanacho, T., Maciejewski, K., Ogudebe, F., Chumo, F., Slade, T., Leff, R., & Ngaruiya, C. (2022). Prevalence and correlates of depression and substance use disorders in emergency department populations: A cross-sectional study at East Africa's largest public hospital. *African Journal of Emergency Medicine*. 12. 307-314. [10.1016/j.afjem.2022.06.008](https://doi.org/10.1016/j.afjem.2022.06.008).
- Jackson, A., & Shannon, L. (2012). Barriers to receiving substance abuse treatment among rural pregnant women in Kentucky. *Maternal Child Health Journal*; 6:1762–70. <https://doi.org/10.1007/s10995-011-0923-5>.
- Jaguga, F., Kuboi, N., Barasa, J., & Kwobah, E. K. (2022). Prevalence of co-occurring mental disorders among in-patients at the Alcohol & Drug Abuse Rehabilitation Unit, Moi Teaching & Referral Hospital in Eldoret. *African Journal of Alcohol & Drug Abuse: Vol 7*; 36-44.
- Kaburia, N. E., Muthondeki, D., & Muthomi, S. (2022). The relationship between depressive disorders and substance use among women in addiction recovery in Kiambu County, Kenya. *African Journal of Alcohol & Drug Abuse*: 8; 43-57.
- Kamacooko, O., Bagiire, D., Kasujja, F. X., Mirembe, M., Seeley, J., & King, R. (2022). Prevalence of probable depression and factors associated with mean Hopkins Symptom Checklist (HSCL) depression score among young women at high risk aged 15–24 years in Kampala, Uganda. *PLoS one*, 17(6), e0270544.
- Kamenderi, M., Muteti, J., Okioma, V., Kimani, S., Kanana, F., & Kahiu, C. (2019). Status of drugs and substance abuse among the general population in Kenya. *African J Alcohol Drug Abuse*, 1, 54-9.
- Kaggwa, M. M., Najjuka, S. M., Bongomin, F., Mamun, M. A., & Griffiths, M. D (2022) Prevalence of depression in Uganda: A systematic review and meta-analysis. *PLoS ONE* 17(10): e0276552. <https://doi.org/10.1371/journal.pone.0276552>

- Kash, B. A., Baek, J., Davis, E., Champagne- Langabeer, T., & Langabeer II, J. R. (2017). Review of successful hospital readmission reduction strategies and the role of health information exchange. *International journal of medical informatics*, 104, 97-104.
- Kingston, R. E. F., Marel, C., & Mills, K. L. (2017). A systematic review of the prevalence of comorbid mental health disorders in people presenting for substance use treatment in Australia. *Drug and Alcohol Review*, 36(4), 527–539. <https://doi.org/10.1111/dar.12448>
- Knoll, A. D., & MacLennan, R. N. (2017). Prevalence and correlates of depression in Canada: Findings from the Canadian Community Health Survey. *Canadian Psychology/psychologiecanadienne*, 58(2), 116.
- Kundakovic, M., & Rocks. D. (2022). Sex hormone fluctuation and increased female risk for depression and anxiety disorders: From clinical evidence to molecular mechanisms. *Frontiers in Neuroendocrinology*, 66; 101010. <https://doi.org/10.1016/j.yfrne.2022.101010>
- Makput, D. M. (2020). Co-occurring Mental Disorders among In-patients in a Substance Use Disorder Treatment Center in Plateau State, Nigeria. *Journal of BioMedical Research and Clinical Practice*, 3(1), 223–229. Retrieved from <https://jbrcp.net/index.php/jbrcp/article/view/134>
- Mohamed, I.I., Ahmad, H.E.K., Hassaan, S.H. *et al.* (2020). Assessment of anxiety and depression among substance use disorder patients: a case-control study. *Middle East Current Psychiatry* 27, 22 doi.org/10.1186/s43045-020-00029-w
- Ndetei, D. M., Mutiso, V., Momanyi, R., Nyamai, P., Musyimi, C., & Mamah, D. (2023). The co-morbidity of DSM-V Gambling with DSM-V mental disorders and substance abuse in a Kenyan context of high-risk schizophrenia. *BMC Psychiatry*, 23(1), 1-11.
- NIDA.
- NACADA (2022). National survey on the status of drugs and substance use in Kenya.
- Novin, M. H., Eftekhar-Ardebili, H., Batebi, A., Amiri, Z. M., & Langeroodi, N. B. (2018). Prevalence of Depression and Its Affecting Factors in Patients Referred to Addiction Recovery Centers in Guilan Province, Iran, During Year 2013; *Iranian Journal of Psychiatry and Behavioral Science*; 12(4): e58779. doi: 10.5812/ijpbs.58779.
- Oladikalarijani, M., Shabani, A., Soraya, S., & Ahmadkhaniha. H. (2023). Comorbidities of Major Depressive Disorder and Bipolar Disorders in Patients with Substance Use Disorder in Iran Psychiatric Hospital: A Cross-sectional Study. *Medical Journal of the Islamic Republic of Iran*; 37:3. <https://doi.org/10.47176/mjiri.37.3>
- Ratheesh, A., Davey, C., Hetrick, S., Alvarez-Jimenez, M., Voutier, C., Bechdolf, A., McGorry, P. D., Scott, J., Berk, M., & Cotton. S. M. (2017). A systematic review and meta-analysis

of prospective transition from major depression to bipolar disorder. *Acta Psychiatrica Scandinavica*; 135(4):273-284.

- Ren, Y., Yang, H., Browning, C., Thomas, S., & Liu, M. (2015). Performance of Screening Tools in Detecting Major Depressive Disorder among Patients with Coronary Heart Disease: A Systematic Review. *Medical Science Monitor*, 21 pp. 646-653. <http://dx.doi.org/10.12659/MSM.892537>
- Santomauro, D. F., Mantilla, Herrera, A. M., Shadid, J., Zheng, P., Ashbaugh, C., Pigott, D. M., et al. (2021). Global prevalence and burden of depressive and anxiety disorders in 204 countries and territories in 2020 due to the COVID-19 pandemic. *The Lancet*; 398(10312):1700–12.
- Smarr, K. L., & Keefer, A. L. (2011). Measures of Depression and Depressive Symptoms. Beck Depression Inventory-II (BDI-II), Center for Epidemiologic Studies Depression Scale (CES-D), Geriatric Depression Scale (GDS), Hospital Anxiety and Depression Scale (HADS), and Patient Health Questionnaire-9 (PHQ-9). *Arthritis Care & Research*, 63, SII, S454 –S466 DOI 10.1002/acr.20556
- Subramaniam, S., Yee, A., Nordin, A. S. B. A., & Khalib, A. Q. B. (2021) Prevalence of Severe Mental Illness Dual Diagnosis Among Inpatients in a Psychiatric Hospital in Malaysia, *Journal of Dual Diagnosis*, 17:1, 4-12, DOI: 10.1080/15504263.2020.1854410
- Substance Abuse and Mental Health Services Administration. (2021). Key substance use and mental health indicators in the United States: Results from the 2020 National Survey on Drug Use and Health (HHS Publication No. PEP21-07-01-003, NSDUH Series H-56). Rockville, MD: Center for Behavioral Health Statistics and Quality, Substance Abuse and Mental Health Services Administration. Retrieved from <https://www.samhsa.gov/data/>
- Thapar, A., Eyre, O., Patel, V., & Brent, D. (2022). Depression in young people. *The Lancet*, 400(10352), 617-631. [https://doi.org/10.1016/S0140-6736\(22\)01012-1](https://doi.org/10.1016/S0140-6736(22)01012-1)
- Tirado-Muñoz, J., Farré, A., Mestre-Pintó, J., Szerman, N., & Torrens, M. (2018). Dual diagnosis in Depression: treatment recommendations. *Addictions*, 30, 1, 66-76
- United Nations Office on Drugs and Crime (UNODC). (2021). Global Overview of Drug Demand and Supply, World Drug Report 2021. United Nations Publication; 11-12.
- Villarroel, A. M., & Terlizzi, E. P. (2020). Symptoms of Depression among Adults: United States, NCHS Data Brief No. 379.
- Wanjiru, N. W., Muthami, J. & Shanyisha, W. (2022). Effects of Relative's Substance Use Disorder on Family Psychological Wellbeing: Mathari Rehabilitation Centre Nairobi, Kenya. *Journal of Research Innovation and Implications in Education*, 6(2), 408 – 419.

- Weissman, M. M., & Klerman, L. (1977). Sex differences and the epidemiology of depression. *Archives of General Psychiatry*, 34, 98-111.
- WHO Regional Committee for Africa. (2017). Regional framework for integrating essential NCDs services in primary healthcare. June 14. Available from: <https://afro.who.int/sites/default/files/2017-08/AFR-RC67-12%20Regional%20framework%20to%20integrate%20NCDs%20in%20PHC.pdf>
- World Health Organization. (2018). Global Status Report on Alcohol and Health 2018. Geneva: World Health Organization Press. License: CC BYNC-SA.