Research Article

Prevalence and Factors Associated with Self-Reported Substance Use among Patients with Mental Illness in Dar es Salaam, Tanzania: A Cross-Sectional Analytical Study

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Background. Substance use is prevalent among patients with mental illness in low- and middle-income countries, including Tanzania. This heightened prevalence not only increases the risk of developing mental disorders and substance use disorders but also contributes to poor treatment outcomes for these patients. Despite these concerns, the current prevalence of substance use and its associated factors in this population remains unclear in Tanzania. Therefore, this study is aimed at determining the 12-month period prevalence of self-reported substance use and associated factors among patients with mental illness. *Methods*. We conducted a cross-sectional analytical study among patients with mental illness at Muhimbili National Hospital in Dar es Salaam, Tanzania. Respondents were selected using a systematic random sampling technique. Data on self-reported substance use were collected using the World Health Organization's (WHO) alcohol, smoking, and substance involvement screening test (ASSIST) V3.0. IBM SPSS version 25 was employed for data analysis, utilizing frequencies and percentages to determine the prevalence of self-reported substance use. The study employed bivariate and multiple logistic regression analyses to investigate the association between patient characteristics and self-reported substance use, with statistical significance set at a p value of < 0.05. *Results*. A total of 364 patients were enrolled in the study, with 215 (59.1%) being male and a mean (SD) age of 35.57 (±9.01) years. Among the participants, 119 (32.7%) reported substance use. The most commonly used substances were alcohol (21.7%), tobacco (19.8%), and cannabis (12.9%). Factors significantly associated with self-reported substance use included younger age (AOR: 1.829; 95% CI: 1.112, 3.010; $p = 0.017$), male gender (AOR: 2.346; 95% CI: 1.397, 3.939; $p = 0.001$), positive family history of mental illness (AOR: 2.247; 95% CI: 1.364, 3.701; $p = 0.001$), and a family history of substance use (AOR: 3.804; 95% CI: 2.305, 6.276; $p < 0.001$). *Conclusions*. A significant proportion, amounting to one-third of patients, reported substance use, highlighting the imperative need for targeted measures within this population. The implementation of routine substance use screening programs for patients with mental illness is crucial, alongside gender-sensitive and age-specific interventions. Consideration of patients' family history of mental illness and substance use should be an integral part of these measures.

1. Introduction

Globally, half of patients with mental illness report a history of substance use, contributing to 37.6% of disease-burden-related disabilities [1]. In Africa, the prevalence of substance use among patients with mental illness varies from 21.3% to 69.2% [2, 3]. The complex relationship between substance use and mental illness operates in both directions—individuals diagnosed with mental illness are more likely to use substances, and those using substances are more likely to experience mental illnesses [4]. As a result, substance use among patients with mental illness contributes to the elevated prevalence of mental disorders and is associated with poor treatment outcomes and unfavorable prognoses [5].

Individuals engaging in various forms of substance use are at an increased risk of developing mental illness. The cooccurrence of mental illness and substance use not only has negative consequences for affected individuals but also poses challenges for healthcare providers [6]. In low- and middle-income countries, such as Tanzania, limited mental

health services contribute to the underrecognition and untreated status of individuals reporting substance use, thereby exacerbating existing mental health issues [7].

The reasons for substance use among patients with mental illness are diverse and include self-medication as a means of coping with symptoms, neurotransmitter changes in the brain, homelessness, and unemployment [8]. Substance use is most commonly reported in patients with anxiety disorders, personality disorders, mood disorders, schizophrenia, and posttraumatic stress disorder [9]. The substances most frequently used among patients with mental illness encompass tobacco, alcohol, cannabis, and cocaine [10].

In contrast to patients who do not use substances, those with mental illness who engage in substance use exhibit higher psychopathological severity, leading to profound functional impairment, poor treatment compliance, and increased rates of relapse, readmission, and suicide [11, 12]. The interference of substance use with the beneficial effects of psychotropic medication further exacerbates these challenges [13]. Consequently, substance use among patients with mental illness significantly elevates the risk of morbidity and mortality compared to the general population, owing to the compounded effects of exacerbated mental illness and profound functional impairment [8].

Patients with mental illness who engage in substance use are more likely to face unemployment and homelessness and engage in violent behaviors, leading to unstable family and interpersonal relationships and diminished contributions to economic activities [14]. Additionally, they often experience victimization, social exclusion, legal problems, and a heightened prevalence of blood-borne infections, such as HIV/AIDS or hepatitis, due to their risk-taking behaviors [15].

Diagnosing substance use in patients with mental illness presents difficulties due to the overlapping and fluctuating nature of symptoms, impeding the provision of appropriate treatment [16]. Moreover, the acute or chronic use of substances can mimic symptoms of mental illness, making it challenging to distinguish between symptoms arising from substance use disorder or withdrawal and those associated with mental illness [17]. However, it is noteworthy that screening tools for these challenges may vary across countries.

In Tanzania, studies examining substance use and associated risk factors among patients with mental illness are limited. Some investigations conducted in Mwanza and Dar es Salaam have identified alcohol, tobacco, and cannabis as the most commonly used substances. Notably, moderate to high alcohol use among patients with chronic psychotic symptoms has been linked to worsened medication attitudes and adherence [18, 19]. However, these studies primarily focused on individual substances and did not report the overall prevalence of substance use.

Therefore, this study is aimed at addressing this gap by determining the 12-month prevalence of self-reported substance use and its associated factors among patients with mental illness at Muhimbili National Hospital. The findings from this study offer valuable insights into the current trends of substance use among this population, potentially informing policies and interventions, such as routine substance use screening, for improved patient care.

2. Materials and Methods

2.1. Study Design. This study employed a cross-sectional analytical design, utilizing a quantitative approach. Cross-sectional designs, measuring exposure and outcome simultaneously in study participants, were chosen for their efficiency—being relatively faster, less time-consuming, and cost-effective. This design allowed us to assess the prevalence of self-reported substance use and associated factors among patients with mental illness, addressing our specific research objectives [20, 21].

2.2. Study Area and Setting. The study was conducted at the adult outpatient psychiatry clinic at Muhimbili National Hospital (MNH) in Dar es Salaam, Tanzania. As a national referral hospital, MNH caters to patients with mental disorders from within Dar es Salaam and neighboring regions. The Psychiatry and Mental Health Department, situated within the Directorate of Medical Services at MNH, offers comprehensive healthcare for patients with mental illness, addressing psychological, addiction, and psychiatric disorders for both inpatients and outpatients.

During the study period, the adult outpatient clinics at MNH served approximately 40-70 patients daily. The clinic was staffed by competent mental health specialists and other healthcare providers. The selection of MNH as the study site was based on its convenience, with ample study participants and available resources facilitating the timely completion of the study. MNH was chosen, recognizing the limited availability of facilities providing psychiatric treatment in the country. Despite various facilities, MNH serves as a central hub for psychiatric care in Dar es Salaam, often receiving referrals for patients with mental health conditions.

2.3. Study Population and Selection Criteria. This study included participants aged 18 years and older with mental illness, attending the adult psychiatry outpatient clinic during the study period. Only those who provided consent were included in the study. However, participants with debilitating and severe mental illness or concurrent physical illnesses were excluded.

2.4. Sample Size and Sampling Procedure. A sample size of 364 was determined using a formula based on the proportion estimate from a prior study [8] and a systematic random sampling to select study respondents. To establish the sampling frame, all patient files attending a follow-up clinic were identified and assigned sequential numbers, which were then entered into an Excel sheet. Utilizing computer-generated random numbers at every 3rd interval, a random sample was drawn, creating a list of selected respondents. Subsequently, their clinic dates were verified, and they were approached on the day of the clinic, where participation in the study was requested.

2.5. Variables Assessed. The outcome variable in this study was self-reported substance use among patients with mental illness. The predictor variables included the age of respondents, sex, marital status, living arrangement, place of residence, employment/occupation, level of education, family history

of mental illness, family history of substance use, and the patient's primary diagnosis.

2.6. Data Collection Method

2.6.1. Tools and Measurements. Sociodemographic characteristics, including age, gender, marital status, place of residence, employment/occupation, and level of education, were collected using an interviewer-administered questionnaire. The questionnaire also included inquiries about the patient's primary diagnosis, family history of mental illness, family history of substance use, and the type of substance(s) used.

Furthermore, the World Health Organization's (WHO) alcohol, smoking, and substance involvement screening test (ASSIST) V3.0 was employed to collect information on self-reported substance use. This globally validated tool has also been validated for substance use screening in Tanzania, exhibiting a Cronbach's alpha of ≥ 0.80 for each specific substance scale and total substance participation [22, 23]. Consisting of eight questions, the first question determined whether a respondent had ever used a given substance, with a binary (yes/no) response. Subsequent questions (2-7) assessed frequency, craving, use-related problems, others' concerns, and control over use. The overall prevalence of self-reported substance use among patients with mental illness was scored using the two categories (yes or no).

The mental disorders and substances included or assessed in this study were classified according to the fifth version of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)* [24], which is commonly used at MNH. In this classification, substances are categorized into 10 groups, including alcohol, caffeine, cannabis, hallucinogens, inhalants, opioids, sedatives (hypnotics and anxiolytics), stimulants, tobacco, and other (or unknown) substances. Patients' diagnoses encompassed bipolar mania, cannabis-induced psychosis, major depressive disorder, schizoaffective disorder, schizophrenia, and posttraumatic stress disorder (PTSD).

2.6.2. Data Collection Procedure. The first author, assisted by two research assistants recruited from the Department of Psychiatry and Mental Health, administered the questionnaires. The research assistants were chosen based on their competence and extensive experience working with patients with mental illness for several years, coupled with prior involvement in research activities. To ensure adherence to the study protocol, the research assistants underwent training covering study objectives, contents in the data collection tools, the data collection process, and ethical procedures.

During the interviews, 10 to 12 respondents were interviewed each day, with each session lasting 12 to 20 minutes. Interviews were exclusively conducted on clinic days. To prevent redundancy, files of interviewed respondents were labeled "interviewed" on a specific date, and every patient and relative was asked if they had already been interviewed before proceeding. The filled questionnaire was thoroughly checked for completeness before the respondent left the interview room. This procedure was repeated daily until the desired sample size was achieved.

2.7. Data Analysis. The data were initially entered into an Excel sheet and underwent a cleaning process before being transferred to IBM SPSS version 25 for analysis. Descriptive statistics, including mean and standard deviation for continuous variables and percentages with frequency for categorical variables, were used for summarization.

Bivariate and multiple logistics regression analyses were conducted to assess the unadjusted and adjusted association between sociodemographic characteristics and self-reported substance use, respectively, including determining both the direction and strength of the observed associations. Throughout all analyses, a p value of < 0.05 was considered statistically significant.

3. Results

3.1. Respondents' Sociodemographic Characteristics. The total number of respondents with completed questionnaires was 364, with the majority being males (215, 59.1%). The mean age (SD) was 35.57 (9.01), and over half (55.5%) fell within the age group of 18-34 years. A significant proportion were single (88.7%), and a majority were unemployed (56.6%). In terms of diagnoses, the majority (263, 72.3%) received a psychotic disorder diagnosis, predominantly schizophrenia (Table 1).

3.2. Prevalence of Self-Reported Substance Use. Overall, 119 (32.7%) respondents reported substance use in the last 12 months. The most commonly used substances were alcohol (21.7%), followed by tobacco (19.8%), cannabis (12.9%), opioids (2.7%), and sedatives (2.2%). Notably, none of the respondents reported using stimulants, hallucinogens, or inhalants.

3.3. Factors Associated with Self-Reported Substance Use. Table 2 shows the crude and adjusted odds ratios from the logistic regression analysis. In multiple regression analysis, after keeping other constant variables in the model, age was significantly associated with self-reported substance use, such that the younger age 18-34 had 83% higher odds (AOR: 1.829; 95% confidence interval [CI]: 1.112, 3.010; $p = 0.017$) of self-reported substance use compared to older patients from 35 years and above. Sex was significantly associated with self-reported substance use such that being a male had twofold higher odds (AOR: 2.346; CI: 1.397, 3.939; $p = 0.001$) of self-reported substance use compared to females. Family history was significantly associated with self-reported substance use such that those with a positive history of mental illness and substance use had 2.2 (AOR: 2.247; CI: 1.364, 3.701; $p = 0.001$) and 3.8 (AOR: 3.804; CI: 2.305, 6.276; $p < 0.001$) times odds of self-reported substance use compared to those with no family history of either of the conditions, respectively. Marital status, education level, employment status, and living arrangement did not show significant association with self-reported substance use.

4. Discussion

This study is aimed at assessing the prevalence of self-reported substance use and identifying associated factors

TABLE 1: Sociodemographic characteristics of respondents ($N = 364$).

Variable	Category	Frequency (n)	Percentage (%)
Age groups (years)	18-34	202	55.5
	35 and above	162	44.5
Sex of the study respondents	Male	215	59.1
	Female	149	40.9
Marital status	Single	323	88.7
	Married	41	11.3
Level of education	Up to primary	159	43.7
	Secondary and above	205	56.3
Employment status	Unemployed	206	56.6
	Employed	158	43.4
Family history of mental illness	Yes	124	34.2
	No	239	65.8
Family history of substance use	Yes	140	38.5
	No	224	61.5

TABLE 2: Factors associated with self-reported substance use among patients with mental illness ($N = 364$).

				Self-reported substance use (yes)				
	n	%	COR	95% CI	p value	AOR	95% CI	p value
Age group (years)								
18-34	75	37.1	1.584	1.011, 2.481	0.044	1.829	1.112, 3.010	0.017
35 and above	44	27.2						
Sex								
Male	82	38.1	1.866	1.175, 2.964	0.008	2.346	1.397, 3.939	0.001
Female	37	24.8						
Marital status								
Single	110	34.1	1.836	0.846, 0.984	0.120	1.362	0.580, 3.197	0.478
Married	9	22.0						
Level of education								
Up to primary	50	31.4	0.904	0.581, 1.408	0.655	1.188	0.717, 1.969	0.503
Sec. and above	69	33.7						
Employment status								
Unemployed	60	29.1	0.690	0.444, 1.071	0.098	0.722	0.440, 1.186	0.198
Employed	59	37.3						
Family hist. of MI								
Yes	58	46.8	2.622	1.658, 4.145	<0.001	2.247	1.364, 3.701	0.001
No	60	25.1						
Family hist. of SU								
Yes	71	50.7	3.773	2.382, 5.977	<0.001	3.804	2.305, 6.276	<0.001
No	48	21.4						

Abbreviations: COR: crude odds ratio; AOR: adjusted odds ratio; CI: confidence interval.

among patients with mental illness. A notable proportion, specifically one-third, of patients with mental illness reported using substances. The most frequently reported substances were alcohol, tobacco, and cannabis. Younger age, male gender, and a family history of both mental illness and substance use emerged as predictors of self-reported substance use.

4.1. The Prevalence of Self-Reported Substance Use among Patients with Mental Illness. The results of our study revealed that one-third of patients with mental illness had used substances in the last 12 months, suggesting a significant proportion. This highlights a heightened risk of substance use among individuals with mental illnesses. Our findings align with the well-documented comorbidity

phenomenon between mental illness and substance use, with the latter often remaining underdiagnosed and contributing to an increased risk of mental illness relapses [25]. This underscores the importance of routine screening for the early detection of substance use in these patients and the establishment of appropriate measures to address the issue [26].

The prevalence of self-reported substance use in our study appears lower than that reported in similar cross-sectional studies in Namibia [27] and tertiary hospitals in Iran and India [2, 4]. This discrepancy might be attributed to differences in sample sizes and cultural norms. The presence of both corroborating and contrasting results in our study, when compared to others in different settings, underscores the influence of sociocultural factors [2, 28–31]. For instance, studies from South Africa, the USA, Malaysia, and Finland have reported a higher prevalence of substance use among patients with mental illness [5, 29, 32]. This variation could be explained by differences in access to mental health services and poor health-seeking behavior, particularly in Africa, where substances may be used as a coping mechanism or perceived as a treatment option. Additionally, differences in the perception of illness and treatment may contribute to these variations, with some individuals eschewing antipsychotics and opting for substances they believe to be more effective [33].

4.2. Commonly Used Substances among Patients with Mental Illness.
The participants in our study most commonly reported using alcohol, tobacco, and cannabis. This could be attributed to the easy availability and accessibility of these substances, particularly alcohol and tobacco, which are readily obtainable in Tanzania. Tanzanian laws and regulations dictate that smoking is prohibited in public places; however, certain designated areas in public places with ventilation systems permit smoking [34]. The freedom permitted by national laws might have contributed to an increased tendency among our study participants to access and use tobacco as one of the substances.

The high prevalence of alcohol consumption in our study suggests that individuals with mental illness have similar access to alcohol as the general population [35]. The early initiation of alcohol consumption in Tanzania, coupled with the belief that alcohol can alleviate stress among individuals with psychological problems, likely contributes to the reported drinking behavior in our study [36]. In the context of mental illness, patients often face stressors associated with their condition and undergo neurochemical changes in the brain, potentially increasing the inclination to use substances such as alcohol and tobacco [33]. The use of alcohol among patients with mental illness may also be driven by the desire for self-medication to cope with negative symptoms of mental disorders, including social withdrawal, apathy, dysphoria, and sleep problems. Additionally, individuals may turn to alcohol to alleviate discomfort from the side effects of antipsychotic medication [37].

While alcohol is readily available in local bars, cannabis faces legal restrictions in Tanzania. This legal status may impact the availability of cannabis, positioning it as the third most commonly used substance among individuals with mental illness, as revealed in our study. Despite its illegal status, young adults, including those with mental illness, can still access and use cannabis, often influenced by peer pressure [38]. This dynamic contributes to the reported prevalence of cannabis use within the study population.

The pattern of reported substance use in our study aligns relatively well with findings from a previous cross-sectional study in the Lake Zone in Tanzania and other countries, including Sweden, Norway, India, and Nigeria [2, 17, 18, 39–42]. The primary difference lies in the order of frequency among the three substances. For instance, a study in India reported tobacco as the most used substance, followed by alcohol and cannabis [42]. In contrast, our results deviate from a systematic review that highlighted benzodiazepines and opioids as the most frequently used substances among patients, excluding cannabis [33]. Furthermore, various types of commonly used substances such as cocaine, hallucinogens, opioids, methamphetamine, and tobacco have been reported in the USA [43], stimulants in Denmark [44], and cough syrup and codeine in Nigeria [8]. This variation in the types of substances used can be attributed to the availability of the substance in specific geographical areas and the sociodemographic characteristics of the study respondents. Substance use among patients with mental illness complicates treatment outcomes, leading to an increased risk of relapse. Therefore, education on substance use-related problems and their impact on treatment outcomes is highly essential [42].

4.3. Factors Associated with Self-Reported Substance Use among Patients with Mental Illness.
In our study, we found that younger age was associated with higher odds (83%) of self-reported substance use among patients with mental illness. This trend may be attributed to factors such as peer pressure, exposure to stressors without fully developed coping skills, the curiosity to experience the effects of substances, early initiation of use, and a lack of family guidance at an earlier age [33, 36]. Similar findings have been reported in other regions, including Nepal, Nigeria, and South Africa [2, 31, 45].

The current study reveals that males have 2 times higher odds of self-reported substance use than females. This discrepancy may be attributed to several factors, including the influence of sex on the development of specific mental disorders, variations in socioeconomic determinants of mental health, social status, susceptibility, and exposure to life stressors and coping skills. Males are often more prone to substance use due to early-life peer pressure, curiosity, and exploration in environments where substances are readily available [30]. Beyond these reasons, biological markers such as sex hormones, the duration of drug use, and periods of abstinence can also influence substance use patterns [46]. Moreover, individual, family, and sociocultural factors contribute to the differences in substance use patterns between males and females [47]. Similar results have been previously reported in various locations, including Tanzania, the USA, Norway, Denmark, and Nigeria [5, 17, 18, 48, 49], indicating

that being male is a significant predictor of substance use among patients with mental illness.

The current study found a significant association between family history of mental illness and family history of substance use with self-reported substance use among participants. Respondents with a positive family history of mental illness were twice as likely to use substances, while those with a family history of substance use were four times more likely to use substances compared to their counterparts. This association may be explained by common risk factors, such as genetic predisposition [50–52], contributing to both substance use and mental illness, although the exact mechanisms remain unknown. The bidirectional relationship between substance use and mental illness, where individuals using substances are more likely to experience mental illness and vice versa, emphasizes the interconnected nature of these issues [33]. This underscores the importance of addressing both substance use and mental illness, particularly among patients with a positive family history of mental illness. Treating both problems concurrently may be essential for effective intervention [25]. These findings align with previous reports in Tanzania and the USA [18, 53].

In our study, marital status, level of education, employment status, and the patient's diagnosis category did not exhibit significant associations with self-reported substance use. Conversely, other studies have indicated that factors such as marital status, occupation, duration of illness, owning a business, and unemployment are significantly associated with higher odds of substance use [30, 31]. Additionally, substance use may vary based on the patient's primary psychiatric diagnosis [54]. These variations could be attributed to sociodemographic differences among study respondents, including age.

4.4. Study Limitations and Mitigation. This cross-sectional analytical study is aimed at assessing self-reported substance use and its associated factors concurrently, limiting its ability to establish a cause-and-effect relationship. The reliance on self-reports introduces the possibility of social desirability bias, potentially leading to an underestimation or overestimation of substance use prevalence in this study. To address these limitations, information provided by patients was cross-verified with the help of accompanying relatives. Additionally, respondents were assured of confidentiality to encourage open expression and comfort.

It is crucial to interpret the results with caution as this study was conducted at a single tertiary referral hospital, involving patients who may differ from the general population. Therefore, generalizability should be approached with care. Nevertheless, the findings offer valuable insights into the prevalence and factors that may be associated with substance use among patients with mental illness in Tanzania and similar settings.

5. Conclusions

This study has revealed a notable prevalence (one-third) of self-reported substance use and associated factors among patients with mental illness in Tanzania, underscoring the urgency of addressing this issue within this population. The fact that substance use among these patients often goes unrecognized raises concerns about effective treatment. The study emphasizes the importance of implementing routine substance use screening programs for individuals with mental illness and advocating for interventions that are not only gender-sensitive and age-specific but also take into account patients' family history of mental illness and substance use. These interventions may involve substance use awareness programs, early identification, and appropriate treatment strategies.

Both mental healthcare providers working within health facilities and community members closely connected to patients have crucial roles in addressing this challenge. Future research endeavors should focus on exploring substance use help-seeking behaviors among this population, as well as assessing the availability and accessibility of treatment options.

Data Availability

The dataset used and analyzed during the current study is available from the corresponding author upon reasonable request.

Ethical Approval

Ethical approval was obtained from the Research Ethics Committee of Muhimbili University of Health and Allied Sciences (MUHAS) with reference number MUHAS-REC-03-2022-1041. Permission to conduct the study was obtained from the Teaching, Research, and Consultancy Unit of Muhimbili National Hospital and the head of the Department of Psychiatry and Mental Health.

Consent

Respondents with their accompanying relatives were given information about the aim, nature, benefit, and risk of the study and were requested to participate in the study. Moreover, the right to withdraw from the study was clearly described and that participation was voluntary. This was followed by signing the informed consent (which all respondents did) before they filled out the questionnaire. Respondents were ensured confidentiality by using the anonymity of all documents that contained the information they provided.

Disclosure

We would like to acknowledge that an earlier version of this manuscript was presented as a Preprint [55] in the following link: https://www.medrxiv.org/node/603347.full.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Authors' Contributions

Acknowledgments

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