

**PREVALENCE AND CO-OCCURRENCE OF SUBSTANCE USE IN MENTAL
HEALTH PATIENTS AT LEWANIKA GENERAL HOSPITAL.**

By

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DECLARATION

I Christine Chibale Mwamba hereby do declare that the work presented in this report is for the award of a Master of Public Health and has not been presented wholly or in part for any other Degree nor is it being submitted for any other course.

Date..... Signature

APPROVAL

The University of Zambia approves this dissertation of Christine Chibale Mwamba as fulfilling part of the requirements for the award of the Master of Public Health.

Supervisor

Name.....Signature.....Date.....

Coordinator

Name.....Signature.....Date.....

DEDICATION

I dedicate this dissertation to my beloved mother Petronella Mwandwe Musonda. I know that she is so proud of what I have turned to be. I as well dedicate this paper to my brothers, sisters, my daughter Himari Tasheni Kanyanta and loved ones to whom I remain forever grateful for the great encouragements and strong pillar of support they have been to me.

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LIST OF ABBREVIATIONS ACRONYMS AND

AIC	Akaike Information Criteria
BIC	Bayesian Information Criteria
DALYs	Disability Adjusted Life Years
GID	Gender Identity Disorder
Kg	Kilogram
M	Meter
NCDs	Non-Communicable Diseases
NHRA	National Health Research Authority
PTSD	Post-Traumatic Stress Disorder
SSA	Sub- Saharan Africa
UNZABREC	University of Zambia Biomedical Research Committee
WHO	World Health Organization

ABSTRACT

Introduction: The prevalence of substance use among mentally ill patients across the world has been varying. In 2019 it was reported by the United Nations (UN) that an estimated 271 million people around the world aged between 15 and 64 used substances, which was 11.5% higher than the reported figure in 2012. The prevalence rates remain high and worrying. The aim of the study was to investigate the prevalence and associated risk factors of substance use among patients with mental illness admitted to Lewanika General Hospital in Mongu, Zambia.

Methods: 523 records of patients diagnosed with mental illness between 1st of January 2017 and 31st of December, 2021 were retrieved from Lewanika General Hospital (n=523). A logistic Regression model was fitted to determine associated factors of substance use. A cross-sectional study design was used in the study. Stata version 14.2 was used.

Results: The results in the study found a proportion of females (167/523) and males (356/523) that were admitted to Lewanika General Hospital. The median age in the study was 30 (IQR, 24 – 40) years. Additionally, majority of the patients had secondary school level education (58.94%) and were unemployed (56.90%). Of these cases 78.55% (315/401) were not married and 21.45% (86/401) were married. From the records, 33.77% (102/302) reached up

to primary, whereas 58.94% and 7.28% reached secondary and tertiary respectively. 56.90% of the patients were unemployed. The findings in the study also show that 57.21% had family history of mental illness. 33.7% reported to have a medical condition and these were STIs (17.55%), Epilepsy (4.7%) and HIV (29.58%). The study also reported patients receiving treatment as 22.88%. Age, occupation, on treatment and family history were associated with substance use among patients with mental illness ($P < 0.05$).

Conclusion: The study reported a prevalence of substance use among patients with mental illness at 54.5%. Age, occupation, on treatment and family history were associated with substance use among patients with mental illness.

Key words: *Substance use, Mental health*

CHAPTER ONE: INTRODUCTION

1.1.0 Background

World Health Organization (WHO) defines mental health as ‘a state of well-being in which every individual realizes his or her own potential, can cope with the normal stresses of life, can work productively and fruitfully, and is able to contribute to his or her community’ (Cook, 2019). Mental health has also been defined as a level of psychological well-being, or an absence of brain or mood disorders. It is a psychological state of a person who is living in a state of general satisfaction and self-reported well-being in emotion, behavior and self-esteem. From the perspective of positive psychology or holism, mental health may include an individual’s capability to enjoy daily life, and maintain an equilibrium between normal actions performed by the person and efforts to achieve psychological resilience, (Etindele Sosso, 2017). On the other hand, World Health Organization (WHO) in 2006 defined substance use as the excessive or inappropriate use of psycho-active substances by a person, for a motive not reliable with medical or legal guidelines. Such use is considered immoral by the culture and may resulting harm to the person or society. It has a consequence on health and may lead to dependence.

Substance use is defined as the excessive or appropriate use of psycho-active substance by a person with such use being considered or judged to be illegal (immoral) by the culture and resulting in harm to the person or society (Asuni and Pela, 1986). It was reported by the United Nations that an estimated 271 million people (5.5%) around the world aged between 15 and 64 had used substances in 2019. This is 11.5% higher than the estimated number in 2012. It is therefore evident that there is a rising number of substance users globally, a continuing upsurge in human, social, health and economic costs in the form of substance-related violence (Lo et al., 2020).

It was reported by the United Nations that an estimated 271 million people (5.5%) around the world aged between 15 and 64 had used substances in 2019. This is 11.5% higher than the estimated number in 2012. It is therefore evident that there is a rising number of substance users globally, a continuing upsurge in human, social, health and economic costs in the form of substance-related violence (Lo et al., 2020). In 2016, WHO estimated the incidence of depression among the entire population around the world to be approximately 350 million people. Depression has by far become the most widespread mental illness around the world and now in the US

affecting an estimated number of 40 million adults. It is known to be spreading very fast affecting about 40 million adults in the US today (Czeisler et al., 2020).

Prevalence of substance use varies across the world with UK's prevalence on comorbidity reported at 44% (Weaver, T. et al, 2003), in Nigeria at 29.3% and globally a lifetime prevalence of substance use among mentally ill patients was reported to be around 50% in 1990 and 76% in 2018 (Regier DA, 1990) and (Herz V. et al, 2018). A study on substance use, homelessness, Mental illness and Medicaid coverage reported a prevalence of substance in California to be 77% (Moulin A et al 2018). Substance use is indeed a serious public health problem as the prevalence are indeed worrying. Several studies have shown age, marital status, occupation, family history, income are predictors of substance use among patients with mental illness (Okpataku CI et al, (2014). Therefore, the aim of this study is to investigate the incidence and effect of substance use in patients admitted with mental illness at Lewanika General Hospital in Mongu.

1.2.0 Statement of the problem

Mongu is the capital city of Western Province in Zambia and it houses the provincial hospital- Lewanika General Hospital. It is the highest referral hospital in the province not only for General Medical conditions but also for mental illnesses hence it is of this reason coupled with proximity that I have decided to use it as my study site.

Substance use disorders are prevalent worldwide. Studies have shown evidence that alcohol, tobacco, and illegal drug use cause considerable morbidity (inclusive mental illnesses) and mortality. Results from WHO and World Mental Health (WMH) surveys of 17 countries across the world reveal alcohol is used by 41% to 97% of adults in their lifetimes and tobacco products are consumed by 17% of adults. Cannabis, which is an illicit drug, varies from as low as 0.3% in China to as high as 42% in USA and New Zealand and cocaine ranges from 1% to 16% in USA (Wu, 2010). Despite the high prevalence of mental illnesses and more so substance abuse among the mentally challenged, yet mental health remains under prioritized worldwide, and especially in Africa. Only 50% of African countries have a mental health policy and many laws are old and outdated (Health et al., 2005) and (Jacob et al., 2007).

A study by Tyler et al in 2016 revealed that youths reported using alcohol or drugs for fun. High rates of substance use have been reported among youths in Zambia, this is particularly concerning

given that substance abuse has been associated as one of the risk factors of mental illness. (Tyler et al., 2016).

Sean Estaban McCabe et al in a study in which they examined trends in prescription drug abuse and dependence (sedatives, tranquilizers, opioids, and stimulants), co-occurrence with other substance use disorders and substance abuse treatment utilization among those with diagnoses of prescription drug abuse and dependence in two large, nationally representative, independent samples of adults in the United States in 1991–1992 and 2001–2002 revealed that the co-occurrence of several forms of prescription drug use disorders and other substance use disorders increased from 1991–1992 to 2001–2002. A minority of individuals with past-year prescription drug abuse and approximately one-half of those with past-year prescription drug dependence utilized substance abuse treatment.

Studies have shown a significant association between the levels of alcohol consumption, academic performance and mental health problems. The findings suggest that students who consumed alcohol at hazardous levels were more likely to experience moderate / high psychological distress and therefore more likely to experience academic problems (Tembo et al., 2017). Thus making alcohol and substance use related harm and mental health problems among the leading health issues in today's society (Bell and Britton, 2014). Approximately about 50% of individuals with a history of alcohol abuse or dependence have a mental disorder in their lifetime (Regier et al., 1990).

1.3.0 Justification

Mental health disorders are common and pose a significant burden on the health of developing nations. Studies have shown that the consumption of alcohol is heavily gendered and is characterized by a high proportion of hazardous drinking men. This is known to result in depressive and anxiety disorders among other causes (Patel, 2007). Alcohol and substance use problems are among the major contributors to the global disease burden including mental health illness. Studies have indicated that the benefits of treatment far outweigh the economic costs; however, regardless of treatment, the vast majority of people with substance use disorders do not seek treatment services. This problem mainly suggest that the incidence of mental health disorders are under-reported and potential could be worse than what is there (Wu, 2010).

Alcohol and substance use and its attributable problems mainly in mental health illnesses, even though have been increasing rapidly remain preventable and modifiable. However the ever changing patterns of alcohol and substance use require combined research and policymaking efforts from all parts of the world to establish knowledge base to inform for prevention, risk-reduction intervention, effective use of evidence-based treatment, and rehabilitation for long-term recovery (Wu, 2010).

A study by T. Kanguya Et al on Mental Health comorbidity in HIV-positive Zambia adults who consumed alcohol revealed that among Zambia adults living with HIV who reported alcohol consumption at their ART clinic, unhealthy use was the norm: moderate alcohol use was rare. Comorbid Mental Health issues (particularly depression and trauma) were highly prevalent among unhealthy drinkers and they should be screened for mental health issues

Thus to significantly combat alcohol and substance abuse and its resulting mental health illnesses, it is very important that this study is carried out. Prevalence of substance use among mental ill persons and the associated risk factors may help in combating this growing problem affecting mostly the developing countries today including Zambia.

1.4.0 Research Questions and Objectives

1.4.1 Research Questions

1. What was the prevalence and co-occurrence of alcohol and substance use in mental health patients at Lewanika General Hospital?

1.4.2 General Objectives

- Prevalence and co-occurrence of alcohol and substance use in mental health patients at Lewanika General Hospital.

1.4.3 Specific Objectives

- To describe the types of mental illness at Lewanika hospital
- To determine the prevalence of alcohol, smoking and drug use in the patients with mental illness at Lewanika hospital
- To model the associated factors of substance use among mental illness at Lewanika hospital

CHAPTER TWO: LITERATURE REVIEW

2.1.0 Incidence of Mental Health

It is argued that the global burden of mental illness is quiet underestimated, estimates show that the burden accounts for 32.4% of years lived with disability (YLDs) and 13.0% of disability-adjusted life years (DALYs) (Vigo et al., 2016). Since 1990 studies have shown that the global burden of mental illness / disorder was among the most impairing conditions worldwide (Whiteford et al., 2013). Mental illnesses are increasingly recognized as a leading cause of disability with an estimated worldwide prevalence of mental disorder in young people of about 13.4% (Polanczyk et al., 2015). In 2016 WHO estimated an incidence of 350 million people with depression. (Czeisler et al., 2020).

In Australia each year, one in five adults is thought to experience a mental illness and one in four across a lifetime will be affected by a mental disorder (Maybery et al., 2018). In the United States, depression is considered as the most widespread mental illness affecting approximately 40 million adults or about 18% of the country's population. The study conducted by Cortina, Sodha and Fazel (2012), found that 1 in 7 children in Africa suffered from significant mental health difficulties while 1 in 10 suffered from a specific mental illness. The illnesses that where found most common were post-traumatic stress disorder (PTSD),Anxiety disorders, mood disorders and reactive behaviors disorders (McKee, 2019).

2.2.0 Types of Mental Health

There are different types of mental illnesses, but not limited to; Alzheimer's, anorexia nervosa, autism and obsessive-compulsive disorder, depression, anxiety and depression, gender identity disorder (GID), heroin addiction, neurosis, paraphilia, phobia, and schizophrenia (Abate, 2012).

2.3.0 Effects of Mental Health

Mental health is a crucial concern to public health. People with mental disorders are considerably more likely to die prematurely than the general population. A systematic review study found that mortality rate remained higher in individuals with mental disorders when deaths from unnatural causes such as suicide and violent death) were excluded (Harris and Barraclough, 1998). In people

with schizophrenia, the standardized mortality ratio (SMR) for all natural causes was 137% compared to 100% for a general population of similar age and gender, accounting for 62% of the excess deaths from all causes. The SMR for endocrine system disorders, including diabetes, was 238% in people with bipolar disorders compared to 150% in the general population (Brown et al., 2010). Studies have also found an association between severe mental illness and diabetes. In 2003 it was accepted that the overall risk of type 2 diabetes in people with schizophrenia was between two and four times that of the general population (Group, 2004).

It has thus been shown that people with diabetes and schizophrenia or bipolar disorders have higher mortality rates than individuals with diabetes alone. The explanation behind is that people with schizophrenia or bipolar disorder and diabetes may progress more rapidly, it may be more poorly controlled, or these individuals may have more comorbid physical illnesses and therefore be more likely to die of other causes (Vinogradova et al., 2010).

2.4.0 Prevalence of Substance use among patients with Mentally illness

The prevalence of substance use across the world is alarming. Results from WHO and WMH surveys across the world reveal alcohol of up to 97% of adults in their lifetimes and tobacco products of up to 17% in the same adults. Furthermore, substance use among patients with mental illness in China, New Zealand and USA was reported up to 42%, 1% and 16% respectively. (Wu, 2010). In UK the comorbidity of substance use was reported at 44% and across the world among patients with schizophrenia was 50% in 1990 (Weaver, T. et al, 2003), 60% in 2006 (Swartz S. M. et al, 2006) and in children was reported at 76% (Herz V. et al, 2018).

2.4.0 Factors Associated with Substance use among Mental Health

2.4.1 Demographic factors

Age is another predictor of substance use among patients with mental illness. Older age groups are associated with substance use compared to the younger population. A study on medical morbidity, mental illness and substance use disorders reported age, gender, race, ethnicity as predicting factors of substance use and misuse among patients with mental illness (Barbara D. et al, 2002). Several studies have shown that older patients were more prone to substance use with the leading substances being alcohol and cannabis (Andrea P. et al, 2014).

Gender was also an interesting variable found to be associating with substance use among patient's mental health problems. Men compared to women have prone to substance use disorders. However, a study in SA found that adolescent girls were more prone to substance use compared to men (38.1% and 38.7% respectively). The findings in the study instead showed that gender was not associated with substance abuse. Substance use continues to impose a major risk on behaviour of mentally challenged people. A study on substance use among secondary school students in an urban setting in Nigeria found a higher prevalence rates for males compared to female counterparts (Oshodi O.Y. et al, 2010).

2.4.2 Social-economic factors

Various studies suggest that the predisposing factors of depression and other mental ailments is alcohol and substance use. Some researchers have found a linear relationship in a positive direction with poorer mental health and substance use (Okoro, 2018). Studies have also found an association in different direction and the findings suggest that the use alcohol and illicit substances like drugs and tobacco in urban youths in the late adolescent stage of development were influenced by mental health and gender among others. However, in the study gender was found not to predict substance abuse, it was nonetheless associated with mental health. A study in Washington found an association among individuals with fetal alcohol effects and psychopathological conditions in these adults. Several reports have suggested that gestational brain injury is associated with the subsequent development of psychotic symptoms and that premature exposure to alcohol is a possible etiology of schizophrenia (Famy et al., 1998).

A study by Bickner and Schmidt (2008) found a positive association between the use of Marijuana and the affliction of social anxiety. The study found that young adults using marijuana where more likely to have anxiety than their counterparts (Buckner and Schmidt, 2008). Different studies have shown that alcohol and other proactive substances are widely recognized risk factors for mental illness and injuries. In Western Cape, it was found that the extensive use of methamphetamine a powerful central nervous system stimulant commonly used as an entertaining drug unlike for its use as a second-line treatment for attention deficit hyperactivity disorder and obesity particularly among adolescents was resulting in admissions and readmissions due to abuse of the drug. This

was further contributing to mental health problems including PTSD, anxiety disorders and mood disorders (Morojele et al., 2013) and (NIDA, 2020).

Other study findings also showed that children coming from poorer households were at a high risk of developing mental health issues. People from low-income households were more at risk of suffering from mental illness than people from high income households. This is due to the stresses from being deprived (McKee, 2019).

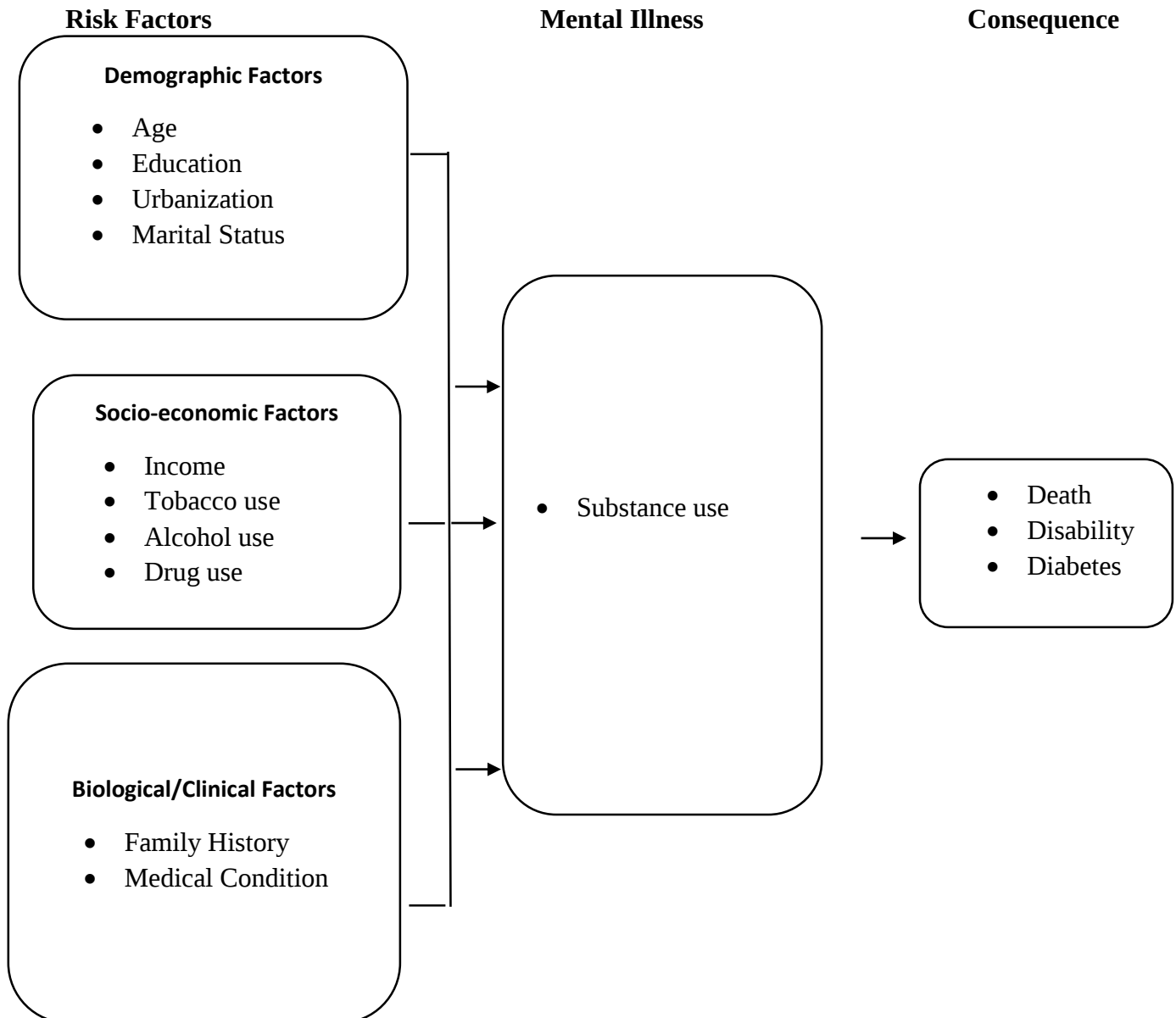
2.4.3 Clinical Factors

Several other factors are known to affect the development of mental disorders and these include genetic factors, stress, diet, physical inactivity, drugs and other environmental factors (Pinto et al., 2015). Dietary factors may aggravate or perfect symptoms and the progressions of the disorders although those are not major etiologies. Polyunsaturated fatty acids (PUFAs), phospholipids, cholesterol niacin are known to be beneficial for mental health. Conversely, saturated fat and simple sugar can be hazardous for brain health, increasing risk for mental illnesses as well as other metabolic disorders including diabetes and cardiovascular diseases (Beilharz et al., 2015). However, contrasting views have been made in a meta-analysis showing weak or no association between specific nutrients and indices of mental function (Forbes et al., 2015).

Several studies have suggested an association of substance use with family history with the findings showing more use of substances from families with mental illness which is contrary to the findings of this study, Herz V. et al, (2018). Another study showed that mental illness was leading to substance use, Robin L. T. et al, (2009). A study on substance abuse as a risk factor for violence in mental illness also found an association between markers of substance abuse and various psychological measures and historical factors, Pickard H and Fazel S, (2013).

2.5.0 Conceptual Framework

The figure below is a conceptual framework showing the risk factors substance use among mental health patients; Demographic, socio-economic and clinical factors which were identified from various studies to affect mental wellbeing of people and the possible consequences of mental illness.



Conceptual framework adopted from (Morojele et al., 2013) and (Forbes et al., 2015)

CHAPTER THREE: METHODOLOGY

3.1.0 Study Design

The study was a cross-sectional study, which was carried out at one-time point or over a short time period. Cross-sectional studies provide a ‘snapshot’ of the outcome and the characteristics associated with it, at a specific point in time, (Levin, 2006).

3.2.0 Study site and population

Lewanika General Hospital is a government hospital in Mongu, the provincial capital of Western Province. It is a level 2 hospital and is a referral center for all first level institutions in the district. The population under study are patients admitted with mental illnesses at Lewanika General Hospital, Mongu (Western Province of Zambia). It has a psychiatric outpatient department where all mentally ill patients are seen. The Psychiatric Outpatient Department is the filtering point where patients are first seen by the clinical officer psychiatrists. Others services offered in the outpatient department include patient counselling, reviews and drug refilling. From the psychiatric outpatient department those that require admission are then taken to the male or female ward which are the admission wards. Lewanika General Hospital psychiatric department approximately admits about 240 patients in a year.

3.3.0 Inclusion and exclusion criteria

The study included all diagnosed with mental illness from 1st January, 2017 to 31st December, 2021. This period was selected because it was sufficiently covered by the good sample size and the latest admissions were better for the study. However, it excluded patients below the age of 18 years.

3.4.0 Sample Design and sample size calculation

$$N = \frac{Z^2 P(1-P)}{e^2}$$

$$N = \frac{1.96^2 0.31(1 - 0.31)}{0.05^2}$$

$$N = \frac{3.84 \times 0.2139}{0.05^2}$$

$$N = \frac{0.821376}{0.05^2}$$

$$N = 328.55$$

$$N = \frac{328.55}{0.9}$$

$$N = 365$$

- Power of 80%,
- Alpha level of 0.05 or 5%,
- Two sided test $Z_{\alpha/k}$ where k is 2,
- Incident rate by WHO estimated to be at 31%, (Forbes et al., 2015)
- Non response is 90%

The minimum required sample for the study period was 365. However, the study adopted a complete enumeration of all male and female patients diagnosed with mental illness from 1st January, 2017 to 31st December, 2021.

3.5 0 List of variables

Variable	Factors	Scale of measurement
Dependent Variable	Substance use 1. No 2. Yes	Ordinal
Independent Variable	Substance Use 1. No 2. Yes	Nominal
	Cannabis 1. No 2. Yes	Nominal
	Alcohol 1. No 2. Yes	Nominal
	Smoking 1. No 2. Yes	Nominal
	Sex 1. Males 2. Females	Nominal
	Education 1. No education 2. Primary 3. Secondary 4. Higher	Ordinal
	HIV Status 1. Negative 2. Positive 3. Unknown	Nominal

	Type of Residence 1. Rural 2. Urban	Binary/Nominal
	Respondent's Age	Continuous
	Marital Status 1. Never in union 2. Married 3. Widowed 4. Divorced	Nominal
	Respondent's Currently Working 1. No 2. Yes	Nominal
	Respondent's religion 1. Catholic 2. Protestants 3. Muslims 4. Other	Nominal
Independent	Past Medical History 1. No 2. Yes	Nominal

3.6.0 Data management

The data was obtained from Lewanika General Hospital patients records in mental departments was proposed by the study; it consisted chiefly of mental outcome, education, age, marital status, substance use, HIV status, etc. The data was recorded in Microsoft excel and exported to STATA version 16.0 for cleaning and analysis. Data that was acquired in this proposed project includes human subjects' information thus will require ethical approval by the University of Zambia Biomedical Research Ethics Committee (UNZABREC). Google drive will be used for backing up of data and only the researcher will have access to it

3.7.0 Statistical Analysis

The collected data was checked and cleaned thoroughly. For descriptive purposes, frequencies and percentages were computed for categorical and dichotomous variables. The continuous variable

(age) was checked for normality using Shapiro Wilk test and was not normally distributed thus reporting was done using the median and interquartile range. A ranksum test (a non-parametric test) was used to measure association between the outcome variable and age. Associations between categorical variables was measured using the Chi-square test. To determine the associated factors of mental ill patients, a logistic regression was used be used and margins plots were shown. Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) were computed to come up with the best-fit model. All tests were conducted at 5% level of significance.

3.8.0 Limitations and Utilization and dissemination of results

Virtually most of the information collected is subject to reporting and recall biases except, weight and height measurements, number of children, occupation and marital status. Certain information such as age of respondent, birth dates, highest level of education etc. refer to events in the past. Another form of bias likely to occur is misclassification bias (e.g. wrongly diagnosed). The magnitude of this bias is still unknown and correcting it is difficult. However, regardless of these limitations as long as the biases are fairly random, the aggregate estimates of indicators will be fairly adequate; nonetheless, individual-level data will be interpreted more carefully. Another potential limitation is missing ness of certain variables in the records which could be due to under documentation or no documentation at all. Analysis will be done carefully and efficiently subject to these limitations pointed out.

Summary copies of the final reports for this research will be made in order to disseminate findings to various stakeholders, including the Lewanika General Hospital and Ministry of Health (MoH). In addition, a copy of the final report will be submitted to the University of Zambia (UNZA) library as a reference copy. A manuscript will also be written for submission to an international journal for publication. It is envisioned that the findings of the study will be disseminated through different platforms including the National Health Research Authority. It is anticipated that the findings of the study will guide planners and policy makers in strengthening the interventions in the management of mental illnesses especially ones induced by alcohol and substance abuse.

3.9.0 Ethical considerations

The study was be retrospective in which information was obtained from previously collected data from Lewanika General Hospital. Approval and ethical waiver was obtained from University of Zambia Biomedical Research Ethics Committee (UNZABREC) for approval and permission was sought from the National Health Research Authority (NHRA) and Lewanika General Hospital where data was obtained. Confidentiality assured as no names or personal identifiers were used. Subject's names not be captured during data collection nor any form of identity link to a specific subject. Each entry was assigned a study identification number. Data was coded and only the researchers had access to the codes. Publication and scientific presentations of the research findings will be presented in numbers and research assistants will be trained on how to maintain confidentiality on the data collected. There were no direct benefits to the participants of this study. However, the study will be beneficial in generating up to date information to Mongu district, Western province and Zambia at large on the incidence and effects of alcohol and substance use in male patients with mental illnesses at Lewanika General Hospital. This could be useful in informing policy and programmes addressed at reducing mental illnesses in Zambia.

CHAPTER FOUR: RESULTS

4.1.1 Overall Population Description

Records for 523 patients diagnosed with mental illness at Lewanika General Hospital between 2017 and 2021 were retrieved. Of these 68.07% (356/523) were males and 31.93% (167/523) were females. The median age was 30 (IQR; 24 – 40) years. Of these cases 78.55% (315/401) were not married and 21.45% (86/401) were married. From the records, 33.77% (102/302) reached up to primary, whereas 58.94% and 7.28% reached secondary and tertiary respectively. 56.90% of the patients were unemployed.

Furthermore, 54.44% reported to have had used substances, of which 42.73% to have been smoking, 50.56% and 36.87% to have consumed alcohol and cannabis respectively. The findings in the study also show that 57.21% had family history of mental illness. 33.7% reported to have a medical condition and these were STIs (17.55%), Epilepsy (4.7%) and HIV (29.58%). The study also reported patients receiving treatment as 22.88%.

Table: 4.1 baseline Characteristics of Mental Ill Patients

Characteristics	Mental Ill Patients N= 523
Age; Median (IQR), Years	30 (24 – 40)
Sex: Male Female	356 (68.07) 167 (31.93)
Marital Status: Not Married Married	315 (78.55) 86 (21.45)
Education: Up to Primary Secondary Tertiary	102 (33.77) 178 (58.94) 22 (7.28)
Occupation: Unemployed Employed	202 (56.90) 153 (43.10)
Substance use: None Yes	205 (45.56) 245 (54.44)
Smoking:	

No	252 (57.27)
Yes	188 (42.73)
Drinks Alcohol:	
No	221 (49.44)
Yes	226 (50.56)
Cannabis	
No	262 (63.13)
Yes	153 (36.87)
Family History	
No	196 (42.79)
Yes	262 (57.21)
Medical Condition:	
No	299 (66.30)
Yes	152 (33.70)
STI:	
No	343 (82.45)
Yes	73 (17.55)
Epilepsy:	
No	426 (95.30)
Yes	21 (4.70)
HIV:	
Negative	269 (70.42)
Positive	113 (29.58)
Treatment Received:	
None	273 (77.12)
Yes	81 (22.88)

4.2.0 Characteristics of Mental Ill patients by Substance Use

Table 4.2 below shows the demographic and clinic characteristics of with mental ill patients at Lewanika General Hospital. The findings show that the median age was 32 (IQR; 26 – 43) years for patients who did not take in substances compared to 27 (IQR; 21- 36) who consumed substances. The difference was statistically significant ($P<0.0001$). Compared to females, 15.1% males had taken in substances, and the difference was likewise statistically significant ($P<0.0001$).

Furthermore, unmarried mental ill patients (82.7%) compared to those who are married were prone to substance use (17.3%). Those who went up to secondary level (54.14%), unemployed (53.99%), were similarly more prone to substance use. 70.93% with no medical condition reported substance use compared to 29.07% who had medical condition (s), specifically 12.5%, 4.25% and 22.73%

who reported substance use had STI, Epilepsy and HIV respectively. Similarly, 82.12% in the study reported not to have been on treatment in comparison to 17.88% who were receiving treatment. Smoking, Alcohol and HIV in the study was found to be associated with substance use ($P<0.05$).

Table: 4.2 Demographic and Clinical Characteristics of Mental Ill Patients

Characteristics	Substance Use None	Substance Use Yes	P-value
Age; Median (IQR), Years	32 (26 – 43)	27 (21 – 36)	$<0.0001^R$
Sex: Male Female	122 (59.51) 83 (40.49)	208 (84.90) 37 (15.10)	$<0.0001^C$
Marital Status: Not Married Married	134 (75.71) 43 (24.29)	153 (82.70) 32 (17.30)	0.101^C
Education: None/Primary Secondary Tertiary	52 (39.10) 72 (54.14) 9 (6.77)	44 (28.95) 99 (65.13) 9 (5.92)	0.159^C
Occupation: Unemployed Employed	88 (53.99) 75 (46.01)	105 (59.66) 71 (40.34)	0.292^C
Family History: No Yes	77 (40.10) 115 (59.90)	96 (43.64) 124 (56.36)	0.469^C
Medical Condition: No Yes	118 (62.77) 70 (37.23)	161 (70.93) 66 (29.07)	0.078^C
STI: No Yes	144 (82.29) 31 (17.71)	175 (87.50) 25 (12.50)	0.158^C
Epilepsy: No Yes	179 (94.71) 10 (5.29)	203 (95.75) 9 (4.25)	0.623^C

HIV: Negative Positive	109 (66.87) 54 (33.13)	136 (77.27) 40 (22.73)	0.033 ^C
Treatment Received: None Yes	100 (75.19) 33 (24.81)	147 (82.12) 32 (17.88)	0.136 ^C

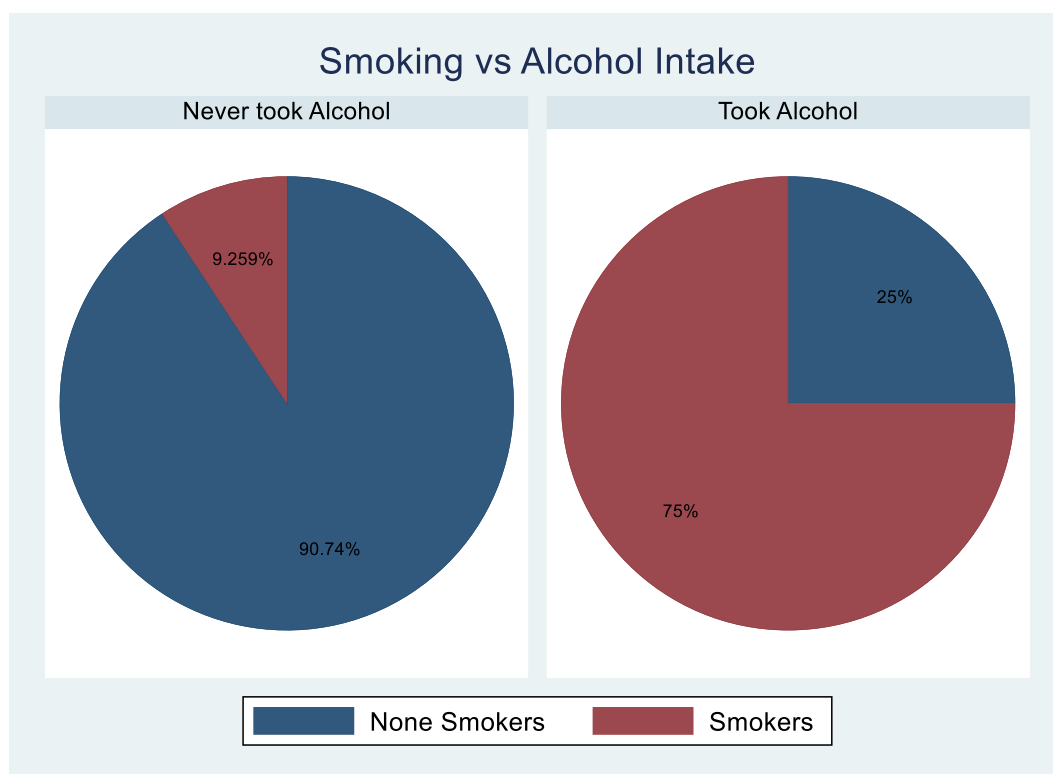
R = Ranksum test

C= Chi Square Test

4.3.0 Association of Smokers and Alcohol Intake

The study findings showed that among those who did not take alcohol 90.74% (196/216) never smoked. On the other hand, among those who took alcohol 75% (165/220) did smoke. Furthermore, the findings showed an association of alcohol intake and smoking ($P < 0.0001$).

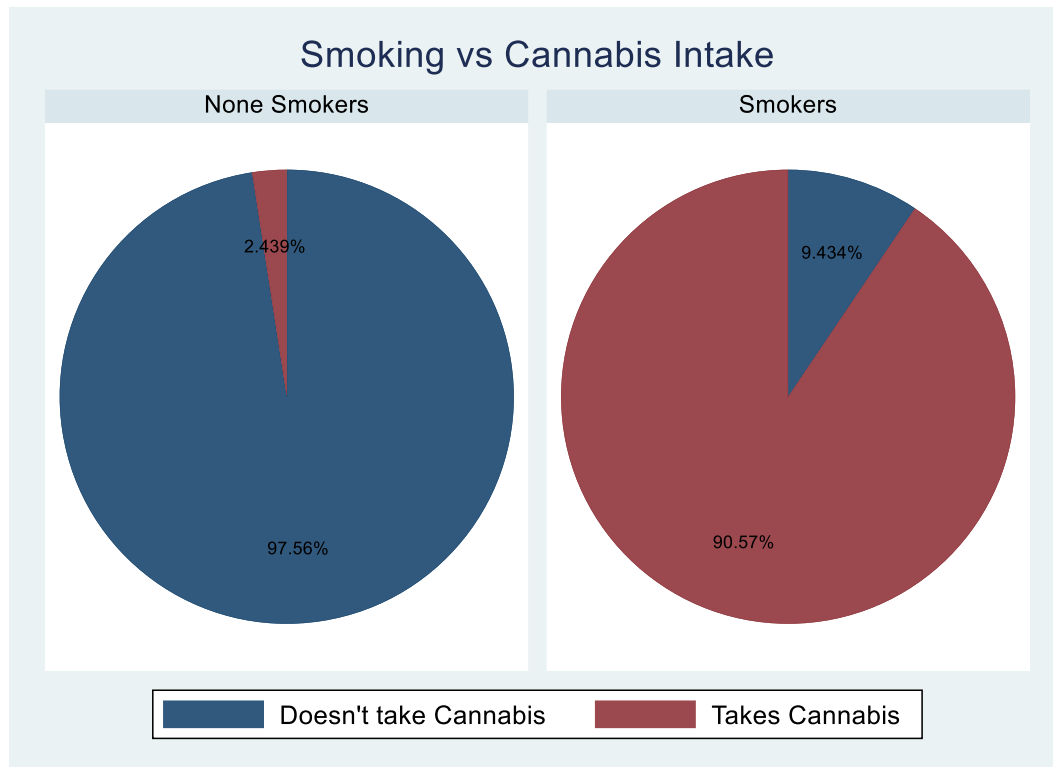
Figure: 1.2 Shows proportion of smoking and alcohol intake among mentally ill patients



4.4.0 Association of Smoking and Cannabis Intake

The figure 1.4 below shows 97.56% of the non-smokers never took cannabis and 90.57 of the smokers did take cannabis as well. Similarly, there was an association between smoking and taking cannabis ($P < 0.0001$).

Figure: 1.3 Shows proportion of smoking and alcohol intake among mentally ill patients



4.5.0 Univariate and Multivariable Logistic Regression Model

The univariate logistic regression analysis was carried out on patients diagnosed at Lewanika General Hospital with mental illness. The findings in table 4.3 show that a year increase in age reduces the odds of substance use among patients with mental illness (OR, 0.95; CI, 0.94 – 0.97; $P < 0.0001$), this was statistically significant. Similarly, females compared to males had decreased odds of substance use (OR, 0.26; CI, 0.17 – 0.41; $P < 0.0001$). Those with secondary and tertiary level of education had increased odds of using substances compared to those who went up to

primary. Those employed, on treatment or had family history had decreased odds of using substances, albeit that they were all not statistically significant ($P \geq 0.05$).

The adjusted model showed that age, occupation, treatment and family history were associated with substance use among patients with mental illness ($P < 0.05$). A year increase in age reduces the odds of substance use among patients with mental illness, holding other factors constant (OR, 0.95; CI, 0.91 – 0.98; $P = 0.007$). Females in the study compared to males had reduced odds of 0.63 times of using substances, however this was statistically insignificant (OR, 0.63; CI, 0.08 – 5.17; $P = 0.671$). Furthermore, mentally ill patients who are employed or had family history of mental illness had reduced odds of using substances compared to those who were unemployed (OR, 0.37; CI, 0.17 – 0.80; $P = 0.011$) and (OR, 0.45; CI, 0.20 – 0.98; $P = 0.046$) respectively), holding all other factors constant. Mental ill patients on treatment had increased odds of 2.7 times of substance use compared to those who were not on treatment, (OR, 2.70; 95% CI, 0.62 – 11.74; $P = 0.033$).

Diagnosis at both univariate and multivariable analysis revealed age as the only predictor of substance use, occupation, treatment and family history which were not significant in the univariate model are all significant in the adjusted model. Using AIC and BIC and Pseudo R squared the model suggest that model two (the nested model) was better than the full model in predicting substance use among mentally ill patients.

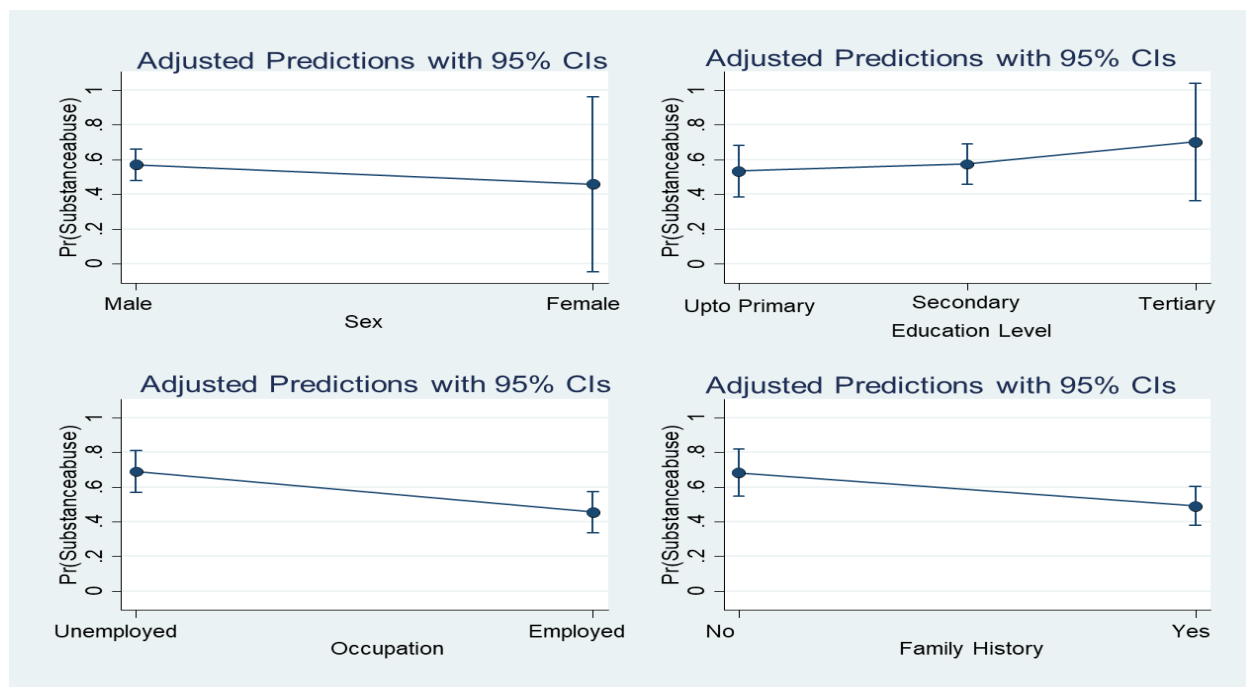
Table: 4.3 Shows the Univariate and Multivariable Logistic Regression Model

Characteristics	COR (95% CI)	P-value	AOR (95% CI)	P-value
Age	0.95 (0.94 – 0.97)	<0.0001	0.95 (0.91 – 0.98)	0.007
Sex				
Male	Ref (1)		Ref (1)	
Female	0.26 (0.17 – 0.41)	<0.0001	0.63 (0.08 – 5.17)	0.671
Education level				
Up to Primary	Ref (1)		Ref (1)	
Secondary	1.63 (0.98 – 2.29)	0.672	1.18 (0.55 – 2.26)	0.672
Tertiary	1.18 (0.43 – 3.24)	0.745	2.06 (0.36 – 11.69)	0.414
Occupation				

Unemployed	Ref (1)		Ref (1)	
Employed	0.79 (0.52 – 1.22)	0.292	0.37 (0.17 – 0.80)	0.011
Medical Condition				
No	Ref (1)		Ref (1)	
Yes	0.06 (0.46 – 1.04)	0.079	1.06 (0.43 – 2.56)	0.904
On Treatment				
No	Ref (1)		Ref (1)	
Yes	0.66 (0.38 – 1.14)	0.137	2.70 (0.62 – 11.74)	0.033
Family History				
No	Ref (1)		Ref (1)	
Yes	0.86 (0.58 – 1.28)	0.469	0.45 (0.20 – 0.98)	0.046

4.6.0 Margins Plot

The margins plots were explored and the findings show that males and females had a similar probability of substance use, however those who had tertiary education, unemployed, and no family history had an increased probability of substance use as shown in Fig 1. The margins probabilities were significantly different from zero ($P < 0.0001$).



4.7.0 Diagnostic Tests: Goodness of Fit

The study compared two different models in order to come up with the best fit model which explained substance use among mentally ill patients. Akaike Information Criteria (AIC) and Bayesian Information Criteria (BIC) were used to compare and come up with the best model(s). The findings show that model 1 containing age, sex, education, occupation, medical condition, treatment and family history explained better substance use compared to model 2 containing age, sex, education, occupation, medical condition and treatment. Further model 1 shows that the model with the variables explained better substance use among the mentally ill patients of Lewanika General Hospital compared to the null model ($P < 0.0001$).

Table: 4.4 Shows the AIC, BIC and Pseudo R Squared

Models	AIC (BIC)	BIC	PSEUDO R SQUARED
Model 1	195.2383	222.5123	0.1569
Model 2	204.897	229.5978	0.1453

CHAPTER FIVE: DISCUSSION

5.1.0 Introductions

This study aimed to investigate the factors associated with substance use among mentally ill patients admitted to Lewanika General Hospital in Mongu between 2017 and 2021. The study found a significant difference in the proportion of females (167/523) and males (356/523) that were admitted to Lewanika General Hospital. The median age in the study was 30 (IQR, 24 – 40) years. Additionally, majority of the patients had secondary school level education (58.94%) and were unemployed (56.90%). The prevalence of substance use in the study was 54.44% (245/450). The study also reported a significant difference in the median age between those who never took substances (32, IQR; 26-43 years) and those who did (27, IQR; 21-36 years). Males compared to females reported a high proportion of substance use, 84.9% ($P < 0.0001$). Furthermore, a year increase in age and having employment was associated with decreased odds of substance use. However, being on treatment increased the odds of substance use among the patients.

A study in UK on comorbidity of substance misuse reported at 44% prevalence of substance use, Weaver, T. et al (2003). In Nigeria the lifetime prevalence for the use of substance was 29.3% while that for multiple substance was 17.7%. Furthermore, the most commonly used substances were alcohol, cannabis and tobacco and they were also the ones mostly used in combination with one or the other, Okpataku CI et al, (2014). The lifetime prevalence of substance use among persons with schizophrenia is close to 50% as recorded in other parts of the world, Regier DA (1990). A study on substance use and misuse among children and youth with mental illness reported a lifetime prevalence of alcohol 76% with nicotine and other illicit drugs coming after alcohol, Herz V. et al (2018). Similarly, a study on substance use among patients with schizophrenia found approximately 60% of the sample was found to use substances, Swartz S. M. et al, (2006).

Findings in the study revealed an association of intake of alcohol, cannabis and smoking. The findings in the study are similar to the results in a Bivariate Genetic Analysis study that revealed an association of alcohol intake and smoking. Young adolescents who were smoking were also likely to drink alcohol. Further the study in adult population showed that smoking was relatively uncommon among non-drinkers, Alaa A. et al (2022).

5.2.0 Factors associated with Substance Use among Mentally Ill Patients

5.2.1 Demographic factors

The findings in the study showed that age, being male, married with at least primary education and unemployed were significant risk factors, Okpataku CI et al, (2014). A study done at University of Chicago found that age was associated with substance use disorder. Older age patients were found to regularly use substances more particularly alcohol and cannabis, Andrea P. et al (2014). A study on reasons for increased substance use in psychosis revealed demographic profiles tended to vary, however substance use was more on the older patients. Similarly, a study on substance use and misuse among children and youth with mental illness reported an association between age and substance use (tobacco use). Contrary to the findings in the study, increase in age increased the likelihood of indulging in substance use, Herz V. et al (2018).

Gender has also been another variable of interest among mental health patients and substance use. Studies show that substance use disorders were more associated with males, Lynsey G. et al, (2007). Results in the study do not however show an association of gender and substance use among patients with mental illness, different studies have A study found that gender was however, associated with substance use, Andrea P. et al (2014). Similarly, a study on substance use among adolescents in Durban South Africa found that 38.1% male adolescents reported substance use compared to females suggesting that gender was not necessarily are a predictor of substance use in the adolescents mentally ill patients, Bhoodeo T. et al, (2017).

5.2.1 Socioeconomic Factors

The results in the study showed that education was not predicting substance use, however occupation was associated with substance use among patients with mental illness. A study on substance use among patients with Schizophrenia reported an association between lower education attainment and substance use, Swartz M.S et al, (2006). A study on substance abuse as a risk factor for violence in mental illness also found an association between substance abuse and education, Pickard H and Fazel S, (2013). Furthermore, studies have also shown that mental ill patients with history of substance use tend to be homeless and having higher rates of Emergency Department (ED) visits for mental health thus more prone to being homeless and consequently fare poorly in

terms of education and other socio related vices. Thus explains a forward and backward relationship of substance use with education on patients with mental illness, Lin W.C. et al (2015) and Kushel M.B. (2001).

Similar to the findings in the study that showed a relationship between unemployment and substance use, a study by Robin E.C. (2001) on family support and substance use outcomes for persons with mental illness and substance use disorders reported predominant cases of substance use among unemployed, never married. This is contrary to the findings in the study which showed reduced odds of substance use among those employed compared to the unemployed.

5.2.2 Clinical Factors

The study revealed an association of being on treatment, history of mental illness and substance abuse. Mentally ill patients with family history of mental illness has reduced odds of substance use compared to those with no family history (AOR, 0.45; CI, 0.2 – 0.98) and this was statistically significant. A study on substance use and misuse among children and youth with mental illness revealed that family history was predicting substance use, the findings showed more use of substances from families with mental illness which is contrary to the findings of this study, Herz V. et al, (2018). A study on mental illness and psychotropic drug use among prescription drug overdose deaths reported an association of mental illness and substance use. The findings showed that mental illness was leading to substance use, Robin L. T. et al, (2009). A study on substance abuse as a risk factor for violence in mental illness also found an association between markers of substance abuse and various psychological measures and historical factors, Pickard H and Fazel S, (2013).

Medical condition in the study was not associated with substance use among mentally ill patients, however several studies have shown a relationship of economic, environmental, cultural, biological, social and psychological factors on alcohol intake among mental ill patients. Studies show common mental disorders such as depression, anxiety, socio anxiety, stress, difficulty in expressing emotions are at higher risk of alcohol use disorder, Kessler R.C. et al (1997).

5.3.0 Strengths and Limitations

The strength in study was the availability of homogenous sample data at Lewanika General Hospital in Mongu with details of age, sex, education level, marital status, medical condition, substance use, smoking, intake of alcohol occupation etc available in the patient record book. Therefore, statistical modelling was sufficiently done. However, there were limitations in the study, which centered on the inability as a statistical method to be able to predict outcomes of a particular person. Hospital data was a major challenge; other variables became redundant because they had no sufficient power to be able to substance use regardless of their relevance. There were some gaps noted in record keeping. The other potential limitation in the study was selection bias. This was likely due to costs involved in accessing the service (user fees and transport costs). Patients who may not afford to pay user fees and transport costs may be left out in the study. However, one of the ways of reducing biasness has been reporting using proportions and not arbitrary figures.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1.0 Conclusion

In conclusion, the prevalence of substance use among patients with mental illness was found to be 54.5%. Clearly, the prevalence is high and a concern to public health problem. Furthermore, age, occupation, on treatment, family history of mental health were associated with substance use among patients with mental illness. The urgent area of attention remains to reduce the prevalence of substance use and more so substance misuse, a proper system has to be created to follow up the patients to offer the rehabilitation services.

6.2.0 Recommendation

The following are thus critical to improving substance use among mental ill patients.

1. Record keeping has to be improved with clear patient contacts
2. Setting up rehabilitation programs to combat increasing prevalence of substance use
3. Patients should be called if they do not come to get histopathology appropriate treatment results
4. Prospective studies are highly recommended in this area to have a full picture of the predictors of substance use among mentally ill patients. Sensitivity and specificity analysis are encouraged in order to have a glimpse of the reliability of test results.
5. Drug Enforcement commission to increase community sensitization programs on the dangers of substance and alcohol use.
6. Prospective studies are highly recommended in this area to have a full picture of the predictors of substance use among mentally ill patients. Sensitivity and specificity analysis are encouraged in order to have a glimpse of the reliability of test results.

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APPENDICES

Appendix I: Data Collection Sheet

ID..... Date.....

Part A: Demographic factors

1. Age

2. Religion

[1] Christian

[2] Muslim

[3] Hindus

[4] Traditional Religious

[5] Atheists

3. Marital Status

[1] Never married

[2] Married

[3] Divorced

[4] Widow

[5] Separation

4. Education Level

[1] None

[2] Primary

[3] Secondary

[4] Tertiary

Part B: Clinical Factors

5. Type of mental illness

6. Confirmation date of the illness.....

7. HIV Status

[1] Negative

[2] Positive

[3] Unknown

8. Medical Condition

[1] None

[2] Yes

9. Family History of Mental Illness

[1] None

[2] Yes

10. On Treatment

[1] None

[2] Yes

Part C: Lifestyle Factors

11. Type of substance abuse

[1] None

[2] Cannabis

[3] Marijuana

[4] Marijuana

[5] Tobacco

[6] Alcohol

[7] Others

12. Occupation

[1] Unemployed

[2] Employed

Part E: Surrogate Factors

Date at first consultation at Lewanika General Hospital

Current state

[1] Alive

[2] Dead

[3] Lost to follow-up

13. Cause of death

14. Date of death.....

Appendix II: Budget

ITEMS	COSTS
STATIONARY	K275
ETHICS	K1, 000
PRINTING, PHOTOCOPYING AND BINDING OF PROPOSAL AND REPORT	K3,000
DATA COLLECTION (TRANSPORT AND LUNCH)	K6, 000
CONTIGENCE FUNDS (10% OF TOTAL)	K1, 077.5
GRAND	K 11, 852.5

Appendix III: Gantt chart

ACTIVITIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	Oct	Nov
Proposal Development											
Submission of the proposal to ethics											
Data Collection											
Data Analysis											
Manuscript write up											