PSYCHIATRIC MORBIDITY AMONG PATIENTS ADMITTED WITH SUICIDE ATTEMPT AT MTRH, ELDORET-KENYA

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THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF MEDICINE IN PSYCHIATRY OF MOI UNIVERSITY, ELDORET

DECLARATION

DECLARATION BY STUDENT

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DEDICATION

This work is dedicated to my beloved parents, **Mr.** and **Mrs. Thomas Kogo** who have been my source of inspiration and strength and have continually provided me with spiritual and moral support.

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ABBREVIATIONS

AUD	Alcohol use disorder
CDC	Centers for Disease Control and Prevention
DSM-5	Diagnostic and Statistical Manual fifth (5th) edition
DSM-III-R	Diagnostic and Statistical Manual third (3rd) edition- Revised
DSM-IV	Diagnostic and Statistical Manual fourth (4th) edition
DSM-IV-TR	Diagnostic and Statistical Manual fourth (4th) edition- Text Revision
ICD-10	International Classification of Diseases, Tenth Revision
IREC	Institutional Research and Ethics Committee
LMIC	Low- and Middle- Income Countries
MDD	Major Depressive disorder
MINI	Mini International Neuropsychiatric Interview
MTRH	Moi Teaching and Referral Hospital
NACOSTI	National Commission for Science, Technology and Innovation
PTSD	Post Traumatic Stress Disorder
SUD	Substance use disorder
UBACC	University of California, San Diego Brief Assessment of Capacity to Consent
WHO	World Health Organization

OPERATIONAL DEFINITION OF TERMS

Psychiatric morbidity: A diagnosis of mental impairment due to alcohol, substance abuse or other causes.

Mental disorder: Clinically significant disturbance in an individual's cognition, emotional regulation, or behaviour that reflects a dysfunction in the biological, psychological, or developmental processes underlying mental functioning(American Psychiatric Association, 2018).

Suicide: The act of deliberately killing oneself.

Suicide attempt: A non-fatal self-directed potentially injurious behavior with intent to die because of the behavior. It may result in an injury that requires hospitalization (Crosby et al., 2011; Stone et al.,2017).

Suicidal ideation: Thoughts of engaging in behavior intended to end one's life.

Suicide Plan: The formulation of a specific method through which one intends to die.

ABSTRACT

Background: Suicide is a global health problem that has prompted the World Health Organization (WHO) to announce the Mental Health Action to reduce suicide rates. It is estimated that annually, 1 million people die by suicide globally. In Kenya, the suicide mortality rate was reported to be 6.1 per 100,000 population in 2019. Suicide attempt is a crucial risk factor for subsequent suicide, making it a psychiatric emergency. As such, transient factors that reflect an imminent risk of suicide must be treated as a crisis that needs to be thoroughly investigated and thereafter be accorded immediate intervention.

Objectives: This study aimed to determine the patterns of psychiatric morbidity, methods of suicide employed as well as their socio-demographic and clinical factors that may predispose patients admitted at Moi Teaching and Referral Hospital (MTRH) to attempted suicide.

Methods: This was a cross-sectional study conducted between August 2019 and July 2021 among 154 adult patients admitted at MTRH with current history of attempted suicide. All potential participants who met the eligibility criteria and consented to participate were enrolled. Their socio-demographic and clinical characteristics data were collected using a structured questionnaire while the validated Mini International Neuropsychiatric Interview Version 7.0 was employed in screening for mental disorders. Potential participants' ability to give an informed consent was assessed using the University of California Brief Assessment of Capacity to Consent (UBACC) questionnaire. Categorical data were reported descriptively as frequencies with corresponding proportions. Inferential data analysis techniques using Pearson chi-square and Fisher's exact tests were performed using STATA version 14 and the results presented in the form of charts and tables.

Results: Majority 109 (70.8%) of the participants were less than 35 years old with more than two thirds 107 (69.5%) being male. About half 76 (49.4%) of the participants were not married, professed the Christian faith 112 (72.7%), had attained a secondary level of education 65 (42.2%), unemployed 57 (37.0%) and earned a monthly income below Ksh10,000) 133 (86.4%). Ingestion of organophosphate 110 (71.4%) was the most frequent method adopted for attempting suicide followed by prescription drug overdose 14 (9.1%). Major depressive disorder (MDD) 60 (39.0%), alcohol use disorder (AUD) 50 (32.5%), psychotic disorder 27 (17.5%) and bipolar 26 (16.9%) were the most prevalent mental disorders. Male participants had a four-fold significantly increased likelihood (AOR = 3.99; 95% CI: 1.59, 11.30; p=0.005) of alcohol use disorder associated with attempted suicide.

Conclusion: The leading psychiatric morbidities were major depressive disorder (MDD) and alcohol use disorder (AUD). Organophosphate poison ingestion and prescription drug overdose were the most employed patterns of attempted suicide. Young male adults (below 35 years) with AUD and female with MDD were vulnerable to attempting suicide.

Recommendation: There is need to inculcate routine mental health screening across various demographics for hospitalized patients outside the psychiatric unit to aid in early detection and prevention of attempted suicide. Organophosphate purchase and use should be regulated by government agencies, and sensitization on consequences of prescription drug overdose should be enhanced. Organophosphates purchase and use should be regulated by government agencies. Furthermore, programs targeting at risk groups should be established and implemented.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background of the Study

Suicide is a global public health problem that necessitated the World Health Organization to announce the Mental Health Action Plan in 2013 in an effort to reduce suicide rates (Saxena et al., 2014). Previously published reports have indicated that suicide knows no boundaries and cuts across every socio-demographic and spatial strata creating a global disease burden due to its high prevalence and associated health care costs (Gunnell et al., 2007). Because suicide attempt is a psychiatric emergency, its transient factors reflect an imminent risk of suicide. These transient factors must be handled as a health crisis that should be accorded immediate intervention (World Health Organization, 2018). Suicidal ideation and attempts have been characterized as major predictors of suicide deaths and may also result in adverse outcomes such as physical or medical injuries, hospitalization, loss of social freedom, increased financial and psychological burden on the affected family members (Nock et al., 2008).

The World Health Organization places suicide among the leading causes of premature death globally with an estimated annual mortality rate of one million individuals (Sinyor et al., 2017; WHO, 2018). In Kenya, the national suicide rate as at 2019 was 6.1 deaths per 100,000 population with age standardized suicide rate at 11.0 per 100,000 population which translates to about 4 suicide deaths per day (Macrotrends, 2022; MOH, Kenya, 2021). It is approximated that for every suicide death of an adult, there are other 20 or more people attempting suicide (WHO, 2014). The approximated global yearly prevalence of suicide attempts that are self-reported is roughly 3 out of every 1,000 adults and about 2.5% of the population during their lifetime making not

less than one suicide attempt (Lindert et al., 2018; Stoliker et al., 2020). Globally each year, 2% of the population contemplate suicide (Karmakar et al., 2016; Renemane et al., 2021). The epidemiological characteristics and pattern of suicide seem to differ among countries and states for instance, suicide attempts are higher in women in some countries and in men in some other countries whereas most developing countries report higher suicide attempts among women (Mirahmadizadeh et al., 2020).

Mental disorders largely play a big role in predicting suicide such that an estimate of 92% of individuals who attempt suicide and 80% to 90% of individuals who die by suicide possibly have mental disorders (Bertolote & Fleischmann, 2002; Knipe et al., 2019). Patients with mental illnesses have a three- to twelve-fold greater risk of suicide than patients in the entire population (Kaplan, 2007; Song et al., 2020). Previous research has demonstrated that psychiatric disorders may have a less eminent role in influencing suicidal behaviour in low- and middle-income countries (LMIC), and that the behaviour itself differs in LMIC compared to high-income countries (HIC) settings (Colucci et al., 2013). In Kenya however, high burden of mental illness has been reported measured by numbers of years lost due to ill health, disability and premature mortality with huge gaps in access to care (MOH, Kenya, 2021). Following the COVID-19 pandemic and distress caused by the uncertainty and threat of infection, isolation, lack of availability of psychiatric services amongst other challenges, a spike in the global suicide incidence was reported (Zalsman et al., 2020). An increased suicide incidence has also been reported through multiple media reports at the count of suicidal deaths in Kenya (NMG, 2022). This has been more among young adults whose mental health is affected by extended use of social media. Since medical practitioners are usually on the frontline to diagnose mental health problems, suicide prevention process therefore should be amalgamated within both

hospital setting and universal healthcare system (Karmakar et al., 2016). Suicide rates do vary spatially, temporally, by gender, age, ethnicity, and race (Crosby et al., 2011; Olfson et al., 2021). Among youth aged 15 to 29 years, suicide comes in as number two cause of all deaths after road traffic accident (Bachmann, 2018). Furthermore, Bachmann reported that in 2015, more than three quarters (78%) of suicide incidences were completed in low- and middle-income countries (LMICs). Beside suicidal deaths, nonfatal suicide attempts, and suicidal thoughts likewise need close attention. This study aimed to assess the effect of an individual's sociodemographic characteristics on the prospect of suicide attempt.

Globally, the lifetime suicide prevalence rates are roughly 9.2% for suicidal ideation and 2.7% for suicide attempt (Health et al., 2019; Mars et al., 2014; Miranda-Mendizabal et al., 2019). Attempted suicide is likewise corelated with unfavourable, long-term outcomes which include mental and medical concomitant disorder, suicide re-attempts, destitution, long standing distress, and stigma (Bhatt et al., 2018). Because mental illness is a risk factor for suicide attempt, this study aimed to determine the patterns of psychiatric morbidity among individuals who attempt to commit suicide in Western Kenya.

Because of the emotive nature of suicide discussions and the criminalization of attempted suicide, there is a great degree of under-reporting because of its sensitive nature and the taboo that still evolves around it (Lindert et al., 2018). However, in continents or countries with organized vital statistical data, suicide may often be mislabeled as an accident or other cause of death since the registration of suicidal deaths is a complex procedure involving different legal and civil stakeholders (World Health Organization, 2018). This necessitated a local study on the patterns of suicide

attempt employed that leads to hospitalization in Kenya. The habitually employed methods and the patients' intent is of great importance to be identified because of the different fatality risks of various methods. Noteworthy is that many victims do not usually plan to kill themselves during the time of commission since they sometimes could be under the influence of drugs, psychiatric condition, or solely want to seek their spouse's attention; therefore, recognizing the risk factors associated with suicide attempts and fatality rate can be a vital step towards prevention of this global health issue (Mirahmadizadeh et al., 2020).

1.2 Statement of the problem

The World Health Organization estimates that suicide is the fourth leading cause of death among young adults aged 15 to 29 years with more than three quarters of them residing in low- and middle-income countries (Bachmann, 2018; Kim et al., 2020) such as Kenya. This increase in acute death is a major reason for agony to the affected family members, friends, colleagues and communities of the bereaved (World Health Organization, 2018). Because of the mental health disorder underpinning suicide, silence and associated stigma prevent those in need of psychiatric intervention from seeking help (Bhatt et al., 2018). Furthermore, fear of legal ramification associated with suicide have led to paucity of published data on attempted suicide both locally and in Africa (Agrawal et al., 2013). This limits mental health experts and other policy makers from defining the specific local psychiatric morbidity patterns associated with suicide. The patterns of the common suicide methods employed have not been adequately documented due to the secrecy and fear of legal ramification associated with suicide. Other sociodemographic and clinical factors that could increase the likelihood of suicide attempt have not been fully explored in the Kenyan population. All these issues necessitated a local study to determine the patterns of

psychiatric morbidity, methods and predisposing factors among patients hospitalized at a national teaching hospital in Western Kenya following a suicide attempt.

1.3 Justification of the Study

Whereas most studies on suicide focus on correlations, another way to improve suicide knowledge and prevention is to better understand the motivations for suicide attempts. Understanding the most common motivations for attempted suicide can inform conceptual models of suicide and facilitate the development of intervention and prevention programs that are likely to resonate with and help those at risk. Knowledge on the patterns of psychiatric morbidity among individuals who are hospitalized following a failed suicide attempt will not only provide trends but also create an opportunity for targeted interventions across various sociodemographic strata.

The recent alarming increased rate of suicide in Kenya has necessitated the need of conducting a local study to understand the point of view of those attempting suicide (Baldessarini, 2019; NMG, 2022). Furthermore, despite suicide attempts being very common in Kenya it remains under-investigated among the Kenyan population (MOH,Kenya, 2021) probably due to secrecy and associated stigma (Bhatt et al., 2018). Undertaking a study determining the most employed methods of suicide will create an opportunity for both prevention through regulation of access to these methods as well as plan for early intervention approaches.

This study addresses the research gap by characterizing potential clinical and socio-demographic factors associated with suicide attempts among patients admitted at a national teaching hospital with complications arising after a suicide attempt. The study screened the participants for underlying undiagnosed mental illness and compared the resulting diagnosis with their sociodemographic and clinical characteristics. The findings of this study could inform the hospital's management and policy makers on potential approaches to use in curbing suicide in addition to reducing barriers for those seeking mental health services.

1.4 Research Questions

i. What is the pattern of psychiatric morbidity among patients with attempted suicide admitted at MTRH?

ii. What are the methods of suicide employed by patients with attempted suicide admitted at MTRH?

iii. What are the socio-demographic and clinical factors of patients with attempted suicide admitted at MTRH?

1.5 Research Objectives

1.5.1 Broad Objective

- To determine the patterns of psychiatric morbidity, methods employed and predisposing factors among hospitalized patients at Moi Teaching and Referral Hospital (MTRH) following suicide attempt.

1.5.2 Specific Objectives

i. To describe the pattern of psychiatric morbidity among patients with attempted suicide admitted at MTRH.

ii. To describe the methods of suicide employed by patients with attempted suicide admitted at MTRH.

iii. To determine socio-demographic and clinical factors of hospitalized patients at MTRH following a suicide attempt.

CHAPTER TWO

LITERATURE REVIEW

2.0 Overview

This chapter presents current and ground breaking research on attempted suicide around the world. Specifically, it begins by providing a situational awareness of the disease burden, the most affected demographics and distribution of the problem. The literature review demonstrates that although attempted suicide could be spontaneous, there is a great likelihood that majority of the victims have an underlying psychiatric morbidity. Furthermore, this section highlights the most common methods of attempted suicide, their geographic distribution as well as sociodemographic and clinical factors associated with their occurrence. Lastly, the chapter concludes by presenting a conceptual framework on the relationship between individual characteristics and psychiatric morbidity in the occurrence of attempted suicide.

2.1 Epidemiology of Suicide

Suicide is the act of deliberately killing oneself (Crosby et al., 2011). Suicide attempt is defined as a non-fatal self-directed potentially injurious behavior with intent to die because of the behavior and may result in an injury that requires hospitalization (Crosby et al., 2011; Stone et al.,2017). Suicide is a major global public health problem and statistics show that nearly 1 million people die from suicide annually (Saxena et al., 2014). The World Health Organization (WHO) provides an age-standardized suicide rate of 10.7 per 1,00,000 persons annually (Bachmann, 2018). Globally each year, 2% of the population contemplate suicide (Karmakar et al., 2016; Renemane et al., 2021). Majority of these suicide associated deaths are rampant among young male adults aged below 35 years (Bachmann, 2018; Tsirigotis et al., 2011). The mortality rate of suicide related deaths among male individuals is four

times higher than females (Conner, 2015). Suicide costs the American taxpayer approximately $34.6 billion a year in matters pertaining to medical expenses and work loss costs, which translates into an average cost of $1,061,170 for each suicide related death (Crosby et al., 2011). Suicide attempts are measured in respect of the therapeutic outcomes or fatality and seriousness of the intention of the individual to die and more, so its therapeutic implacability is affiliated with the higher risk of lethality and significant suicidality (Choo et al., 2019). Attempted suicide has been identified as the major predictor for completed suicide (Kim et al., 2020). A Swedish study reported that the rate of suicide among individuals during the year after a suicide attempt was estimated to be about 100-fold above the reciprocal suicide rate amidst the community controls that were matched for age and sex (Kim et al., 2020; Tidemalm et al., 2015). In the same study, within year one after a suicide attempt, the imminence for completed suicide varied from 0.3 to 1.9% for the women and 0.8 to 3.0% for men.

Death by suicide can be differentiated from causes of death from illness since it culminates from a behavioral end point and can occur at any point of life after early childhood (WHO, 2014; Sinyor et al., 2017).There are multiple factors that predispose individuals to suicide and these include underlying mental illness, familial history of suicide, financial difficulties, broken family/friends relationships, unbearable emotional or chronic physical pain, bereavement, loss of an important relationship, negative life events and personality factors such as coping styles (DeVylder et al., 2015; Oliveira, 2018; Sandhu et al., 2019) which further increase the feasibility of individuals to engage in risky behaviours such as alcoholism and substance abuse (Turecki & Brent, 2016). Individuals previously managed for alcohol abuse or dependence are 10 times more probable of suicide related mortality in comparison to

the general population; while those who inject drugs have a 14 times increased risk for eventual suicide (Conner, 2015; Wilcox et al., 2004). Adverse childhood experiences (ACE) have also been related to various undesirable health outcomes eventually in adulthood comprising of psychiatric illnesses and suicidal death (Brådvik, 2018). Protective factors for suicide furthermore include good coping mechanisms and effective problem-solving skills, observing the religious and cultural beliefs that discourage suicide, good social support networks, availability and accessibility of wholesome physical and mental health care and limited access to lethal means among those at risk (Sinyor et al., 2017; Turecki & Brent, 2016; WHO, 2018).

2.2 Patterns of Psychiatric morbidity in attempted suicide

Psychiatric morbidity is defined by (Kwobah et al., 2017) as the existence of at least one of the mental disorders included in the Mini International Neuropsychiatric Interview (MINI) Version 7 for Diagnostic and Statistical Manual 5th Edition (DSM-5). The presence of, and comorbidity between psychiatric disorders is a major risk factor for suicide attempts (Moussavi et al., 2007; Qin et al., 2013; Wei et al., 2017). Mental disorders largely play a big role in predicting suicide such that an estimate of 92% of individuals who attempt suicide and 80% to 90% of individuals who die by suicide possibly have mental disorders (Bertolote & Fleischmann, 2002; Knipe et al., 2019). Patients with mental illnesses have a three- to twelve-fold greater risk of suicide than patients in the entire population (Kaplan, 2007; Song et al., 2020). Previous research has demonstrated that psychiatric disorders may have a less eminent role in influencing suicidal behaviour in low- and middle-income countries (LMIC), and that the behaviour itself differs in LMIC compared to high-income countries (HIC) settings (Colucci et al., 2013). In Kenya however, high burden of

mental illness has been reported measured by numbers of years lost due to ill health, disability and premature mortality with huge gaps in access to care (MOH, Kenya, 2021). It has also been noted that having a prior suicide attempt(s) is another potent predictor of the eventual death by suicide across the lifespan (Parra-Uribe et al., 2017). Moreover, having several previous suicide attempts has been listed among the strong predictors of fatal suicidal behavior in both young and old adults (Christiansen & Jensen, 2015) as is a prior attempt with high medical fatality (Parra-Uribe et al., 2017).

Mental disorders that are classified in the category of severe mental illnesses associated with more severe symptoms and consequently a greater vulnerability of suicide compared to other mental illnesses include major depressive disorder, bipolar disorder and psychotic disorder (Song et al., 2020). The mental disorders that have a high prediction of a subsequent suicide attempt in developed countries include bipolar disorder, posttraumatic stress disorder, and major depression (Bachmann, 2018; Cliffe et al., 2020); while in countries with developing economies, the imminent disorders include conduct disorder, posttraumatic stress disorder and substance abuse/dependence (Nock et al., 2009). In a systematic review on suicidal behavior among young adults (Nock et al., 2008), noted that the most commonly identified categories of psychiatric illnesses amongst this population were internalizing disorders, specifically mood and anxiety disorders, and externalizing disorders, including substance use disorders and antisocial behaviors. Data from the National Comorbidity survey (Nock & Kessler, 2006) show that in a countrywide representative sampling of US adults, over 53% of attempters met diagnostic criteria for a major depressive disorder, 15% for generalized anxiety disorder, and nearly 12% for panic disorder (Nock & Kessler, 2006). The authors further described that the

rates of substance use disorders comprising of alcohol abuse (43%), alcohol dependence (35%), drug abuse (33%) and drug dependence (23%) coupled with antisocial personality disorder (21%) were common amongst suicide attempters.

Multiple studies have reported that major depressive disorder (MDD) is the most rampantly diagnosed mental health condition among individuals who have attempted suicide. People affected by MDD regardless of age, male gender, comorbidity with anxiety disorder, substance abuse, or somatic illness have an elevated imminence of suicide (Courtet, 2016). In the United Kingdom, the authors (Cliffe et al., 2020) noted that 12.5% of these individuals were diagnosed with major depressive disorder compared to only 3% with bipolar disorder, 1.7% with alcohol use disorder and 0.6% with substance use disorder. In New York – United States of America (Olfson et al., 2021), more than half (50.5%) subjects who participated in the study were had been found to have major depressive disorder, 42.8% with substance use disorder, 34.1% with anxiety disorder and 30.6% with bipolar disorder. From the findings emanating from an Indian study by (Kodali, 2013), it was noted that although less than half (41%) of the participants did not have any psychiatric morbidity, 28% of all those enrolled had major depressive disorder as the most prevalent mental health condition. This was followed by alcohol use disorder (12%), bipolar disorder (3%), psychotic disorder (2%) and 1% with anxiety disorder (Kodali, 2013). In China (Li et al., 2017), the most common mental illness among the individuals whose life was cut short by completing suicide were Major depressive disorder (40%), schizophrenia (7%), and alcohol dependence (7%). There is compelling evidence, however, that adequate prevention and management of suicidal behavior among MDD patients is beneficial to bring down the suicide rates (Lin et al., 2014). Western countries have previously reported the following as some of the predisposing factors for suicide

attempts in MDD patients; familial record of mental disorders, adverse life events such as unemployment and divorce, comorbidity with anxiety disorders, early age at onset, more frequent depressive episodes and higher number of admissions (Choo et al., 2014; Klonsky & May, 2015; Xin et al., 2018).

The second mental disorder associated with an elevated risk of suicide is bipolar disorder (Fazel et al., 2019). Suicide in bipolar disorder is influenced by early outset of the condition, history of suicide attempts, polarity of current episode, episode severity, presence of comorbidities and familial history of suicide (Hansson et al., 2018). In a study assessing the risk of suicide amongst cases with severe mental illness, more than one third (37%) of these individuals had bipolar disorder (Fazel et al., 2019). Through this finding, the authors (Fazel et al., 2019) came up with a risk prediction score for suicide among individuals with bipolar disorder and its validation showed a good measure of discrimination and prediction. In a retrospective study done in South London (Cliffe et al., 2020), it was noted that bipolar coupled with other mental disorders further increased the risk of suicide significantly amidst cases who had eating disorder. Furthermore, this finding was also replicated in an editorial on the recent development on the epidemiology of suicide (Baldessarini, 2019). The author noted that suicide was particularly high among individuals diagnosed with bipolar disorder or severe depression if their diagnosis was coupled with either mixed features, agitation, or with concomitant substance abuse (Baldessarini, 2019). Among this group of individuals, the other environmental factors increasing the imminence of suicide are low access to mental health support, social and geographic isolation. This rising suicide burden is reducing the life expectancy rate especially in countries with developed economies where most suicide cases are reported among individuals with advanced years. In a third study assessing suicide risk among the entire Danish

population diagnosed with cancer between 1978 to 2013; the authors (Toender et al., 2018) noted that those who had severe mental illness (including bipolar disorder) faced a two-to-three-fold increased mortality risk from suicide in comparison to those devoid of severe mental illness. This increased mortality risk corresponded to a 15 – 20-year reduced life expectancy. Because of this, the World Health Organization notes that all types of mood disorders have been associated with suicide. These include bipolar affective disorder, depressive episode, recurrent depressive disorder and persistent mood disorders (such as cyclothymia and dysthymia), which form categories F31-F34 in ICD-10 (Knipe et al., 2019; Kodali, 2013; Lageborn et al., 2017).

Alcohol abuse is strongly correlated with suicidal ideation, suicide attempts and eventually death among the youth and adults (Darvishi et al., 2015; Rizk et al., 2021), a circumstance not elucidated by concurrent psychiatric conditions (Conner et al., 2013). Alcohol use disorder (AUD) has a 10-fold increased suicidal risk compared to the entire population (Wilcox et al., 2004) and is frequently diagnosed among young adults who have attempted suicide (Crosby et al., 2011; Wiktorsson et al., 2022). Factors related to AUD including familial history of AUD, early onset of alcohol use, recent problematic alcohol use and both the severity and chronicity are also correlated with suicide attempt (Pandey et al., 2022). Neurobiological factors are also associated with suicide attempt in AUD patients, and these include serotonin and dopamine dysregulation which in turn may be associated with alcohol use and are manifested as a derangement in levels of circulating prolactin. Dopamine and serotonin exert regulatory functions over level of prolactin through inhibitory and stimulatory mechanisms respectively (Jung et al., 2019). Alcohol inebriation is correlated to a larger extent with fatality of suicide attempt methods, making suicide fatalities more

likely as a result (Rizk et al., 2021; Sher et al., 2009). The acute effects of alcohol intoxication for instance increased agitation, myopia, impaired perception, dysphoria and impaired motor control may predispose an individual to partake in risky or impulsive behavior resulting in suicidal behavior (le Berre et al., 2017). Moreover, apart from promoting behavioral disinhibition, alcohol intoxication also causes affective numbing by masking one's psychological ability to be frightened of death (Rizk et al., 2021). Further, alcohol intake interferes with perception, discernment, and memory function by incapacitating emotional control and instigating impulsive hostility and cognitive distortion. Therefore, alcohol consumption in people who are vulnerable for suicide plays a crucial role in unplanned suicide attempts, while acute alcohol intoxication provokes suicidal ideation and suicide attempts in at-risk people (Choo et al., 2021). Moreover, consuming alcohol after a suicide attempt that had serious medical consequences increases the risk of re-attempting suicide or having a successful suicide (McQuaid et al., 2022). In research done within multiple clinical settings in Sweden (Wiktorsson et al., 2022), 35% of the participants reported alcohol use disorder. A nearly similar proportion (38%) was reported in a retrospective study done in New York where 38% of the 55,323 participants reported an alcohol use disorder. This finding therefore corroborates the argument that AUD is a major predictor of suicide attempt. Furthermore, suicide amongst persons diagnosed with substance abuse is about five times higher than those devoid of the condition (Post et al., 2018). In the United States of America, it was reported that people who use opioids are 14 times plausibly to die by suicide in comparison to the entire population, this being the highest odds of all substances (Braden et al., 2017). The lifetime prevalence of suicide attempt among individuals with substance use disorder particularly the opioids is gravely elevated and ranges between 17% and 48% (Chen

et al., 2010). Co-use of alcohol and opioids can significantly elevate the risk of death from overdoses due to respiratory depression (Witkiewitz & Vowles, 2018). Previous published work has differed concerning rates of suicide attempt between female and male AUD patients. Some authors report higher rates in females (Ries et al., 2022; Roy & Janal, 2007) and some in males (Boenisch et al., 2010; McQuaid et al., 2022) whereas others report no sex-based difference (Costanza et al., 2021; Jakubczyk et al., 2014; Pandey et al., 2022). Many studies on AUD patients have identified sex as a covariate in predicting suicide attempt but very few have explored the sex-specific determinants of suicide attempt (Pandey et al., 2022). A study in the general population reported that the suicide re-attempt was related to post traumatic stress disorder (PTSD) and depression severity in females and substance abuse in males. Another study among the military veterans receiving treatment for substance misuse found that suicidal ideation and suicide attempts in females were more strongly related to the extent of abuse of alcohol and other substances, as well as to aggression and combat-related PTSD, whereas those in males were more strongly associated with sexual and physical abuse, depression, and relationship problems (Jakubczyk et al., 2014; McQuaid et al., 2022; Monnin et al., 2012).

Recent studies have found that patients experiencing first-episode psychosis (FEP) have a 60% increased risk of suicidal behaviour (attempts and completed suicide) in the index year of treatment versus those patients in treatment of subsequent phases with the prevalence of suicide attempts ranging from 26.2% to 56.5% during the initial presentation of FEP and 2.9% to 18.2% in the years following FEP (Coentre et al., 2021). Other authors have argued that about 50% of patients with schizophrenia have suicidal ideation or have attempted suicide while about 5% of the same patients have completed suicide (Coentre et al., 2021). In a study focusing on a sample of

clinical and non-clinical young adults on subject suicide and psychotic disorder, self-reported auditory hallucinations were associated with two-fold risk of suicidal ideation and suicidal plans and four-fold risk of suicide attempts in a non-clinical sample of young adults in comparison to the general population while hypomania, paranoia, thought control, strange experience, and auditory hallucination in subject without definite psychosis were significantly associated with higher suicidal ideation and suicide attempt (OR ranging from 3.13; 95% CI 1.99–4.93 to 4.03; 95% CI 1.56–10.42) (Ventriglio et al., 2016).The predisposing factors for suicide in psychotic disorder include age, male gender, unemployment, increased frequency of hospitalizations, longer duration of untreated psychosis, depressive symptoms, substance abuse, the presence of concomitant hallucinations and delusions together with traumatic life events (Aydın et al., 2019; Hor & Taylor, 2010). Some studies have also reported a relationship between suicidal behavior and iatrogenic causes such as antipsychotic-induced extrapyramidal side effects particularly akathisia (Hassan et al., 2016). A study which focused on patients referred to the emergency room due to suicidal attempts revealed that patients with schizophrenia and anxiety/somatoform disorders tend to engage in more serious suicide attempts compared to individuals with other psychiatric disorders, which were more closely related to suicide completion (Song et al., 2020). Moreover, psychosis (or psychotic disorders) has been reported to be common among individuals who abuse substances such as the frequent use of high potency cannabinoid products (Gobbi et al., 2019). Consequently, this leads to an increase of avoidable mortality such as those arising from road traffic accidents and other risky behaviour. Other first time psychotic disorders may not necessarily be associated with substance or alcohol abuse. The risk of suicide could be elevated prior to the first contact to mental health services, but at that time, people

will not appear in the psychiatric case register, and they would not yet have been included in clinical studies. During the phases of untreated psychosis before the first hospital contact, there are many nonfatal suicidal acts that can be recorded retrospectively (Nordentoft et al., 2015). There is a greater risk of violent suicide attempts in the initial episode of psychosis than later in the illness. However, many reviewed studies did not report an increased prevalence of psychosis compared to other mental disorders among individuals with a current history of suicide attempt. In New York (Olfson et al., 2021), 23.1% were diagnosed with psychosis compared to the 8% in Sweden (Wiktorsson et al., 2022) and 3.2% (Kim et al., 2020).

Anxiety and panic disorders have been most frequently associated with suicide, followed by obsessive-compulsive disorder (Wilcox et al., 2004). This was similarly noted in a Swedish study where more than three quarters (77%) of participants with a current history of attempted suicide were diagnosed with anxiety disorder. Anxiety disorders have a great association with increased suicidal behavior(Nepon et al., 2010). Comorbidities are also found within anxiety disorders but the distinction as to whether it is this comorbidity and not simply the existence of an anxiety disorder that is associated with increased suicidal behavior is not clear (Hocaoglu, 2015). The same author Hocaoglu in his study found that anxiety disorders, especially panic disorder and PTSD, were independently associated with suicide attempts such that among the individuals who reported a lifetime history of suicide attempt, over 70% had an anxiety disorder (Hocaoglu, 2015). Studies looking at how anxiety and suicidal behaviors corelate have demonstrated mixed results since anxiety has been suggested to be a potentially alterable risk factor for suicide (Bilgiç et al., 2017; Placidi et al., 2000). Anxiety disorders have not only been linked to suicidal behavior in the general population but also in individuals with other psychiatric conditions (Abreu et al.,

2017). Anxiety symptoms (nervousness, uneasiness, and anxiety) are common in patients with mood disorders and even in those without an established diagnosis of an anxiety disorder (Bilgiç et al., 2017). Some studies have however demonstrated that anxiety symptoms have a protective effect against suicidal behavior in patients with mood disorders particularly major depressive disorder(Placidi et al., 2000). Panic disorder in reference to previous literature is a strong unconventional prospect for suicide while other specific anxiety disorders such as obsessive-compulsive disorder, generalized anxiety disorder and post-traumatic stress disorder lack evidence to link them to being independent risk factors for suicide(Wiebenga et al., 2021). However, when anxiety disorder is diagnosed with comorbid schizophrenia, depression, substance abuse, bipolar disorder and personality disorders, the risk may be substantially elevated(Hocaoglu, 2015; Wiebenga et al., 2021).

2.3 Methods of suicide attempt

Suicide attempters and completers differ in terms of the suicide methods they employ and the fatality of these methods(Lim et al., 2014). The choice of a suicide method is complicated and has multiple determinants. It is influenced by various factors, such as the cultural aspects, environmental determinants as well as an individual's own preferences or characteristics (Runeson et al., 2010; Shelef et al., 2021). Various countries and regions differ when it comes to the methods of suicide and this may change over time when new methods emerge (Cheng et al., 2015; Park et al., 2018). Other factors that can influence the selection of suicidal method include the diffusion between one population to another, the season of the year, genetic predisposition, social media reports and comorbid-physical or psychiatric disorders (Chen et al., 2015; Koo et al., 2019; Lu et al., 2011). In addition, specific drug use, legal ownership of firearm, use of drugs for occupational purposes, marital status, level of education,

experiencing interpersonal conflict and the impulsivity of leaving a suicide note are also other determinants that affect the selection of suicide method (Claire et al., 2019; Duarte et al., 2020).

The most identified methods for completing suicide include organophosphate pesticide poisoning and other forms of poisoning, falls from heights, drowning, hanging and firearms (Qu et al., 2021). Organophosphate pesticides are prevalent as method of attempting suicide throughout the low middle income country (LMIC) compared to the more developed countries (Johnston et al., 2020). According to WHO, pesticide poisoning is ranked the frequently used method of suicide globally and is frequently reported in Sri Lanka, China and India, particularly in the countryside where there is accessibility of the pesticide intended for use in agricultural activities(Gunnell et al., 2007; Qu et al., 2021; WHO, 2018). Pesticide poisoning is also an eminent method in Africa, however there is paucity of data documented from the countryside dwellers which could lead to underestimation of the magnitude of suicidal acts revolving around pesticides where these chemicals are easily accessible (Mars et al., 2014).

Among Kenyans, ingestion of organophosphate poison was the most preferred method a similar case to South India where agricultural activities are practiced (Bundotich & Gichuhi, 2015; Tsirigotis et al., 2011). As most of our population consists of farmers, organophosphate compounds are readily available for use as pesticides. The authors Mars et al., while assessing suicidal behavior across the African continent found hanging as the predominant method of suicide in most countries. The highest proportions were around 90% in men and 80% in women, as

observed in eastern Europe (Mars et al., 2014). South Africans were also mostly found to hang themselves 69% in males and 41% in females (Bachmann, 2018).

A study by Bachmann reveals that firearm suicide was the most common method in the U.S affecting 61% in male and 36% in female; women also die from poisoning at a rate of 31%. Moreover, firearms were not frequently used in the other American countries where both genders considered completing suicide by use of organophosphate pesticide poisoning (Bachmann, 2018). Suicide by falling from high points is also predominantly reported among metropolitan communities such as Luxembourg, Malta and Hong Kong SAR (Ajdacic-Gross et al., 2008).

In a review of sub-Saharan Africa by the authors (Klonsky et al., 2016), data on methods of suicide were assessed from 10 countries and the prevalence was found highest for victims who considered hanging with the ingestion of poison clearly differing from one country to another. Hanging ranged from 8–70% while poisoning ranged from 8–83%. Another means was the choice of firearms ranging from 0–32%. Gender effect was not linked to this study as there was no information provided with respect to gender as observed in the same study. In the Asian region, the population preferred mostly hanging and this accounted for 92% in Kuwait, 69% in Japan, and 23% in Hong Kong. The male victims in Hong Kong however chose to end their lives through falls which accounted for 43% and through other non-specified crude methods accounting for 23% (Bachmann, 2018). The same author also reported that both methods (hanging and falls) was also seen in women mostly of Hong Kong origin accounting for 48% and 23% respectively. In the other Asian countries, females lose their lives by hanging (26% in South Korea to 60% in Japan) or by pesticide poisoning (4% in Japan to 43% in South Korea) (Jordans et al., 2014). The South-East

Asian Region including Korea have a higher prevalence of strangulation and falls (Park & Kim, 2016).

According to (Kaushik et al., 2020), the mode of suicide attempt was by poisoning (55.6%), followed by hanging (24.4%) while in yet another study conducted in South India by Kodali, oral insecticide was consumed by 52% followed by rat poison (17%) (Kodali, 2013). Kinyanda from Kampala, Uganda found in his study that the main methods of suicide from the Ugandan community were hanging and ingestion of poison mostly organophosphates (Kinyanda et al., 2011), a situation like other developing countries.

More aggressive and crude or fatal methods, for instance strangulation through hanging and death by firearm are the most identified methods among men while the women usually choose less aggressive and crude methods like drowning and organophosphate poisoning or other forms of poisoning, and these marks the major differences between men's and women's most favourable methods for suicide (Ajdacic-Gross et al., 2008). Generally, methods of suicide in the order of decreasing fatality include firearms (83%), drowning (66%), hanging (61%), gas poisoning (42%), falls/jumps (35%), poison ingestion (1.5%), cutting (1.2%), and other methods accounting for 8%(Spicer & Miller, 2000).

In other studies, done in Australia by (Kõlves et al., 2018), despite a slight decrease in suicide rates, suicides by hanging continue to rise. Suicide rates by hanging have also shown increases in other countries; for example, in South Korea rapid increase in the proportion and incidence of hanging in 2000–2011 for both sexes has been reported (Oh et al., 2014). The profile of hanging suicide cases indicated that they involved males, young persons, likely to be Indigenous, reacting to recent life events, with 50%

experiencing recent interpersonal conflict, consuming alcohol before death and less likely to have medical and mental health problems. Another Australian study revealed that guns and explosive devices are also other forms of male-dominated options prevailing more in males in the rural areas of Australia (De Leo et al., 2003). In the same study, there was a significant negative drift during the study period, and this was experienced at the end of 1980s when guns were the primary method. This is similar to a Finnish study where Pirkola et al., found that sex, age, indigenous status, country of birth, mental illness, history of a suicide attempt and year of death was significant at ($\chi 2(14) = 788.03$, $p < 0.001$)(Pirkola et al., 2003). In the same study, people who chose jumping from height as a suicide method were less likely to consume alcohol prior to suicide and leave a suicide note.

A study done by Kairi Kõlves et al., in Australia revealed that 'other methods' accounted for suicides at 9.3%, the most prevalent was jumping or lying before a moving object at 2.4%, suicide by a sharp object 2.1% and suicide by drowning and submersion 2.1% (Kõlves et al., 2018). 'Other methods' were habitual in older adults (65+ years), non-Australian born. Indigenous Australians, people residing in rural and remote areas, with recent financial problems/unemployment and interpersonal conflict were not as probable to die by suicide using 'other methods'. People who used 'other methods' were more seemingly to happen in older males from rural areas, and less likely than other suicide types to have psychiatric disorders. According to Klieve et al., people holding a gun license are more apparent to live in rural/agricultural areas since they have more accessibility to them and this could be attributed to its higher use in the countryside or remote areas (Klieve et al., 2009).

Social processes such as urbanization in some countries have had an impact on changes in suicide methods as they have a direct impact on availability. Urbanization in China has been a factor in the decline of suicide by pesticides as people are moving to cities (where access to pesticides is difficult); although increase in jumping from heights is common among urban suicide method (Page et al., 2017). Lower prevalence of suicide by jumping (3.6%) have been compared to data from Singapore (72%) (Chia et al., 2011) and Hong Kong at approximately 50% (Wong et al., 2014), showing higher likelihood in females with mental health disorders, in urban residents.

2.4 Factors associated with psychiatric morbidity

2.4.1 Sociodemographic factors

a) Sex

In the US, there are marked differences in suicide attempts and deaths between males and females; 15- to 19-year-old boys die five times more from suicide than girls in the same age range (CDC, 2019).In general, men complete suicide up to three times more than women, while for suicide attempts, an inverse ratio is found (Bachmann, 2018). This difference is in part explained by the predilection of the male gender for more deadly means (Ajdacic-Gross et al., 2008). Other explanations given for the preference of men for more deadly means include greater suicidal intent, aggression, knowledge on violent means and don't care attitude on bodily disfigurement (Choo et al., 2019; Hawton, 2000). Though death due to suicide is more common among males, suicidal ideation and attempts is frequent among the females (Park & Kim, 2016). People vulnerable to suicide attempts are more feasibly to be young, female and have a recent record of having experienced interpersonal differences and losses (Choo et al., 2019). Previous research show that girls with previous suicide attempts have threefold rise in suicide risk while boys with previous suicide attempt have a 30-fold increased likelihood of completing suicide (Lindert et al., 2018).

A study by Baby et al., in India found that 65% of the suicide attempters were male (Baby et al., 2006) similarly to a study by (Kodali, 2013) where 62% of the suicide attempters were male. Another study by Li et al., found that the odds ratio of suicidality among the females was about three times that in the male (OR =2.62; 95% CI 1.45±4.76) among respondents who reported to have MDD(Li et al., 2017). A study in Missouri found out that women with AUD were at 3.1 (95% confidence interval [2.5, 3.8]) odds of also reporting a lifetime suicidal history (Agrawal et al., 2013).

A study on suicide prevention in Switzerland concluded that "Women seek help – men die" in the sense that 75 % of those who sought professional help in an institution for suicide prevention were female, and 75 % of those who completed suicide in the same year were male(Möller-Leimkühler, 2003). Men have a much greater overall risk of suicide but are much less likely to have a diagnosed mental health condition while women are more presumably to seek mental health treatment hence are more feasible to be detected with a psychiatric condition. Furthermore, Pompili et al., found that male patients having bipolar disorder averagely made 1.6 suicidal attempts (Pompili et al., 2006).

b) Age

Data from the CDC indicated that suicide rates for females were highest among those aged 45-54 years (9.6 per 100,000), whereas males aged 75 and older had a suicide rate of 39.9 per 100,000 (Crosby et al., 2011; Elgin, 2014). Suicide rates are higher among middle aged, and people aged 70 years or more regardless of sex in most regions globally (Alicandro et al., 2019; Fiske & O'Riley, 2016; World Health Organization, 2014). Some of the prospects of suicide among the elderly include the

existence of physical illness, stressful life events, psychiatric disorders (mostly depression) and functional impairment (Stoliker et al., 2020). The WHO report further states that in some countries, suicide rates are more marked among the youth. Suicide is ranked second cause of death amongst the 15−29-year-olds globally. The prevalence of suicidality is exorbitantly higher among youths aged 18-29 than among adults 30 years of age and older (Elgin, 2014). The age difference in this subject could be explained by different sociological settings. Additionally, according to Boeninger et al., several longitudinal studies have assessed the progressive trajectories of suicidal behaviors during adolescents and emerging adulthood and found a distinction in girls' and boys' trajectories (Boeninger et al., 2010). Specifically, results of these studies suggest that girls' are at the most risk for suicidal attempts during mid-adolescence, whereas boys' risk does not decline in the same way, and may continue to rise into early adulthood (Boeninger et al., 2010). Generally, many more young than old individuals die from suicide, but the relative numbers per age group are up to eight times higher in the elderly (Gürhan et al., 2019).

In accordance with (Qusar et al., 2010) findings, 43.2% of patients with suicide attempt belonged to the age group below 20 years. In another study, those aged between 15 to 34 years was 45.6% (n=94) patients and those aged more than 31 years was only 25% (Baby et al., 2006). In another study on psychiatric morbidity of patients who had attempted suicide and had been hospitalized in a general hospital in rural area of South India,(Kodali, 2013) found that most suicide attempters were below 30 years of age. A foundational study in Kenya found that 90% of suicide attempters were below the age of 40 while 76 % were between 16-30 years (Mengech & Dhadphale, 1984).

c) Religion

Religion is a significant dimension of life globally since about eighty-four percent people worldwide are affiliated with a religious belief structure (Norko et al., 2017). About three quarters of the world population accredits themselves to either belonging to the Abrahamic religions (Christianity, Islam, and Judaism) or the Dharmic religions (Buddhism and Hinduism) and generally each of these religions, in its true or accurate teachings, is opposed to suicide; they all consider life to be precious (Thimmaiah et al., 2016; Yuan et al., 2018). Religious leaders worldwide have customarily condemned suicide because they believe that human life is sacred. Religion can impact suicidality and an individual's level of religiosity can buffer against suicidal behavior however it is important to take other variables into consideration such as culture in specific communities and its implications upon individuals (Gearing & Lizardi, 2009; Hajiyousouf & Bulut, 2022). Some factors are thought to associate religious affiliation to decreased risk for both suicide attempt and suicidal death. These protective factors include a positive sense of self-worth, personal empowerment, good social support, religious beliefs that condemn suicide, commitment to religious life-preserving morals, responsibility towards others, healthy lifestyle, problem-solving, coping skills and motivation for the future(Hajiyousouf & Bulut, 2022; Lew et al., 2021).The rates for suicide, the risks and protective factors vary across religions and country with most literature emphasizing on the Western countries (Lawrence et al., 2016; Lew et al., 2021). It is also worth noting that religious countries have lower suicide rates in comparison to secular ones (Norko et al., 2017). Holding religious beliefs and rituals has been termed as a buffer against stress and a source of comfort to distressed individuals. It is therefore inevitable to say these important religious beliefs and values held by that individual will affect how

help is sought and where help is sought from (Bhugra, 2010). Irrespective of one's faith, individuals from traditional, conservative, or religious societies that are in the forefront of condemning the act of suicide may as well be vulnerable to suicidal thoughts as a solution to ending their problems and sufferings, just as likely as those from non-religious societies (Hajiyousouf & Bulut, 2022). These individuals would however be less probable to have suicidal behavior and they may not reach the extent of acting upon their suicidal thoughts since they are aware that suicide is doomed, condemned and is morally impermissible in their religion (Hajiyousouf & Bulut, 2022; Lawrence et al., 2016).

A study by (Dervic et al., 2004) found that suicidal attempts among depressed participants were not as likely to occur in patients who had religious affiliations compared with those not having any religious affiliation. Religious affiliations may symbolize various things and thus there is a need to differentiate religiosity from beliefs, rituals, and attitudes. Religiosity in this case is a normal constituent of human behavioral repertoire(Gearing & Lizardi, 2009). Moreover, individuals may not embrace all of their religion's teachings, yet remain affiliated with that religion for instance many Catholics use contraceptives, yet it is against their teachings (Lawrence et al., 2016).

Some studies have suggested that religious affiliation protects against suicide attempts. In a United States sample the authors identified that patients with no religious affiliation (total n = 51, 80.4%) were more presumably to attempt suicide compared to their counterparts (total n = 641, 63.1%) bivariate p = 0.023 (Dervic et al., 2004). Similarly, Kralovec et al. in Europe surveyed Austrian lesbian, gay, or bisexual (LGB) adults of which 219 participants identified themselves as religious

affiliates while 139 did not while as for their heterosexual matched controls, 215 participants had religious affiliation while 52 did not. Those with a religious affiliation had less suicide attempts reported in comparison with those who had no religious affiliation(Kralovec et al., 2014) ; in both comparison groups (6% versus 15%, OR 2.92, CI 1.65-5.18) and the LGB group (11% versus 20%, OR 1.95, CI 1.07-3.58). In contrast, religious affiliation is not protective in all sample as demonstrated by Sisak et al. whose data derived from seven countries noted that in South Africa, those who attempted suicide were more presumably than controls to report a religious affiliation (n = 541 of 565 suicide attempters versus 414 of 497 controls) (Sisask et al., 2010).

In Christianity, attitudes towards suicide vary. The clergy believed that suicide occurred among the youth because of temptations by the devil (Gearing & Lizardi, 2009), and as a result those completed suicide were buried at a distance from the community and their bodies pierced with a stake to offer protection against their malevolent souls. According to Gearing et al., Hinduism is not only a religion but also a philosophy and a way of life, where life is seen as a cycle and reincarnation is seen as part of this cycle, attitudes towards suicide could be more liberal. However, in India, the suicidal act remains punishable by law. The Islam faith strongly prohibits any suicidal behaviour especially self-harm and suicide, this therefore is an indicator that rates would be expected to be low (Bagasra & Mackinem, 2014). However, under these circumstances, a disclosure of suicidal thought and ideation may be artificially lower. In contrast, the authors of a self-reported in the US found that Muslim adults were twice more likely to report suicide attempt compared with the respondents from other faith traditions, including atheists and agnostics (Awaad et al., 2021). However, the proportion of the Muslim respondents in this study who reported suicide attempts

was larger than the proportion reported from a different study which comprised of Muslim-majority communities (Eskin et al., 2020).

d) Level of education

It has been speculated that poor school performance recorded during the early life of a child will later on be associated with suicide attempt during later life as an adult, however the mechanisms for this are not clearly established (Wallin et al., 2020). Previous research work have shown that there is a relationship between mental health and academic performance. Academic performance plays a big role in the development of the social relationships between peers, the development of one's identity, the improvement of individual skills such as problem solving and critical thinking, and in addition contributes to better opportunities for the future (Orozco et al., 2018). Apart from the development of cognitive function, education as well plays an important role in the progress of the economy, politics, and the culture of the society (Wang et al., 2022). The relationship between poor academic performance in childhood or adolescence and suicidal behaviour during adulthood as has been demonstrated in previous studies is significantly strong projecting up to fourfold or fivefold risks of suicide and suicide attempt for people with the lowest academic achievement compared to those with the highest achievement (Sörberg et al., 2018; Wallin et al., 2020). Some studies have established a fivefold enhanced probability of suicide attempt among students who were found to have low academic performance compared to those who categorized their academic achievement as above average (Orozco et al., 2018; Richardson et al., 2005). Early-onset mental disorders have presumably been found to be present in individuals who fail to complete high school or college and this accounts for 14.2% and 4.7% of high school dropouts and college dropouts respectively (Christiansen et al., 2015). In a Swedish

study, it was found that poor school performance among young people can predict suicide attempt in individuals who had no history of suicidal thoughts, furthermore low intellectual quotient (IQ) and poor school performance are also associated with an increased risk of suicide in males (Franklin et al., 2017). Some recent studies have established the relationship between mental health, educational attainment (EA), and cognitive performance (CP); and this found that a history of suicide planning and attempt(s) prior to matriculation was associated with decreased college academic performance (Rosoff et al., 2020). It is worth noting that educational achievement and cognitive performance are strongly influenced by the environmental, social and cultural factors and they are as well polygenic and heritable (Benjamin et al., 2019). Externalizing problems for instance impulsivity, attention deficits and hyperactivity problems are thought to hamper learning and academic performance from an early age, and these are likely to increase the risk of suicidal behaviour(Wallin et al., 2020). Those who have received better education have probably an increased likelihood of being employed hence may often have wide opportunities for advanced occupations, which comes along with more responsibilities, diverse networks embedded with strong social ties and therefore reducing the burden of suicidal behaviours (Øien-Ødegaard et al., 2021).

According to an Italian study on education level and mortality, research data derived from the Italian Mortality database based on the years between 2006 and 2008 which included all suicidal deaths and deaths due to natural causes in relation to their levels of education, it was found out that there was an outstanding differences in terms of educational levels between suicide victims and individuals who died by natural causes, categorized by gender and broken down by age groups (Pompili et al., 2013). Of the victims in the same study aged 15 to 64 years old regardless of sex, it was

noted that suicide victims were remarkably more often to have attained higher education compared with the same sex and age compatriots who died from natural causes. In addition, people with higher educational level, in comparison with those with a primary school certificate in the same study, had significantly increased odds ratios of dying from a suicide rather than a natural cause while for persons aged 65-74 years or above, the difference was not so much obvious. It is of note that individuals with higher educational achievement may be more prone to suicide risk when facing failures, public shame, and high premorbid dysfunction (Pompili et al., 2013). A contradicting study conducted in India (Srivastava et al., 2004) found out that 39% of the patients who attempted suicide were educated only up to the primary level. This is similar to findings in many other Indian studies, which suggests that lower educational achievement as a risk factor for suicide attempt (Srivastava et al., 2004).

Christiansen et al., in a study found out that individuals with a suicide attempt at age 16–20years or with multiple suicide attempts were most likely not to complete secondary education. However, suicide attempt is not necessarily a measure for not completing secondary level of education, but it is a marker which can project an enhanced probability of not completing secondary level of education (Christiansen et al., 2015). Furthermore, in a study (Ivey-Stephenson et al., 2020) that examined the relationships between preteen alcohol use initiation and subsequent suicide ideation and attempts for boys and girls in the 2005 national Youth Risk Behavior Survey, which included a representative sample of over 13,000 high-school students in grades 9–12 in the United States. The authors (Ivey-Stephenson et al., 2020) concluded that preteen alcohol use initiation was significantly associated with suicidal ideation (adjusted OR = 1.89) and suicide attempts (adjusted OR = 2.71) relative to nondrinkers. In a study by (Lageborn et al., 2017), students who were ongoing with

university studies were found to have an enhanced risk of suicide compared with students who had attained university-level education. The justification for this is because university period is accompanied by additional responsibilities and pressure to succeed, which may increase mental distress, depression or lead to excess alcohol use (Jadoon et al., 2010). In another study (Hem et al., 2005), suicide rates according to education with an emphasis on dentists, physicians, nurses, theologians, and police officers compared with university graduates and the general population, the authors found higher suicide rates among physicians and elderly graduates, and this is because graduates are more vulnerable to suicide than others when getting older.

e) Marital status

It has been argued that marital unions have significantly reduced the risks of physical and psychiatric disorders because of bonds created by non-kin which consequently promotes an individual's well-being within the union as well as increased financial satisfaction (Næss et al., 2021). It is worth noting therefore that social bonds and attachments are vital for normal human functioning since most people tend to thrive under strong long-lasting relationships and their livelihoods tend to be shuttered when these relationships are threatened or broken (Idstad et al., 2015). Important moderators that have been found to act between marital status and suicide risk are sociocultural differences, time, and gender inequality (Kyung-Sook et al., 2018; Næss et al., 2021). Previous studies have demonstrated an association between marital status and suicidal behaviour. They have shown that being married has lower suicidal rate than being single (those that had never married) and that divorced, separated, and widowed individuals have the highest suicidal rates (Kposowa, 2002; Kravdal et al., 2018). The suicidal risk as demonstrated by previous studies have been found to be highest among divorced individuals and notably significant among the divorced men

and greater among those recently divorced than for more distal divorce (Kyung-Sook et al., 2018; Næss et al., 2021). Marriage cushions one against social isolation by providing social stability and emotional support in addition to social and community integration which lacks in people who are either single, separated, divorced, or widowed hence the difference in the suicidal risks (Calati et al., 2019; Kravdal et al., 2018). In contrast, divorce has been seen as an agent of elevating suicidal risk since it brings down the bond between the individual being divorced and the marital union. Whenever there is a breakdown in a marriage, there are usually increased psychological stressors such as frequent conflicts, self-accusation, loss of marriage benefits, financial problems, uncertainty about the future and children separation issues arise (Idstad et al., 2015; Næss et al., 2021; Rahmani et al., 2019). Those facing the effects of marital dissolution (divorce and widowhood) seem to bear the full weight of social relationship loneliness and the loss of a loved one in addition to loss of financial or instrumental support while those who are single may be more vulnerable to face issues such as depression (because of lacking someone to share their livelihood with) than those married (Kposowa et al., 2020). Fewer studies have examined the risk of suicide for people who are separated for instance, Australia found a higher risk for persons who are separated than those who are divorced, particularly for men since people going through separation usually are closer to the actual relationship breakdown than people who are divorced (Kposowa et al., 2020). However, some studies conducted in the United States and a Danish register study found the suicidal risk among those who were separated to be roughly the same as for those divorced, while another US study found no increased risk associated with being separated as compared to being married (Agerbo, 2005; Cook, 2019; Kposowa et al., 2020). Some studies have singled out that men who are widowed after the age of 50

have a higher suicide risk while as for women who are widowed at 65 years and older, the widowhood status had a protective effect. Similarly, the females who are below 35 years and over 51 years who had never been married had a protective effect while those women who had never been married while aged 35–50 years had an elevated suicide risk (Cook, 2019; Yeh et al., 2008).

A study done to profile suicide in Tanzania found that majority of those who completed suicide were single 62% (Ndosi et al., 2004). A study carried out in America in which 46.9% were married, 28.7% were never married, 9.2% were widowed, and 15.2% were divorced. (Srivastava et al., 2004) found that divorced individuals were 2.9 times more likely to die of suicide than individuals who had spouses while individuals who were widowed were almost three times more likely to die because of suicide compared to married persons. They also found in the same study that single individuals experienced a suicide risk that was almost twice more likely than that of married people (Srivastava et al., 2004). Similarly, (Kposowa, 2002) found increased suicidal risk in persons who were divorced than in those who were married and in addition divorced and separated persons were almost twice as likely to complete suicide as married individuals.

f) Socio-economic status

Socioeconomic status is vital in determining suicide risk in both high-income countries and low and middle-income countries (Raschke et al., 2022). Social position, economic factors, and cultural factors play a significant role in influencing suicide, and these may have important implications for suicide prevention (Kim et al., 2016). Recent studies have documented high numbers in suicidal behaviour associated with increased unemployment rates (Näher et al., 2020). According to

Vijayakumar et al., low socioeconomic status has been pointed out as the utmost cause for suicide in countries with developing economies particularly where welfare systems are limited or nonexistent. Proximal factors that influence suicidality include poverty, job loss, and major financial setbacks such as bankruptcy (Vijayakumar et al., 2005). Consequently, individuals with a lower socio-economic status go through challenges brought about by higher costs of living versus limited life chances therefore rendering them vulnerable to mental illness (Muntaner et al., 2004) and psychological distress (Turecki & Brent, 2016), and hence raise the suicidal risk. Socioeconomic status plays an important role in suicidal behaviour in high-income countries, with recent research projecting up to a five-fold greater risk in persons with lower socioeconomic status (Jeong, 2021). Other studies in terms of gender differences have also shown that lower income status, education and employment or occupational status were stronger among men than women with women having a increased rate of suicidal ideation, while men have an increased rate of attempting or completing suicide (Knipe et al., 2017).

Unemployment status therefore is a significant financial distress to the society as well as it being a burden to an individual's mental stability and welfare. Suicide risk along direct and indirect pathways of unemployment tends to link a causal association between unemployment and suicide (Blakely et al., 2003), since it is a considerable source of social stress leading to increased family tensions, increased isolation from others, and the loss of self-esteem and confidence especially among those have attained higher education (Vijayakumar et al., 2005).Some studies have demonstrated that unemployment is a common factor among individuals who completed suicide and is associated with elevated risk for lethal suicidal behavior(Van Orden et al., 2010). In addition, (Kerr et al., 2017) found that economic recessions that led to marked

elevations in negative outcomes such as job losses and home foreclosures were associated with increased suicide rates. People living with severe mental illness have slim chances of employment hence have lower income compared to people without mental illness (Luciano & Meara, 2014). Some studies have demonstrated that people living with mental illnesses have difficulties attaining a sufficiently high level of education that will enable them to secure better future and a good quality of life(Christiansen et al., 2015). A recent study conducted in Korea identified low income, unemployment, and economic difficulties as factors contributing to all suicidal behaviours (suicidal ideation, suicide attempts and completed suicide) whereas working in shifts especially night-shift, extended working hours, self-employment, working in harsh conditions and changes in employment status were associated with a higher risk for suicidal ideation (Raschke et al., 2022). The authors also pointed out that having attained low education seemed to elevate the risk for both suicide attempts and completed suicide. A study by Lin et al., in Taiwan found that the majority of those who had attempted suicide were unemployed 51.0% (Srivastava et al., 2004). Another Indian study by Kaushik also found that 31.1% of suicide attempters were unemployed (Kaushik et al., 2020).

2.4.2 Clinical factors

a) Physical illness

Physical and mental health conditions are strongly connected and play a role in contributing to a large proportion of suicides (Renemane et al., 2021). Physical illness and suicide on the other hand have an indirect relationship that is likely accounted for by a multitude of other risk factors, including co-morbid mental disorders (O'Mahony et al., 2005), functional limitations (Kaplan, 2007) and social isolation (Carrico et al., 2007). More than one-third of people who completed suicide had a medical illness at

the time of their death (Baldessarini, 2019) hence linking a relation between the presence of physical illness and suicide. Previous studies have shown that people who have several physical health conditions are likely to have a lower quality of life and in addition, the type and number of the conditions are linked to an elevated risk of suicidal ideation and suicide attempts (Onyeka et al., 2020). HIV/AIDS is one disease with a particularly high risk for suicide and has been shown to confer approximately a seven-fold risk for suicide as compared to the general population (Pugh et al., 2007). Brain cancer is also another illness that appears to confer suicide risk, it has a nine-fold increased risk for suicide as compared to the general population and a four-fold risk as compared to individuals with other forms of cancer (O'Mahony et al., 2005; Toender et al., 2018).Ultimately, any chronic physical disease is a disability which leads to an increase in suicidality and it may be linked to a higher risk of suicide with various research singling out multiple sclerosis which has a two-fold risk (Vigo et al., 2016), epilepsy, asthma, hemodialysis for kidney failure (Tsigebrhan et al., 2017), traumatic brain or spinal cord injury (Khazaeipour et al., 2015), and post-stroke conditions (Eriksson et al., 2015). A recent USA research which focused on restless leg syndrome and the risk of suicide or self-harm found an association between the two but was not able due differentiate between these two outcomes due to a small sample size (Nassan et al., 2022; Zhuang et al., 2019). Another recent USA multi-state study has proposed that some various physical conditions which include cancer, chronic obstructive pulmonary disorder (COPD), back pain, kidney disease, traumatic brain injury, congestive cardiac failure, HIV/AIDS, sleep disorders and migraine headaches, are largely correlated with an elevated risk of suicide and comorbidity had about a 2-fold increased risk of suicidal death (Ahmedani et al., 2017). This study, however, was confined to only those within well-resourced health systems and was

not a representative of the general population. Two other recent systematic reviews and meta-analyses studies found an increased likelihood of suicidal deaths among persons with COPD and cancer have upheld some of Ahmedani et al.'s findings (Amiri & Behnezhad, 2020; Sampaio et al., 2019). A study conducted in Denmark (N=209,915) revealed that myocardial infarction was positively associated with the risk of suicide among individuals with or without psychiatric comorbidity while another retrospective cohort study found a positive relationship between traumatic brain injury (TBI) and suicide, as well (Jacob et al., 2020). Patients diagnosed with epilepsy face a particularly increased risk of death by suicide, with an overall 12% of all deaths in patients with epilepsy attributed to suicide and an increased standardized mortality ranging from 2.6- to 5.0-fold (Thurman et al., 2017). The incidence of depressive symptoms and suicidal ideation among patients with epilepsy has been reported to be remarkably greater than among patients with other chronic neurologic diseases or in the general population (Elger et al., 2017). Some studies have estimated the prevalence of chronic suicidal ideation among patients with epilepsy to be as high as 10% with a further increased risk of completed suicide in patients with epilepsy comorbid with depression, however, it is not certain whether the increased risk of suicidality associated with epilepsy is self-reliant of the high prevalence of psychiatric comorbidities in patients with epilepsy (Xu et al., 2018). Suicidal deaths because of physical health problems are commonly seen in older adults compared to young people (Conejero et al., 2018) and this is so because at old age most people have retired and lack sufficient medical insurance covers to cater for their medical bills, therefore treatment of their physical ailment especially if its chronic becomes a financial burden.

In accordance with a National Comorbidity Survey in the America (N=8,098), each physical illness was associated with a significantly increased odds of suicide attempt (Goodwin et al., 2003). It was found specifically that AIDS was associated with an over 100-fold increase in likelihood of suicide attempt, hernia with an over ten-fold increase, and ulcer over a threefold increase (Goodwin et al., 2003). In a study by Qin et al., in Denmark, slightly more than half (63.5%) of subjects who had completed suicide (cases) and 44.5% of subjects who were controls had been hospitalized due to physical illness. For both the cases and the controls, physical illness was found to be common in women (70.8% of cases; 50.0% of controls) compared to men (59.7% of cases; 41.6% of controls)(Qin et al., 2013).

b) Number of hospital admissions

Frequent readmission to hospital due to a physical illness is also thought to have influence on attempted suicide. Qin et al., in their study noted a progressively increased suicide risk associated with both the frequency of previous hospitalizations and the recency of the last hospitalization – the greater the frequency of hospitalizations or the more recent the last hospitalization, the higher the risk of suicide (Qin et al., 2013). In the same study, 50.2% cases had been admitted more than three times, and 39.8% had been hospitalized within the year preceding the suicide. They also found out that progressive increase in suicide risk associated with frequency of hospitalization and multiple comorbidities indicates that the severity of physical illness plays is key in the occurrence of subsequent suicide, moreover, being physically severely ill, as evidenced by either multiple hospitalizations or the involvement of several organs or systems, confers a strong risk of subsequent suicide. Patients may choose to end their life to obtain release from a long-term debilitating condition or to avoid experiencing the progression of an illness (Qin et al., 2013).

Frequently, patients with chronic illness such as epilepsy residing in the US face an increased monetary burden with over $15 billion in annual nationwide costs and are at an especially increased risk of rehospitalization (Xu et al., 2018). This can be in part as a result of the complexity of antiepileptic drug regimens, pharmacologic adverse effects, increased prevalence of underlying cognitive dysfunction (e.g., impaired executive function and memory) and psychiatric comorbidities.

2.5 Conceptual framework

This study hypothesizes a direct relationship between the individual's sociodemographic and clinical characteristics and the patterns of psychiatric morbidity. This is because, the distribution of various psychiatric morbidities are a function of age, sex, level of education, religious beliefs, socioeconomic status, whether one has an underlying disease and prolonged hospitalization.

INDEPENDENT VARIABLES
DEPENDENT VARIABLE

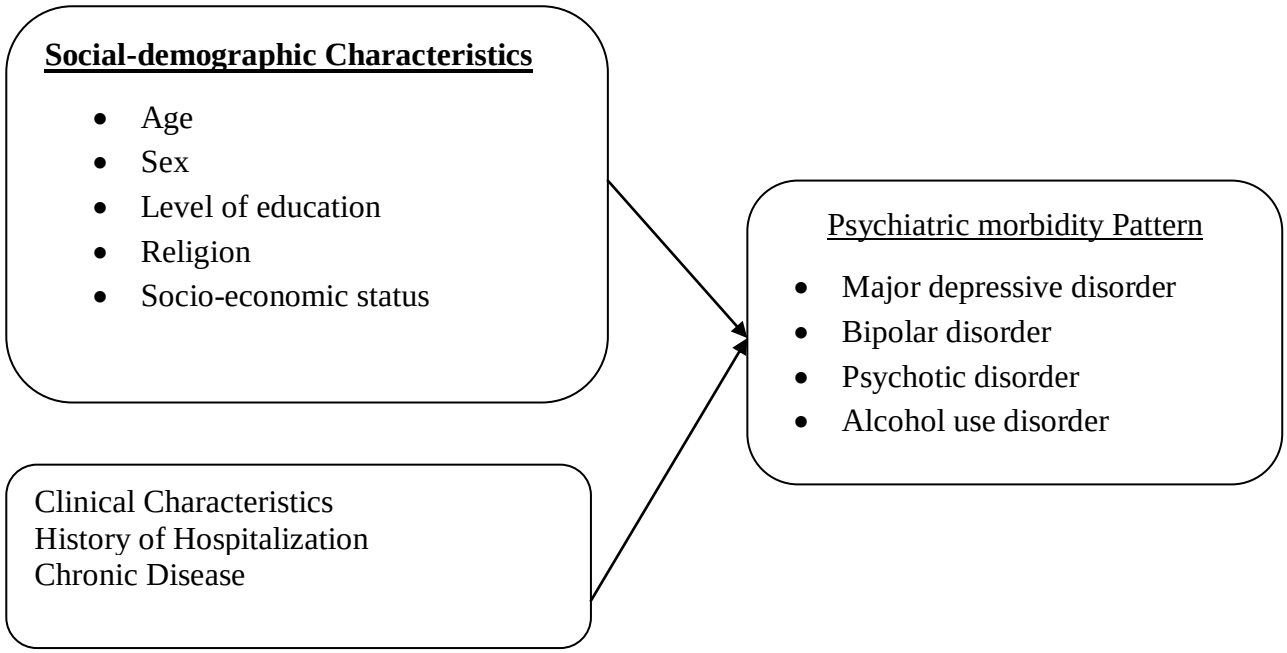

Figure 1: Conceptual framework

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Design

The study employed a descriptive cross-sectional study design based on the scope of the study, as all the required data points to answer the research questions could be collected in a single session.

3.2 Study Setting

This study was conducted at the inpatient units (medical wards, surgical wards, mental health unit, gynecology ward, antenatal and postnatal wards) of Moi Teaching and Referral Hospital (MTRH) in Eldoret Kenya. It is situated along Nandi Road in Eldoret Town, Uasin Gishu County (310 Kilometers Northwest of Nairobi). The Hospital's catchment area comprises of residents living within 23 Counties in Kenya and the neighboring countries such as South Sudan, parts of Eastern Uganda, the Democratic Republic of Congo and Tanzania with a population of over 24 million. The hospital is a level six healthcare facility and is the second largest national referral hospital in Kenya. It offers outpatient, inpatient, and specialized healthcare services with a bed capacity of 1020 specialized beds with an average number of 1300 inpatients at any time and 1500 outpatients daily. Because of its national referral hospital status, it was selected due to the high number of hospitalized patients who attempted suicide being referred. The population is socioeconomically and ethnically diverse and this gives it both a regional and national outlook.

3.3 Study Population

This study enrolled adult hospitalized patients aged 18 years or more who had a current history of attempted suicide. The choice of this study population was based on the ability to provide informed consent.

3.4 Sample Size Determination

This study used the Cochran formula(Bartlett et al., 2001; Cochran, 1977) to estimate the sample size. Sample size determination was required to obtain the optimal number of participants needed to both answer the research questions as well as ethically and scientifically achieve the study objectives (Bhalerao & Kadam, 2010). Using the Cochran formula:

$$n_o = \frac{z^2 pq}{e^2}$$

Where:

e = is the desired level of precision (i.e. the margin of error) (0.05),

p = the (estimated) proportion of the population which has the attribute in question (the most prevalent disorder found in a similar study on psychiatric morbidity among patients admitted with attempted suicide in a general hospital in rural South India was major depressive episode accounting for 28% (Kodali, 2013).This study was chosen since there was no recent study in Kenya that had focused on suicide attempt most studies focused on complete suicide.

q = 1 – p.

The z-value is found on the Z-table at 95% confidence interval (1.96).

Therefore:

$$n_o = \frac{1.96^2 \times 0.28 \times 0.72}{0.05^2}$$

$$n_o = 310$$

The study enrollment was to be conducted over a one-year period. However, the projected number of hospitalized patients following an attempted suicide based on MTRH's statistics of the previous year (2018) was 245. This necessitated adjusting the sample size for a finite population (population less than 10,000) using the modified Cochran Formula for sample size determination in a finite population (Bartlett et al., 2001; Cochran, 1977):

$$\boldsymbol{n} = \frac{\boldsymbol{n_o}}{\boldsymbol{1 + \frac{n_o - 1}{N}}}$$

Where:

$\mathbf{n_0}$= sample size derived from equation above,

N = population size (this was 245 based on the number of patients admitted at MTRH after attempting suicide as from January – December 2018)

$$\mathbf{n} = \frac{\mathbf{310}}{\mathbf{1 + \frac{310 - 1}{245}}}$$

$$\boldsymbol{n} = \mathbf{138}$$

Calculating for a **non-response rate** of 10%

$$\mathbf{138/_{0.9}} = \mathbf{154}$$

This study therefore enrolled **154 participants**.

3.5 Sampling procedure

All participants who met the eligibility criteria were consecutively sampled until the desired sample size was achieved. This was informed by the hard-to-reach population nature of the target population.

3.7 Eligibility Criteria

3.7.1Inclusion Criteria

All adult patients (18 years and above) admitted with current history of attempted suicide.

3.7.2 Exclusion Criteria

i. All patients deemed clinically unstable to take part in the study. Clinically unstable patients in this case refer to those patients whose vital signs may be unstable and not within normal limits or those who are not fully conscious.

ii. Lack of capacity to consent to the study as determined by the University of California, San Diego Brief Assessment of Capacity to Consent (UBACC).

3.8 Study Instruments

Study participants were interviewed using researcher's structured interview questionnaire which contained two sections; section A which entailed the sociodemographic factors (age, sex, religion, level of education, marital status and socio economic status) and clinical factors (presence of physical or mental illness) that was examined for their association with attempted suicide. Section B of the questionnaire comprised the use of the Mini International Neuropsychiatric Interview (MINI) version 7.0 to screen for psychiatric illnesses(Sheehan et al., 1998). The number of psychiatric diagnoses generated by the MINI was also examined for its association with attempted suicide. The MINI is a short structured diagnostic interview developed in 1990 jointly by psychiatrists and clinicians in the United States and Europe, for the DSM and ICD psychiatric disorders (Appendix 4). The tool diagnoses the major Axis I psychiatric disorders, and one Axis II disorder (Antisocial

personality disorder)[1]. The MINI has been validated against the Structured Clinical Interview for DSM diagnoses (SCID) and the World Health Organization World Mental Health - Composite International Diagnostic Interview (Sheehan et al., 1998). It has been translated and linguistically validated in over 70 languages and has a minimum of 0.70 specificity and 0.85 sensitivity across disorders. It can be administered in a much shorter period of time (mean 18.7 ± 11.6 minutes, median 15 minutes).The latest version of the tool, the MINI version 7.0 for DSM-5 was employed in this study. The tool has been used in a study in Kenya in a study (Aillon et al., 2014) conducted within a primary health care setting, was adopted in a study conduted at Mosoriot Sub-County Hospital and found to be reliable (Kwobah et al., 2017).

To ensure that they had sufficient capacity and autonomy to consent to the study, the investigator used the University of California, San Diego Brief Assessment of Capacity to Consent (UBACC) (Kim et al., 2009) which has been used as an an iterative learning tool in similar populations in South Africa (Campbell et al., 2017) and in Kenya it has been used recently in a study by (Bahati, 2021) and in an ongoing research study on Neuropsychiatric Genetics of African Psychosis (Stevenson et al., 2019). After reading the information sheet out loud to the subject, the researcher administered the UBACC, a **10-item** questionnaire that evaluates the potential participant's understanding of different components of the study. Each response was scored on a range of **0–2**, with **0** representing no understanding and **2** representing a

[1]The multiaxial assessment system was utilized in prior versions of the DSM for diagnostic purposes and included 5 dimensions. Axis I disorders included the clinical syndromes in psychiatry while personality disorders and intellectual disability were listed under Axis II disorders. The other axes III, IV and V included: medical conditions, psychosocial and environmental stressors, and Global Assessment of Functioning respectively. This system has now been replaced with a non-axial approach in the DSM-5.

clear understanding. In this study, the researcher administered the UBACC over a maximum of four trials. The researcher re-explained and re-administered any items the subject answered incorrectly. The process ended if the full score of 20 was obtained. After the fourth trial, participants who were unable to achieve a score of 14.5, the cut-off originally developed for screening decisional capacity using the UBACC (Kim et al., 2009) were excluded. It has good inter-rater reliability, with intraclass correlation coefficients of 0.84 and 0.98, respectively; and has been used in our setting (Stevenson et al., 2019).

3.9 Study Implementation

Following approvals from the ethics committee and hospital management, the researcher liaised with the admitting clinicians at the emergency department and the primary doctors in the various inpatient departments to be notified of admission of patients with current history of attempted suicide. The researcher also placed her mobile number on strategic notice boards in the wards accessible to the clinicians handling patients in those respective wards for notification purposes. Any patient who met the eligibility criteria was approached once they were medically stable. Data on sociodemographic and clinical characteristics were collected using an interviewer administered semi-structured questionnaire. Furthermore, the MINI tool was used to collect information on psychiatric morbidity. The participants were informed of the study objectives and procedures prior to a written informed consent being administered by a trained research assistant. For those who were not able to write, a fingerprint consent was used and cleaned.

3.10 Data Analysis and Presentation

Subsequent to data collection, the data was entered into a Microsoft Access database which was password protected. Double entry was conducted by two research assistants to ensure completeness of entries. The researcher then cleaned the data for missed or wrong entries, conducted quality control tests by sampling the questionnaires to ensure accuracy and consistency. After data cleaning, the database was exported to STATA version 14 statistical software for data analysis. Categorical data was summarized as frequencies with corresponding percentages and presented using frequency tables and pie chart. Associations between independent variables variables (age, sex, income, employment status, level of education and history of hospitalization) and psychiatric morbidity patterns were assessed using Pearson chi-square test. In cases where the cell counts were below 5, the Fisher's exact test was used. The association was deemed significant at a p-value$\leq$0.05. Odds Ratios were computed at 95% confidence intervals.

3.12 Ethical Considerations

Prior to commencing the study, ethical approval (IREC FAN 0003406) to conduct this study was sought from the Institutional Research and Ethics Committee (IREC) and a research permit obtained from the National Commission for Science, Technology, and Innovation (NACOSTI). Permission to conduct the study at the Moi Teaching and Referral Hospital was obtained from the hospital's Chief Executive Officer (Appendix 6). A written informed consent was obtained from all eligible study participants prior to enrollment. Participant's privacy and confidentiality was ensured by not recording their names but only using study numbers. All patients' hardcopy records were secured in locked cabinets to limit access while digital records were password protected.

CHAPTER FOUR

RESULTS

4.0 Background

This chapter provides the findings on patterns of psychiatric morbidity among patients with attempted suicide admitted at Moi Teaching and Referral Hospital (MTRH) adult inpatient facilities. It also describes the methods of suicide employed by these patients, their reasons for attempting suicide as well as their sociodemographic and clinical characteristics. Finally, the chapter demonstrates the association between sociodemographic and clinical factors and psychiatric morbidity among individuals with a current history of attempted suicide.

4.1 Sociodemographic and Clinical Characteristics of the study participants

This study enrolled 165 adult individuals with a history of an attempted suicide who had been admitted to the adult inpatient facilities of MTRH. From these enrolled participants, 11 had incomplete or missing information and could not be included in the final analysis leading to an accrual of 154 participants.

There were nearly equal proportions of participants aged between 18-24 years (35.7%) and 25-34 years (35.1%); with the third most populous age group being 35 to 44 years (21.4%). More than two-thirds (69.5%) of those enrolled were male while the most professed faith was Christianity at 87.5% (*n*=135). About half (49.4%) of the participants stated that they had never been married, 48 (31.2%) were married, 16 (10.4%) had separated from their spouses, 11 (7.1%) were widowed and 3 (1.9%) had divorced. Majority (54.6%) of all the participants with a history of attempted suicide were unemployed, 43 (27.9%) were self-employed while 27 (17.5%) were formally employed. More than four-fifths (86.4%) earned a monthly income below KSh. 10,000 while 14 (9.1%) earned between KSh. 10,000 and KSh. 20,000 (Table 4.1).

Table 4. 1: Participants' Sociodemographic characteristics

Variable		***n* (%)**
Age (years)	18-24	55 (35.7%)
	25-34	54 (35.1%)
	35-44	33 (21.5%)
	45-54	5 (3.2%)
	55-64	5 (3.2%)
	65-74	2 (1.3%)
Sex	Female	47 (30.5%)
	Male	107 (69.5%)
Religion	Christian	135 (87.5%)
	Hindu	3 (2.9%)
	Islam	10 (5.3%)
	Others	6 (4.3%)
Education	Nursery	7 (4.5%)
	Primary	61 (39.6%)
	Secondary	65 (42.3%)
	Tertiary	21 (13.6%)
Employment	Formally employed	27 (17.5%)
	Self-employed	43 (27.9%)
	Unemployed	84 (54.6%)
Income per month (KSh.)	10000-20000	14 (9.2%)
	20000-30000	5 (3.2%)
	30000-40000	1 (0.6%)
	Above 40000	1 (0.6%)
	Below 10000	133 (86.4%)
Marital status	Divorced	3 (1.9%)
	Married	48 (31.2%)
	Separated	16 (10.4%)
	Single	76 (49.4%)
	Widowed	11 (7.1%)

33 (21.4%) of the participants reported a history of having been hospitalized in their lifetime, while 22 (14.3%) had been admitted 1-3 times in the past three months, 26 (16.9%) had a pre-existing chronic illness, 5 (3.2%) had been previously diagnosed with mental illness and 114 (74.0%) had only attempted suicide once (Table 4.2).

Table 4. 2: Clinical characteristics of the participants

Variable		***n*(%)**
Ever Hospitalized	No	121(78.6%)
	Yes	33 (21.4%)
Have a chronic illness	No	128 (83.1%)
	Yes	26 (16.9%)
Ever diagnosed mental illness	No	149 (96.8%)
	Yes	5 (3.2%)
Times admitted (past 3 months)	1-3	22 (14.3%)
	≥4	4 (2.6%)
	Never	128 (83.1%)
Times attempted suicide in the past	1	114 (74.1%)
	2	31 (20.1%)
	3	8 (5.2%)
	≥4	1 (0.6%)

4.2 Pattern of psychiatric morbidity among patients with attempted suicide admitted at MTRH

This study aimed to determine the patterns of psychiatric morbidity among patients with a history of attempted suicide admitted at MTRH. There were 136 (88%) participants who met the criteria for at least one psychiatric morbidity, of these, majority, 84 (62%) had only one morbidity while 45 (33%) had two comorbidities with the remaining 7 (4.9%) having three comorbidities. The leading psychiatric morbidity was major depressive disorder (MDD) among 59(38%) of the participants, followed by bipolar disorder at 27 (18%) and alcohol use disorder (AUD) in 25 (16%). There were lower proportions of psychotic disorders in 9(6%), anxiety disorders among 8 (5%) and substance use disorder (SUD) in 8 (5%) participants (Figure 4.1).

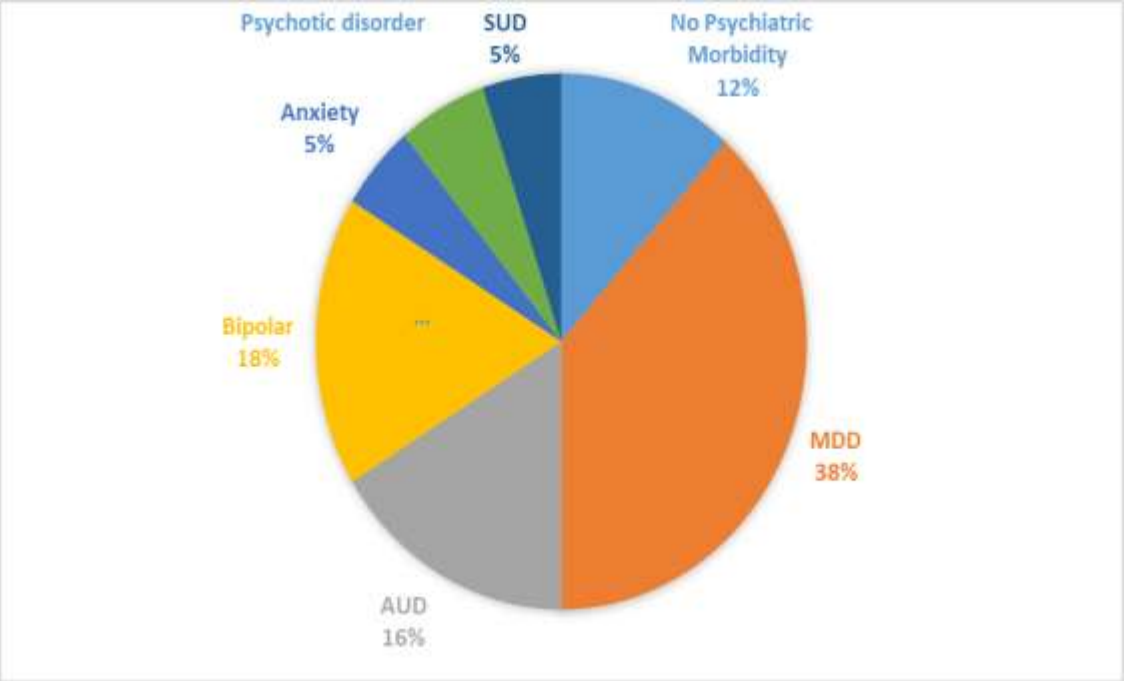

Figure 4.1: Distribution of Psychiatric morbidity

Legend: *MDD - major depressive disorder; AUD – Alcohol Use Disorder, SUD – substance use disorder.*

41 (30.1%) of those diagnosed with psychiatric morbidities had comorbid conditions. The most common comorbidity was major depressive disorder with anxiety - 12 (29.3%) participants, followed by MDD with AUD - 7 (17.1%) and AUD with bipolar disorder in 6 (14.6%) (Table 4.3).

Table 4. 3: Distribution of Psychiatric comorbidities.

Diagnosis	Comorbidity	*n*	%
MDD	Psychotic	2	4.9
	Anxiety	12	29.3
	AUD	7	17.1
	SUD	1	2.4
AUD	Bipolar	6	14.6
	PTSD	2	4.9
	SUD	3	7.3
Anxiety	Psychotic	1	2.4
	Bipolar	1	2.4
Psychotic Disorder	Anxiety	1	2.4
	SUD	3	7.3
SUD	Bipolar	1	2.4
	Anxiety	1	2.4

4.3 Method of attempted Suicide employed

The most frequently reported method adopted by participants who attempted suicide was pesticide ingestion mainly of organophosphate origin among 110 (71.4%) of them. This was followed by prescription drug-use overdose in 14 (9.1%), rodenticides (rat and rat) among 10 (6.5%), strangulation (hanging) in 10 (6.5%), drowning among 7 (4.5%) and self-stabbing in 2(1.3) as shown on Table 4.4.

Table 4. 4: Methods of Attempted suicide reported at MTRH

Method of attempted suicide	Frequency and Proportion by sex n (%)		*n* (%)
	Female	Male	Total
Pesticides (Organophosphates)	30 (63.8%)	80 (74.8%)	110 (71.4%)
Prescription drug overdose	7 (14.9%)	7 (6.5%)	14 (9.1%)
Hanging (Strangulation)	3 (6.4%)	7 (6.5%)	10 (6.5%)
Rodenticides (Rat and rat)	6 (12.8%)	4 (3.7%)	10 (6.5%)
Drowning	1 (2.1%)	6 (5.6%)	7 (4.5%)
Self-stabbing	0	2 (1.9%)	2 (1.3%)
Slitting throat with broken glass	0	1 (0.9%)	1 (0.6%)

The most common reasons for attempting suicide were family rejection 42(27.3%) followed by end of a relationship 37(24.0%), other reasons consisted of family conflict 25 (16.2%), traumatic experience 14 (9.1%), bereavement 12 (7.8%), financial problems 12 (7.8%), chronic pain and terminal illness 11 (7.1%), job loss 10 (6.5%), voices in the head 2 (1.3%), academic failure 3 (1.9%), anger 2 (1.3%) and compulsion to take poison 1 (0.6%) as shown in Table 4.5.

Table 4. 5: Reasons for attempting Suicide

Reason	***n* (%)**
Family rejection	42 (27.3%)
End of relationship	37 (24.0%)
Family conflict	25 (16.2%)
Traumatic experience	14 (9.1%)
Bereavement	12 (7.8%)
Financial problems	12 (7.8%)
Chronic pain and terminal illness	11 (7.1%)
Job loss	10 (6.5%)
Academic failure	3 (1.9%)
Anger	2 (1.3%)
Voices in my head	2 (1.3%)
Compulsion to take poison	1 (0.6%)

4.4 Factors associated with having a psychiatric morbidity in patients with attempted suicide at MTRH

This study noted that being female (p<0.001) and having attained at least secondary level of education (p=0.005) were significantly associated with major depressive disorder (MDD) as shown on Table 4.6.

Variable		MDD (n=60)		p-value	AOR (95% CI)
		No (n/%)	Yes (n/%)		
Age (years)	18-24	37 (67.3)	19 (32.7)	0.552	-
	25-34	33 (62.3)	20 (37.7)		
	35-44	18 (54.5)	15 (45.5)		
	>=45	6 (50.0)	6 (50.0)		
Sex	Female	19 (40.4)	28 (59.6)	**0.001**	1.992 (1.371,.2.894)
	Male	75 (70.1)	32 (29.9)		
Religion	Christian	71 (63.4)	41 (36.6)	0.376[1]	-
	Other	23 (54.8)	19 (45.2)		
Level of Education	≥ Secondary	44 (51.2)	42 (48.8)	**0.005**	1.845 (1.175, 2.897)
	<Secondary	50 (73.5)	18 (26.5)		
Employment status	Employed	17 (63.0)	10 (37.0)	0.663[1]	-
	Self employed	28 (65.1)	15 (34.9)		
	Student	16 (66.7)	8 (33.3)		
	Unemployed	33 (55.0)	27 (45.0)		
Monthly income (KSh)	≥10000	11 (52.4)	10 (47.6)	0.381[1]	-
	<10000	83 (62.4)	50 (37.6)		
Marital status	Divorced/ Widowed	15 (50.0)	15 (50.0)	0.239[1]	-
	Married	28 (58.3)	20 (41.7)		
	Single	51 (67.1)	25 (32.9)		
Ever Hospitalized	No	76 (62.8)	45 (37.2)	0.388	-
	Yes	18 (54.5)	15 (45.5)		
Frequency of Hospitalization	Never	83 (64.8)	45 (35.2)	0.155 0.300	1.0
	1-3	10 (45.5)	12 (54.5)		1.500 (0.963, 2.337)
	4-6	1 (25.0)	3 (75.0)		1.974 (1.081, 3.602)
Chronic Illness	Yes	12 (46.2)	14 (53.8)	0.122	1.498 (0.980, 2.291)
	No	82 (64.1)	46 (35.9)		

Table 4. 6: Factors associated with Major Depressive Disorder (MDD)

Alcohol use disorder (AUD) was significantly associated with the age (p=0.002) of participants with a history of attempted suicide that required hospitalization, being male (p=0.003), employment status (p=0.015) and monthly income (p=0.003) as shown on Table 4.7.

Variable		Bipolar (n=30)			
		No (n/%)	**Yes(n/%)**	**p-value**	**AOR (95% CI)**
Age (years)	18-24	10 (18.2)	45 (81.8)	0.904	-
	25-34	13 (24.1)	41 (75.9)		
	35-44	6 (18.2)	27 (81.8)		
	>=45	1 (9.1)	11(90.9)		
Sex	Female	7 (14.9)	40 (85.1)	0.385	1.0
	Male	23 (21.5)	84 (78.5)		0.693 (0.320, 1.502)
Education	<Secondary	10 (14.7)	58 (85.3)	0.221	1.0
	≥ Secondary	20 (23.3)	66 (76.7)		1.581 (0.794,3.150)
Employment	Employed	6 (22.2)	21 (77.8)	0.527	-
	Self employed	9 (20.9)	34 (79.1)		
	Student	2 (8.3)	22 (91.7)		
	Unemployed	13 (21.7)	47 (78.3)		
Monthly income (KSh)	≥10000	24 (18.0)	109 (82.0)	0.372	1.0
	<10000	6 (28.6)	15 (71.4)		0.632 (0.293, 1.360)
Marital status	Divorced/ Widowed	4 (13.3)	26 (86.7)	0.776	
	Married	12 (25.0)	36 (75.0)		
	Single	14 (18.4)	62 (81.6)		-
Ever Hospitalized	No	22 (18.2)	99 (81.8)	0.461	1.0
	Yes	8 (24.2)	25 (75.2)		1.333 (0.654, 2.717)
Frequency of Hospitalization	1 to 3	5 (22.7)	17 (77.3)	0.771	1.200 (0.514,2.801)
	4 to 6	0 (0.0)	4 (100.0)		-

Table 4. 7: Factors associated with Alcohol Use Disorder (AUD)

Male participants were less likely (OR= 0.692; 95% CI: 0.320, 1.502) to have bipolar disorder compared to their female compatriots, however, this relationship was not statistically significant (p=0.385) as shown on Table 4.8.

Table 4. 8: Factors associated with bipolar disorder

Attaining a lower level of education (less than secondary) significantly (p=0.005)

Variable		AUD (n=50)			AOR (95% CI)
		No (n/%)	**Yes (n/%)**	**p-value**	
Age (years)	18-24	44 (80.0)	11 (20.0)	**0.002**	
	25-34	31 (57.4)	23 (42.6)		
	35-44	23 (69.7)	10 (30.3)		
	>=45	6 (50.0)	6 (50.0)		
Sex	Female	40 (85.1)	7 (14.9)	**0.003**	1
	Male	64 (59.8)	43 (40.2)		1.398 (1.157, 1.688)
Education	<Secondary	41 (60.3)	27 (39.7)	0.119	1.370 (0.966, 1.943)
	≥ Secondary	63 (73.3)	23 (26.7)		1
Employment	Employed	15 (55.6)	12 (44.4)	**0.015**	-
	Self employed	26 (60.5)	17 (39.5)		
	Student	22 (91.7)	2 (8.3)		
	Unemployed	41 (68.3)	19 (31.7)		
Monthly income (KSh)	≥10000	8 (38.1)	13 (61.9)	**0.003**	1.0
	<10000	96 (72.2)	34 (27.8)		0.449 (0.291, 0.693)
Marital status	Divorced/ Widowed	18 (60.0)	12 (40.0)	0.071[1]	-
	Married	28 (58.3)	20 (41.7)		-
	Single	58 (76.3)	18 (23.7)		-
Ever Hospitalized	No	80 (66.1)	41 (33.9)	0.474	1.0
	Yes	24 (72.7)	9 (27.3)		0.780 (0.392, 1.552)
Frequency of Hospitalization	1 to 3	8 (36.4)	14 (63.6)	0.806	1.189 (0.534, 2.647)
	4 to 6	1 (25.0)	3 (75.0)	0.747	0.693 (0.074, 6.499)

increased the likelihood (OR= 1.772 (1.267, 2.479) of presenting with a psychotic disorder among adult individuals who were hospitalized following a suicide attempt (Table 4.9).

Table 4.9: Factors associated with Psychotic disorder

Variable		Psychotic disorder (n=26)			
		Yes (n/%)	No (n/%)	p-value	AOR (95% CI)
Age (years)	18-24	8 (14.5)	47 (85.5)	0.65	-
	25-34	11 (20.4)	43 (79.6)		
	35-44	6 (18.2)	27 (81.8)		
	>=45	1 (9.09)	11 (90.1)		
Sex	Female	5 (10.6)	42 (89.4)	0.243	1.0
	Male	21 (19.6)	86 (80.4)		1.202 (0.962, 1.503)
Education	<Secondary	18 (26.5)	50 (73.5)	0.005	1.772 (1.267, 2.479)
	≥ Secondary	8 (9.3)	78 (90.7)		1.0
Employment	Employed	6 (22.2)	21 (77.8)	0.454	
	Self employed	10 (23.3)	33 (76.7)		
	Student	2 (8.3)	22 (91.7)		
	Unemployed	8 (13.3)	52 (86.7)		
Monthly income (KSh)	≥10000	2 (9.5)	19 (90.5)	0.594	1.0
	<10000	24 (18.0)	109 (82.0)		1.895 (0.483, 7.435)
Marital status	Divorced/ Widowed	3 (10.0)	27 (90.0)	0.757	-
	Married	11 (22.9)	37 (77.1)		
	Single	12 (15.8)	64 (84.2)		
Ever Hospitalized	No	19 (15.7)	102 (84.3)	0.455	1.0
	Yes	7 (21.2)	26 (78.8)		1.325 (0.645, 2.724)
Frequency of Hospitalization	1 to 3	2 (9.1)	20 (90.9)	0.373	0.492 (0.122, 1.979)
	4 to 6	0 (0.0)	4 (100)		-

CHAPTER FIVE

5.0 DISCUSSION

5.1 Socio-demographic and clinical characteristics of participants

In this study, the main sociodemographic characteristics of interest were age group, sex, religious inclination, level of education attained, employment status, monthly income, and marital status. There were nearly equal proportions of participants aged 18 to 24 years and those aged 25 to 34 years at 35.7% and 35.1% respectively. This was followed by those aged 35 to 44 years at 21.4%; with very low proportions of participants aged at least 45 years old. A higher proportionate representation of younger individuals attempting suicide was also reported across studies conducted in South London (Cliffe et al., 2020), and two studies conducted in India (Kodali, 2013; Tsirigotis et al., 2011). In the first study conducted in Krishna District-South India (Kodali, 2013), 25% of those enrolled were aged 18 to 24 years. Similarly, the mean age of participants was 25.9 (±11.1) years and 19.37 (±5.40) years in a second study conducted in Poland (Tsirigotis et al., 2011a). However, in a case-control study conducted in Ontario Canada (Bhatt et al., 2018), the mean age of individuals was 45.18 (±14.69) years which is higher than that reported in these studies and many other studies under comparison. In a retrospective study conducted at the Nipon Medical Center in Japan, the mean age of the of the individuals who attempted suicide was 41.1 (±16.3) years. It has been reported that there is a higher average age of suicide attempts in countries with developed economies compared to the younger age of individuals in countries with developing economies.

This study reports that less than one third (30.5%) of the participants enrolled were female compared to 69.5% who were male. This finding is in agreement to that reported in India where 38% of the patients who attempted suicide and required

hospitalization were female and 62% were male (Kodali, 2013). From empirical evidence, this current study's enrolled hospitalized patients who had developed complications on their way to completing suicide. In addition, a British study conducted in South London where 91.8% (Cliffe et al., 2020) of the participants enrolled were female, focused on suicide attempts that required hospitalization, however, the authors opted to adopt a retrospective study design among patients with eating disorders. It has been previously noted that eating disorders are more prevalent among female patients compared to males (Arcelus, 2011; Bachmann, 2018; Cliffe et al., 2020; Harris & Barraclough, 2008). Other studies that reported a higher proportion of female participants were those conducted in Poland at 77.6% (Tsirigotis et al., 2011), Canada at 55.48% (Bhatt et al., 2018), South Korea at 65.8% (Kim et al., 2020), Sweden at 67% (Wiktorsson et al., 2022) and a retrospective study conducted in New York – United States of America at 67.1% (Olfson et al., 2021). In a study carried out at the George Hospital Emergency Centre in Stellenbosch – South Africa, nearly three-quarters (72%) of the participants were female; while in Japan, there were nearly equal proportions of female (54%) and male (46%) participants (Raubenheimer & Jenkins, 2015).

Less than half (42.2%) of the participants had attained secondary-level of education followed by 39.6% with a primary school-level of education. Only 13.6% reported to have attained tertiary level of education. This study was conducted in Eldoret town which is a peri-urban setting and there is a great likelihood of the participants having both extreme level of education attainment. Similarly, in Poland (Tsirigotis et al., 2011a), 59.18% had attained primary level of education while 34.69% had attained secondary level of education. In Canada, the authors (Bhatt et al., 2018) noted that 54.17% had a secondary level of education while 40.28% had attained post-secondary

level of education. This higher level of education attainment reported in Canada is in line with their advanced economic status where access to education is more available compared to countries with developing economies such as Kenya and India.

This study enrolled 27 (17.5%) participants who were formally employed compared to 61% in both formal and informal employment in India (Kodali, 2013). Nearly equal proportion of formally employed participants was reported in Canada at 23.45% (Bhatt et al., 2018). Similarly in South Africa (28%) and Japan (31%), less than one third of the participants in studies that assessed attempted suicide were formally employed (Raubenheimer & Jenkins, 2015).

However, in South Korea (Kim et al., 2020), 38.4% were formally employed. The difference can be explained by the fact that the authors (Kim et al., 2020) included students in the formally employed category. When the participants' income was assessed, 86.4% earned less than Ksh. 10,000 per month followed by those who earned Ksh. 10,000 to 20,000 monthly at 9.1%. These two income brackets were in the lower socioeconomic bracket while those who earned Ksh. 20,000 to 40,000 were in the medium socioeconomic bracket. Earning more than Ksh. 40,000 monthly was defined as a higher socioeconomic bracket. In India, two studies (Kodali, 2013; Tsirigotis et al., 2011a) described the socioeconomic status of patients who attempted suicide with contrasting findings. In the first study conducted in South India (Kodali, 2013), 62% were in the lower socioeconomic bracket followed by those in the middle tier at 34%. This could be due to the fact that the study (Kodali, 2013) was conducted in the rural regions of South India. However, the second study reported that the least proportion of participants (20.41%) were in the lower socio-economic bracket. This

implies that socioeconomic status is not the only predictor of attempting suicide but that there are multiple factors that may predispose an individual to complete suicide.

In this study, about half (49.4%) were single, 31.2% married, 10.4% separated from their spouses while 7.1% were widowed. This finding is in agreement with a study done to profile suicide in Dar es Salaam, Tanzania whereby majority of those who completed suicide were single 62% (Ndosi et al., 2004). Because of a higher proportion of younger participants, this study noted that nearly half of them were single, a finding that is much higher than that reported in Canada (Bhatt et al., 2018) where 31.03% of the study participants had never been married. The Canadian study (Bhatt et al., 2018) had a much older population than the current study and this could explain the proportionate difference. This finding in the proportion of married participants matches that in South Korea (Kim et al., 2020) where 26.9% reported to be either currently married, in common law partnership or living with a partner. In Sweden (Wiktorsson et al., 2022), 24% of the study participants reported that they were either married or cohabiting. In Canada, the authors (Bhatt et al., 2018) noted that 42.07% were either widowed, separated or divorced; a proportion that is higher than that reported in the current study. The differences noted could be attributed to the variation in the way marital status was categorized in the two studies under comparison. Previous studies (Kposowa, 2002b; Smith et al., 1988) have reported that being married lowers suicide risk compared to higher suicide incidences among those who are single, divorced, separated and widowed who may lack the opportunity to share their adverse life experiences. One of the major explanations given in past studies to account for the observed differentials in the risk of suicide by marital status is that being married provides both a sense of belonging to the society and emotional stability while being divorced, having had a separation, being single

and being a widow or a widower do not (Mayer & Ziaian, 2002). However, in India (Kodali, 2013), being married was not protective against suicide.

This study found that 78.6% of the participants had no history of hospitalization over the past 3 months; however, frequent readmission to hospital due to a physical illness is also thought to have an influence on attempted suicide. In Denmark, the authors (Qin et al., 2013) determined that patients with physical illness were more likely to be hospitalized and subsequently attempt suicide compared to the lower hospitalization rate among those without any form of physical illness.

In this study, 25.9% (n=40) of the study participants had previously attempted suicide; of whom, more than half of these had one previous attempt. This finding is lower than that reported in Stellenbosch - South Africa (Raubenheimer & Jenkins, 2015), where 41% had previously attempted suicide. This difference could be attributed to difference in sample size. In South Africa, the authors (Raubenheimer & Jenkins, 2015) enrolled 39 participants compared to the 154 enrolled in the current study. Lower sample sizes have been attributed to give an impression of a higher proportion even with equivalent frequencies with larger studies. Similar to the current study, about half (44%) of those enrolled in Stellenbosch (Raubenheimer & Jenkins, 2015) had previously attempted suicide once.

5.2 Pattern of Psychiatric morbidity

Among the participants in this study, 12% of them did not have any form of psychiatric morbidity. This finding is in contrast with that reported in a study conducted in both South India at 41% (Kodali, 2013) and Japan at 32% (Narishige et al., 2014). Psychiatric morbidity diagnosis was made at the time of hospitalization with some (3.2%) already having a known psychiatric morbidity.

The most prevalent psychiatric morbidity among those who attempted suicide was major depressive disorder at 38%. The high proportion of major depressive disorder could be attributed to depression associated with increased risk of suicide in the general population. This finding is consistent with that reported in India (Minhas, 2019) where 28% of those hospitalized were diagnosed to have a major depressive disorder and also another study in New York – United States of America (Olfson et al., 2021) where more than half (50.5%) of the study participants were also diagnosed with major depressive disorder. Family history of psychiatric disorders, unemployment, early age at onset and higher number of admissions are some of the risk factors that have been linked to suicide attempts in MDD patients (C. Choo et al., 2014; Klonsky & May, 2015; Xin et al., 2018). However, in South London (Cliffe et al., 2020), a lower prevalence of major depressive disorder was reported at 12.5%. The British study (Cliffe et al., 2020) focused more on eating disorders as a predictor of suicide attempt while also determining any other psychiatric comorbidities therefore this could explain the difference. However, the current study did not anchor on any specific psychiatric morbidity.

The second most prevalent psychiatric morbidity was bipolar disorder at 18%. However, higher prevalence of 30.6% have been reported in New York n = 55,323 (Olfson et al., 2021), 31% China n = 27,340 (Dong et al., 2019)and 26% Italy n =1673 (Buoli et al., 2022). The difference could be attributed to different geographical settings and the larger sample sizes used in the contrasting studies compared to the current study.

Alcohol use disorder was reported among 16% of the study participants as the third most prevalent psychiatric morbidity. This prevalence was almost similar to the 12% reported in India (Kodali, 2013). Furthermore, the finding is close to that of a study conducted in Sweden where a lifetime prevalence of AUD was observed in 26% (n= 27) of the elderly persons who sought hospital care in connection with a suicide attempt (Morin et al., 2013). Higher prevalence of 35% was reported in Sweden (Wiktorsson et al., 2022)and 38% reported in New York (Olfson et al., 2021). The difference could be attributed to the fact that the study by Wiktorsson et al., was a multisite cross-sectional cohort study done in 3 different Swedish hospitals hence capturing a diverse population while the Olfson et al., study enrolled retrospectively a larger sample size of 55,323 participants with suicide attempts. There were low proportions of psychotic (6%), anxiety (5%) and substance-use (5%) disorders. This finding is consistent with that reported in India with low proportion of Psychotic (1%), Anxiety (3%) and substance use disorder (2%).

5.3 Method of suicide employed

The most preferred method of attempted suicide among participants enrolled in this study was use of organophosphate pesticide at 71.4%. This finding matches that reported in India (Kodali, 2013) where pesticide use was the most common method of attempted suicide at 57%. In a second study conducted in India, the authors (Mir, 2016) reported that 88% of the suicide attempters used pesticides to commit the act. Organophosphate poisoning has been reported to be a common method of attempting suicide among farming (agrarian) communities such as those in Kenya and India where it is readily available (Ponnudurai, 2011). The lack of restrictions in the procurement of this type of poisons could also explain their frequency of use. Rodenticides just like organophosphate poisoning are preferred modes of attempted suicide due to their availability as common household vermin control products. In this study, 10 (6.5%) of the participants opted for rat-and-rat, a common rodenticide used in Kenya, just like the 17% in India (Kodali, 2013). However, in Japan (Narishige et al., 2014), much lower proportions (4.7%) of poisoning were reported. This could be attributed to the fact that poisonous gas use (7.8%) was differentiated from use of chemical products.

The second most common mode of attempting suicide among 14 (9.1%) of the patients enrolled was overdosing on prescription medications; a proportion that could be attributed the availability and ease to acquire prescription drugs over the counter in community pharmacies. This proportion is much lower than that reported in Poland (Tsirigotis et al., 2011) at 42.3%. It has been previously reported that there is an opioid crisis in many Western countries, and this could explain the very high proportion of opioid use in Poland compared to the current study's findings (Hall & Farrell, 2018; Verhamme & Bohnen, 2019). In Japan (Narishige et al., 2014), more

than half (52%) of the participants attempted to complete suicide by overdosing on prescription drugs; while in South Africa (Raubenheimer & Jenkins, 2015), all the study participants enrolled had adopted this method and in Novara, Italy 42.9% of elderly adults (65 years or more) admitted to a psychiatric hospital embraced this method (Gramaglia et al., 2022).

Many African countries report more traditional methods of suicide attempt such as strangulation (hanging) as was seen in the 10 (6.5%) of this study's participants. However, in Poland (Tsirigotis et al., 2011a), there was a much higher proportion of strangulation at 16.7% compared to the current study. In India, strangulation was the least reported mode of attempted suicide at 3% (Kodali, 2013).

5.4 Reasons for attempting suicide

This study reports that family rejection (27.3%), end of a relationship (24%) and family conflict (16.2%) were the three leading reasons for suicide attempt. The other frequently noted reasons were traumatic experiences (9.1%), bereavement and financial constraints in equal proportions (7.8%).

These findings match those reported in India (Kodali, 2013) where domestic quarrel and relationship issues (23%) were the major reasons for suicide attempt. In Amsterdam - The Netherlands, majority of those who attempted suicide reported loneliness as their major motivation and there was a positive correlation to suicide attempt decline with family acceptance (Dekker et al., 2017).

In the United States of America (Suzuki et al., 2021), the reason for suicide attempts amongst psychiatric inpatients were interpersonal motivations which were associated with lower age and higher problematic alcohol use. There were also intrapersonal motivations for suicide attempt that were related to having previous suicide attempts,

more past year negative life events, and higher depressive symptoms (Suzuki et al., 2021).

5.5 Sociodemographic Variables and clinical factors as Determinants of Suicide attempts

5.5.1 Major Depressive Disorder

This study reports no statistically significant association between the major depressive disorder (MDD) and participant's age. However, this finding contrasts with the findings reported in China (Wei et al., 2017) where older participants were more likely to be diagnosed with major depressive disorder. The finding implies that young individuals who are more likely to have suicidal behavior, tend to attempt suicide without a previous psychiatric diagnosis. On the other hand, older individuals who may have already been diagnosed with a major depressive disorder were more likely to complete suicide because of their mental condition (Wei et al., 2017). The authors (Wei et al., 2017) noted that majority of the individuals who attempted suicide were older and was consistent with previous findings that older individuals with mental illness and depression had a higher intent and risk of completing suicide.

There was a statistically significant association ($p=0.001$) between the participant being female, having MDD and attempting suicide. Female participants with MDD had a nearly two-fold (OR=1.992; 95% CI: 1.371, 2.894) increased likelihood of attempting suicide compared to their male counterparts. This could be explained by biological and psychosocial differences between male and female in responding to psychological distress. However, Wei et al., 2017 in China did not find any statistically significant association and more than three quarters of those who attempted suicide (with MDD) were female. Similarly, a longitudinal study

conducted in Brazil showed that female individuals (83.3%) diagnosed with MDD had a three-fold (OR=2.51; 95% CI: 0.75 to 8.43) increased likelihood of attempting suicide compared to their male counterparts, however the relationship was not statistically significant (Gonçalves et al., 2020). Both the Chinese and the Brazilian studies employed different methodology compared to the present study. All these studies inclusive of the present study demonstrated that suicide attempts among male patients with MDD is lower than that of female patients and this may be explained by men tending to be more impulsive and consequently employing more lethal means for attempting suicide. In a systematic review conducted in Spain, the authors (Miranda-Mendizabal et al., 2019) reported that females aged between 12 and 24 years had a higher lifetime prevalence and 12-month incidence of suicide attempts. On the other hand, as the women get older, they may be more likely to seek psychosocial support with general readiness to talk about their emotional challenges. They often identify friends and professionals as sources of help in the event of a mental disorder.

Attaining more than secondary level of education was significantly (p=0.005) associated with major depressive disorder among the study participants who had attempted suicide. This could be attributed to the fact that university or college period is usually accompanied by pressure to succeed and additional responsibilities which may consequently increase mental distress or depression. This nearly two-fold (1.845; 95% CI: 1.175, 2.897)) increased likelihood of having MDD is congruent with the findings reported in China (Wei et al., 2017) where attaining higher level of education was associated with a major depressive disorder diagnosis. The authors (Wei et al., 2017) noted that higher education level was a predictor of suicide attempt and that the predictors of suicide attempt among patients with MDD in emergency

departments were lower quality of life, higher education level, and suicide ideation. Major depressive disorder generally interferes with the quality of life of the affected individuals, and this could increase the risk of suicide ideation and attempt. In addition, university period is accompanied by additional responsibilities and pressure to succeed, which may increase mental distress, depression or lead to excess alcohol use (Jadoon et al., 2010). The findings in the present study on the level of education contrasts with a cross sectional study conducted in an outpatient facility of Renmin Hospital of Wuhan University, China where patients with major depressive disorder who had lower education level and had been separated from their parents in childhood were found to have a higher risk of suicide-related behaviors (SRB) (Wang et al., 2022). This later study focused on family related factors to suicide in MDD and perhaps this could explain the difference in the education attainment levels.

This study also noted that there was a statistically significant association (p=0.014) between having a past history of suicide attempts and the current suicide attempt.

This study did not find any significant association between the participants' MDD diagnosis and religion, employment status, monthly income, marital status, chronic illness and history of hospitalization. However, those who had been hospitalized four to six times were more likely (OR= 1.974; 95% CI: 1.081, 3.602) to be diagnosed with MDD compared to those who had been hospitalized one to three times (OR=1.500; 95% CI: 0.963, 2.337). Despite the lack of a significant association, these findings compare to the findings reported in China where majority of those diagnosed with MDD were unemployed and more likely to be either divorced, separated or living alone. On frequency and duration of hospitalization, a recent study (Zalsman et al., 2020) conducted in Israel noted that hospitalization as a

form of confinement (as was the case during the COVID-19 pandemic due to prolonged confinement of the general public as well as longer duration of hospitalization for the infected individuals) was a major cause of depression. Furthermore, the financial and family burden of hospitalization is associated with a major depressive disorder.

5.5.2 Bipolar Disorder

This study reports that female participants were less likely (OR= 0.692; 95% CI: 0.320, 1.502) to have bipolar disorder compared to their male compatriots, however, this relationship was not statistically significant (p=0.385). Although this likelihood finding compares to that reported in Japan (Narishige et al., 2014), the authors noted that bipolar disorder proportions were significantly (p=0.016) higher among male compared to female participants who had a history of attempted suicide. This difference could be attributed to different study settings and target populations. Disease prevalence differ spatially across different demographic groups and this could explain the significantly higher proportion of bipolar disorder among males in the study conducted in Japan (Narishige et al., 2014).

Secondly, patients with bipolar disorder enrolled in this study were more likely (OR=1.498; 95% CI: 0.720, 3.120) to have a history of hospitalization compared to those without, however, this relationship was not statistically significant. In a study conducted at the Kings College London, the authors (Cliffe et al., 2020) noted that there was a three-fold (OR=3.34; 95% CI: 2.30,4.86) significantly ($p<0.001$) increased likelihood of hospitalization for patients with bipolar disorder who had attempted suicide. This difference could be attributed to the fact that the British study (Cliffe et al., 2020) retrospectively focused on patients with eating disorders who

required hospitalization following an attempted suicide. The fact that they focused on a specific mental disorder with bipolar disorder being a co-morbidity skewed the proportions of bipolar disorder amongst other comorbidities identified. Furthermore, the use of a retrospective study design compared to the cross-sectional design adopted by this current study's authors could have also influenced the study's findings. Retrospective studies are often fraught with either recall bias among study participants alongside incomplete data where medical records are over-relied upon.

5.5.3 Alcohol Use Disorder

In this study, alcohol use disorder (AUD) was significantly associated with the age (p=0.002) of participants with a history of attempted suicide that required hospitalization, being male (p=0.003), employment status (p=0.015) and monthly income (p=0.003).

Male participants enrolled in this study had an increased likelihood (OR=1.398; 95% CI: 1.157, 1.688) of having AUD; a finding that matches those from a systematic review conducted in Italy where the authors (Miranda-Mendizabal et al., 2019) noted an increased likelihood of AUD among male participants. In the United Kingdom (Cliffe et al., 2020), alcohol use disorder increased the risk of attempted suicide irrespective of the sex of the participant. Furthermore, in a meta-analysis conducted in Iran, the authors (Darvishi et al., 2015) noted that Alcohol Use Disorder was significantly associated with an increased risk of suicidal ideation or thought, suicide attempt and finally completed suicide. This is because of the existence of complicated relationship between alcohol-use and psychiatric disorder. Generally, alcohol consumption has negative effect on mental health and could cause psychiatric disorders and increase the risk of suicide through disinhibition, impulsiveness and

impaired judgement, but it may also be used as a means to ease the distress associated with committing an act of suicide (Darvishi et al., 2015; Dunn & Cook, 1999). The findings contrast with a study conducted in New Jersey which showed that suicide attempts were significantly more likely among females with AUD (Ries et al., 2022). The different developmental economies and cultural differences could probably explain the dissimilarities.

Those earning who earned below 10,000 Kenyan shillings per month were less likely to have alcohol use disorder compared to those who earned more than 10,000 Kenyan shillings per month (AOR = 0.449; 95% CI: 0.291, 0.693; p = 0.003). This is consistent with a Japanese study in which lower income (lowest percentile) was significantly associated with a lower risk of non-problematic heavy drinking (OR, 0.66; 95% CI, 0.43–1.00), but not of problem drinking (OR, 0.80; 95% CI, 0.50–1.30), compared with the highest income percentile (Murakami & Hashimoto, 2019). Another ecological assessment study conducted in New York also found that the neighborhoods with both the highest income and the highest income maldistribution had the highest prevalence of drinking alcohol (69.0%) (Collins, 2016). In contrast, a Swedish co-relative control study found that high income and living in an affluent neighborhood in adulthood acted as protective factors against AUD after having considered childhood socio-economic status (SES) and other shared familial factors (Calling et al., 2019). The difference could be attributed to the different study designed employed in the latter study (co-relative control study design) which focused on those being followed up for AUD for a mean follow-up time ranging between 10 and 15 years while comparing the risk of AUD as a function of income, education and neighborhood SES in the general population and in pairs of first cousins and full siblings within the same sex, who differed in their exposure to the SES measure.

Being either meaningfully employed or unemployed are both risk factors for alcohol use disorder. Those with a steady income courtesy of being formally employed may have an alcohol use disorder due to their ability to afford the purchase of alcoholic products. On the other hand, those without meaningful employment may have AUD as a way of masking their reality of lacking an ability to fend for themselves. All these two variables (employment status and income level) were found to be significantly associated.

5.5.4 Psychotic disorder

From the findings of this study, attaining a lower level of education (less than secondary) significantly (p=0.005) increased the likelihood (OR= 1.772 (1.267, 2.479) of presenting with a psychosis among adult individuals who were hospitalized following a suicide attempt. Lower academic achievement could be an indicator of an early onset of the psychosis and due to stigma attached to mental illnesses, this could have hindered them from progressing with their education. Psychotic experiences may cause psychological distress related to the symptoms or which may alter people's conception of reality can make people with psychosis susceptible to suicidal risks. This finding is comparable to that reported in Spain (Ayesa-Arriola et al., 2021) where 49% and 37% of patients presenting with a first-episode of psychosis had attained low and medium levels of education, respectively. Studies conducted in the past demonstrated that higher education was associated with better clinical, cognitive and functional measures in the first episode of psychosis in patients(Amoretti et al., 2021). A similar association between better cognitive performance in higher education was found in later stages of illness. Furthermore, education framed within the construct of cognitive reserve (CR) could be a protective factor in the

development of psychosis and has as well a beneficial effect on outcomes (Tan et al., 2021).

This study did not report any statistically significant association between psychosis versus the age, sex, religious beliefs, employment status, monthly income, marital status, history of hospitalization and presence of a chronic illness.

From a meta-analysis of longitudinal studies conducted around the globe, the authors (Yates et al., 2019) opined that psychotic experiences are clinical markers for risk of future suicidal behavior and predicted a 3-fold increased odds of suicide attempt. Their findings also suggested that there is a psychosis-associated subtype of suicidal behavior that extends well beyond the previously established association between psychotic disorder and suicidal behavior. Finally, they (Yates et al., 2019) recommended that the assessment of psychotic experiences and not just symptoms of a fully psychotic individual should be part of any mental state examination.

CHAPTER SIX

6.0 CONCLUSIONS, RECOMMENDATIONS, STRENGTHS, AND LIMITATIONS

6.1 Conclusions

The leading psychiatric morbidities were major depressive disorder (MDD) and alcohol use disorder (AUD). Organophosphate poison ingestion and prescription drug overdose were the most employed methods of attempted suicide. Young male adults (below 35 years) with AUD were vulnerable to attempting suicide.

6.2 Recommendations

The study recommends inculcation of routine mental health screening across various demographics for hospitalized patients outside the psychiatric unit. Organophosphate purchase and use should be regulated by government agencies, and sensitization on consequences of prescription drug overdose should be enhanced. Programs targeting at risk groups should be established and implemented. Future studies adopting mixed qualitative and quantitative methods to build on determining other salient suicide motivations and ideations.

6.3 Study Strengths

This study documents the predisposing factors and motivations to suicide and their relationship to psychiatric morbidity. It creates a platform for future studies adopting mixed qualitative and quantitative methods to build on in determining other salient suicide motivations and ideations.

6.4 Study Limitation

Social desirability bias due to the self-reporting nature of the interviewer administered questionnaire could be a major limitation in this study. However, this was mitigated by assuring respondents of confidentiality and data de-identification.

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APPENDICES

APPENDIX 1: CONSENT FORM

Study Title: **Psychiatric morbidity among patients with attempted suicide admitted at Moi Teaching and Referral Hospital, Eldoret, Kenya**

Name of Principal Investigator: Dorcas Kogo

Name of Organization: Moi University and Moi Teaching and Referral Hospital

Name of Sponsor: Self

This Informed Consent Form has two parts:

- ✓ Information Sheet (to share information about the study with you)
- ✓ Certificate of Consent (for signatures if you choose to participate)

You will be given a copy of the signed Informed Consent Form.

Part I: Information Sheet

Introduction:

You are being requested to take part in a research study. This information is provided to tell you about the study. Please read this form carefully. You will be given a chance to ask questions. If you decide to be in the study, you will be given a copy of this consent form for your records.

Taking part in this research study is voluntary. You may choose not to take part in the study. Saying no will not affect your rights as a patient of Moi Teaching and Referral Hospital. You are also free to withdraw from this study at any time. If after data collection you choose to quit, you can request that the information provided by you be destroyed under supervision- and thus not used in the research study. You will be notified if new information becomes available about the risks or benefits of this research. Then you can decide if you want to stay in the study.

Purpose of the study:

The purpose of this study is to determine the burden of mental illness among patients with attempted suicide admitted at Moi Teaching and Referral Hospital.

Type of Research Project/Intervention:

The study will involve questionnaires inorder to answer the study questions.

Commonly asked questions

Why have I been identified to Participate in this study?

You have been chosen to participate in this study so as to establish the reasons as to why you attempted suicide and prevention strategies be placed to avoid recurrence in future.154 other patients with current history of attempted suicide admitted at MTRH and who meet the eligibility criteria for the study are also being invited to participate.

How long will I be involved in the study?

You will be involved in the study only during the interview which is one day.

What will happen to me during the study?

We are asking you to help us learn more about what prompted you and the method you used to attempt suicide. If you accept, you will be asked to answer a number of questions concerning the subject.

What side effects or risks can i expect from being in the study?

We shall not be applying any interventions or giving any medication, therefore we don't anticipate any risks nor side effects from the study.

Are there benefits to taking part in the study?

The possible benefits of this study to the society include screening of undiagnosed mental illnesses and prompt action taken to reduce the burden of the illness.

Reimbursements:

There shall be no reimbursements to those who volunteer to participate in the study

Who do I call if I have questions about the study?

For questions about the study, call Dorcas Kogo on Tel No: 0724066739

For questions about your rights as a research subject: You may contact Institutional Review Ethics Committee (IREC) 053 33471 Ext.3008. (IREC is a group of people that reviews studies for safety and to protect the rights of study subjects).

Will the information i provide be kept private?

All reasonable efforts will be made to keep your protected information (private and confidential. Protected Informationis information that is, or has been, collected or maintained and can be linked back to you. Using or sharing ("disclosure") of such information will follow National privacy guidelines. By signing the consent document for this study, you are giving permission (“authorization”) for the uses and disclosures of your personal information.

As part of the study, Dorcas Kogo may share the results of your [age, residence, level of education ,health status e.t.c]. These may be study or non-study related. The researcher may also share with the groups named below:

- ✓ The Institutional Review and Ethics Committee,
- ✓ MTRH and Moi University

National privacy regulations may not apply to these groups; however, they have their own policies and guidelines to assure that all reasonable efforts will be made to keep your personal information private and confidential.

The study results will be retained in your research record for at least 7 years after the study is completed. At that time, the research information not already in your medical record will be stored in a secure location, only accessible to the researcher. Research information will be kept for a period of 7 years and will then be destroyed permanently.

Part II: Consent of Subject:

I have read (or the investigator has read to me) the description of the research study. The investigator or his representative has explained the study to me and has answered all of the questions I have at this time. I have been told of the potential risks, discomforts and side effects as well as the possible benefits (if any) of the study. I freely volunteer to take part in this study.

_____ _____ _____

Name of Participant Signature of subject/thumb print Date

_____ _____ _____

Printed name of Investigator Signature of Investigator Date

APPENDIX 2: EVALUATION OF CAPACITY TO CONSENT FORM

UNIVERSITY OF CALIFORNIA BRIEF ASSESMENT OF CAPACITY TO CONSENT(UBACC)				
1. What is the purpose of the study that was just described to you?	**Trial 1 circle**	**Trial 2 circle**	**Trial 3 circle**	**Trial 4 circle**
Response ;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**
To determine the burden of mental illness (2)	**2**	**2**	**2**	**2**
2. What makes you want to consider participating in this study?				
Response; 2 key concepts: 1. to know the reason why I attempted suicide. 2.To prevent recurrence in future	**Score**	**Score**	**Score**	**Score**
Neither concept (0)	**0**	**0**	**0**	**0**
One concept (1)	**1**	**1**	**1**	**1**
Two concepts (2)	**2**	**2**	**2**	**2**
3. Do you believe this is primarily research or primarily treatment?				
Response;	**Score**	**Score**	**Score**	**Score**
I don't know; both (0)	**0**	**0**	**0**	**0**
Research (2)	**2**	**2**	**2**	**2**
4. Do you have to be in this study if you do not want to participate?				
Response;	**Score**	**Score**	**Score**	**Score**
Yes: I don't know (0)	**0**	**0**	**0**	**0**
No (2)	**2**	**2**	**2**	**2**
5. If you withdraw from this study, will you still be able to receive regular treatment				
Response;	**Score**	**Score**	**Score**	**Score**
No: I don't know (0)	**0**	**0**	**0**	**0**
Yes (2)	**2**	**2**	**2**	**2**
6. If you participate in this study, what are some of the things that you will be asked to do?				

Response;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**
To answer questions; fill questionnaires (2)	**2**	**2**	**2**	**2**
7. Please describe some of the risks or discomforts that people may experience if they participate in this study.				
Response;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**
No risks or discomfort involved (2)	**2**	**2**	**2**	**2**
8. Please describe some of the possible benefits of this study.				
Response; The benefits to me and the society/others include	**Score**	**Score**	**Score**	**Score**
1). Early screening of mental illness				
2). Early treatment of mental illness	**0**	**0**	**0**	**0**
Neither concept (0)	**1**	**1**	**1**	**1**
One concept (1)	**2**	**2**	**2**	**2**
2 concepts (2)				
9. Is it possible that being in this study will not have any benefit to you?				
Response:	**Score**	**Score**	**Score**	**Score**
No: I don't know	**0**	**0**	**0**	**0**
Yes: I will benefit by being screened for mental illness	**2**	**2**	**2**	**2**
10. If you agree to be in this study, is it possible that the information collected from you may be used in other research studies in the future?				
Response;	**Score**	**Score**	**Score**	**Score**
No; I don't know (0)	**0**	**0**	**0**	**0**
Yes (2)	**2**	**2**	**2**	**2**

APPENDIX 3: QUESTIONNAIRE

SECTION A

Please answer the questions provided below by ticking [√] in the boxes provided below. Some questions may require you to write down brief answers.

Sex

Male ☐

Female ☐

I. What is your age?

a. 18- 24 years old ☐
b. 25- 34 years old ☐
c. 35- 44 years old ☐
d. 45- 54 years old ☐
e. 55- 64 years old ☐
f. 65- 74 years old ☐
g. 75 years old ☐

II. What is your religion?

Christian ☐

☐

Hindu ☐

Islam

No religion affiliation ☐

III. What is your highest level of education?

Nursery School ☐

Primary School ☐

Secondary School ☐

Tertiary Education ☐

IV. What is your current employment status

Employed ☐

Unemployed ☐

Self Employed ☐

Student ☐

Retired ☐

V. What is your monthly income in Kenya shillings?

Below 10,000 ☐

10,000 - 20,000 ☐

20,000 – 30,000 ☐

30,000 – 40,000 ☐

50,000 and above ☐

VI. What is your marital status?

Single ☐

Married ☐

Divorced ☐

Widowed ☐

Separated ☐

VII. Have you visited a doctor/hospital in the last 3 months?

Yes ☐ No ☐

If yes, why?

……..

VIII. Have you ever been diagnosed with any chronic illness?

Yes ☐ No ☐

If yes, which one?

……..

IX. Have you ever been diagnose with any mental illness?

Yes ☐ No ☐

X. How many times have you been admitted in the past 3 months?

Never been admitted ☐

1-3times ☐

4-6 times ☐

7-9 times ☐

More than 10 times ☐

XI. How many times have you ever attempted suicide in the past?

Once ☐

Twice ☐

Thrice ☐

More than 4 times ☐

XII. What were your reasons for attempting suicide today?

Academic failure ☐

Bereavement of a loved one ☐

Chronic pain and terminal illness ☐

End of a relationship ☐

Family rejection ☐

Financial problems ☐

Job loss ☐

Traumatic Experience (physical abuse, sexual abuse, trauma during war) ☐

Others …….

XIII. What method did you use to attempt suicide today?

Pesticide Poisoning ☐

Drug overdose ☐

Rat and rat poisoning ☐

Hanging ☐

Drowning ☐

Others …….

APPENDIX 4: The Mini International Neuropsychiatric Interview (MINI) version 7.0

M.I.N.I.

MINI INTERNATIONAL NEUROPSYCHIATRIC INTERVIEW

English Version 7.0.0

FOR

DSM-5

DISCLAIMER

Our aim is to assist in the assessment and tracking of patients with greater efficiency and accuracy. Before action is taken on any data collected and processed by this program, it should be reviewed and interpreted by a licensed clinician.

This program is not designed or intended to be used in the place of a full medical and psychiatric evaluation by a qualified licensed physician – psychiatrist. It is intended only as a tool to facilitate accurate data collection and processing of symptoms elicited by trained personnel. It is not a diagnostic test.

Patient Name:			*Patient Number:*			
Date of Birth:			*Time Interview Began:*			
Interviewer's Name:			*Time Interview Ended:*			
Date of Interview:			*Total Time:*			

	MODULES	TIME FRAME	MEETS CRITERIA	DSM-5	ICD-10	PRIMARY DIAGNOSIS
A	MAJOR DEPRESSIVE EPISODE	Current (2 weeks)	❒			
		Past	❒			
		Recurrent	❒			
	MAJOR DEPRESSIVE DISORDER	Current (2 weeks)	❒	296.20-296.26 Single	F32.x	❒
		Past	❒	296.20-296.26 Single	F32.x	❒
		Recurrent	❒	296.30-296.36 Recurrent	F33.x	❒
B	SUICIDALITY	Current (Past Month)	❒			❒
		Lifetime attempt	❒	❒ Low ❒ Moderate ❒ High		❒
	SUICIDE BEHAVIOR DISORDER	Current	❒	(In Past Year)		❒
		In early remission	❒	(1 - 2 Years Ago)		❒
C	MANIC EPISODE	Current	❒			
		Past	❒			
	HYPOMANIC EPISODE	Current	❒			
		Past	❒	❒ Not Explored		
	BIPOLAR I DISORDER	Current	❒	296.41-296.56	F31.0--F31.76	❒
		Past	❒	296.41-296.56	F31.0- F31.76	❒
	BIPOLAR II DISORDER	Current	❒	296.89	F31.81	❒
		Past	❒	296.89	F31.81	❒
	BIPOLAR DISORDER UNSPECIFIED	Current	❒	296.40/296.50	F31.9	❒
		Past	❒	296.40/296.50	F31.9	❒
	BIPOLAR I DISORDER WITH PSYCHOTIC FEATURES	Current	❒	296.44/296.54	F31.2/31.5	❒
		Past	❒	296.44/296.54	F31.2/31.5	❒
D	PANIC DISORDER	Current (Past Month)	❒	300.01	F41.0	❒
		Lifetime	❒	300.01	F40.0	❒
E	AGORAPHOBIA	Current	❒	300.22	F40.00	❒
F	SOCIAL ANXIETY DISORDER (Social Phobia)	Current (Past Month)	❒	300.23	F40.10	❒
G	OBSESSIVE-COMPULSIVE DISORDER	Current (Past Month)	❒	300.3	F42	❒
H	POSTTRAUMATIC STRESS DISORDER	Current (Past Month)	❒	309.81	F43.10	❒
I	ALCOHOL USE DISORDER	Past 12 Months	❒	303.9	F10.10-20	❒
J	SUBSTANCE USE DISORDER (Non-alcohol)	Past 12 Months	❒	304.00- 90/305.20- 90	F11.1x-F19.288	❒
K	PSYCHOTIC DISORDERS	Lifetime	❒	297.3/297.9/ 293.81/298.83/298.89	F20.81-F29	❒
		Current	❒	297.3/297.9/ 293.81/298.83/298.89	F20.81-F29	❒
	MOOD DISORDER WITH PSYCHOTIC FEATURES	Lifetime	❒	296.24/296.34-296.44 296.54	F31.2/F32.2/F33.3	❒
		Current	❒	296.24/296.34/296.44/296.54	F31.2/F32.2/F33. 3	❒
L	ANOREXIA NERVOSA	Current (Past 3 Months)	❒	307.1	F50.01-02	❒
M	BULIMIA NERVOSA	Current (Past 3 Months)	❒	307.51	F50.2	❒
MB	BINGE-EATING DISORDER	Current (Past 3 Months)	❒	307.51	F50.8	❒
N	GENERALIZED ANXIETY DISORDER	Current (Past 6 Months)	❒	300.02	F41.1	❒
O	MEDICAL, ORGANIC, DRUG CAUSE RULED OUT		❒ No	❒ Yes ❒ Uncertain		
P	ANTISOCIAL PERSONALITY DISORDER	Lifetime	❒	301.7	F60.2	❒

IDENTIFY THE PRIMARY DIAGNOSIS BY CHECKING THE APPROPRIATE CHECK BOX.
(Which problem troubles you the most or dominates the others or came first in the natural history?)

APPENDIX 5: University of California Brief Assessment of Capacity to Consent (UBACC) questionnaire.

UNIVERSITY OF CALIFORNIA BRIEF ASSESMENT OF CAPACITY TO CONSENT(UBACC)				
1. What is the purpose of the study that was just described to you?	**Trial 1 circle**	**Trial 2 circle**	**Trial 3 circle**	**Trial 4 circle**
Response ;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**
To determine the burden of mental illness (2)	**2**	**2**	**2**	**2**
2. What makes you want to consider participating in this study?				
Response; 2 key concepts: 1. to know the reason why I attempted suicide. 2.To prevent recurrence in future	**Score**	**Score**	**Score**	**Score**
Neither concept (0)	**0**	**0**	**0**	**0**
One concept (1)	**1**	**1**	**1**	**1**
Two concepts (2)	**2**	**2**	**2**	**2**
3. Do you believe this is primarily research or primarily treatment?				
Response;	**Score**	**Score**	**Score**	**Score**
I don't know; both (0)	**0**	**0**	**0**	**0**
Research (2)	**2**	**2**	**2**	**2**
4. Do you have to be in this study if you do not want to participate?				
Response;	**Score**	**Score**	**Score**	**Score**
Yes: I don't know (0)	**0**	**0**	**0**	**0**
No (2)	**2**	**2**	**2**	**2**
5. If you withdraw from this study, will you still be able to receive regular treatment				
Response;	**Score**	**Score**	**Score**	**Score**
No: I don't know (0)	**0**	**0**	**0**	**0**
Yes (2)	**2**	**2**	**2**	**2**
6. If you participate in this study, what are some of the things that you will be asked to do?				
Response;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**

To answer questions; fill questionnaires (2)	**2**	**2**	**2**	**2**
7. Please describe some of the risks or discomforts that people may experience if they participate in this study.				
Response;	**Score**	**Score**	**Score**	**Score**
I don't know (0)	**0**	**0**	**0**	**0**
No risks or discomfort involved (2)	**2**	**2**	**2**	**2**
8. Please describe some of the possible benefits of this study.				
Response; The benefits to me and the society/others include	**Score**	**Score**	**Score**	**Score**
1). Early screening of mental illness				
2). Early treatment of mental illness				
Neither concept (0)	**0**	**0**	**0**	**0**
One concept (1)	**1**	**1**	**1**	**1**
2 concepts (2)	**2**	**2**	**2**	**2**
9. Is it possible that being in this study will not have any benefit to you?				
Response:	**Score**	**Score**	**Score**	**Score**
No: I don't know	**0**	**0**	**0**	**0**
Yes: I will benefit by being screened for mental illness	**2**	**2**	**2**	**2**
10. If you agree to be in this study, is it possible that the information collected from you may be used in other research studies in the future?				
Response;	**Score**	**Score**	**Score**	**Score**
No; I don't know (0)	**0**	**0**	**0**	**0**
Yes (2)	**2**	**2**	**2**	**2**

APPENDIX 6: ETHICAL APPROVALS

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET
Tel: 33471/2/3

Reference: IREC/2019/173
Approval Number: 0003406

29th August, 2019

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
29 AUG 2019
APPROVED
P. O. Box 4606 - 30100 ELDORET

Dr. Dorcas Jepchumba Kogo,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET-KENYA.

Dear Dr. Kogo,

PSYCHIATRIC MORBIDITY AMONG PATIENTS WITH ATTEMPTED SUICIDE ADMITTED AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET, KENYA

This is to inform you that ***MU/MTRH-IREC*** has reviewed and approved your above research proposal. Your application approval number is ***FAN:0003406.*** The approval period is ***29th August, 2019 – 28th August, 2020.***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***MU/MTRH-IREC***.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***MU/MTRH-IREC*** within 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***MU/MTRH-IREC*** within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***MU/MTRH-IREC.***

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://oris.nacosti.go.ke and also obtain other clearances needed.

Sincerely,

DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc CEO - MTRH Dean - SOP Dean - SOM
Principal - CHS Dean - SON Dean - SOD

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET
Tel: 33471/2/3

Reference: IREC/2019/173
Approval Number: 0003406

29th August, 2020

Dr. Dorcas Jepchumba Kogo,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET- KENYA.

INSTITUTIONAL RESEARCH & ETHICS COMMITTEE
29 AUG 2020
APPROVED
P. O. Box 4606-30100 ELDORET

Dear Dr. Kogo,

RE: CONTINUING APPROVAL

The Institutional Research and Ethics Committee has reviewed your request for continuing approval to your study titled:-

"Psychiatric Morbidity among Patients with Attempted Suicide Admitted at Moi Teaching and Referral Hospital, Eldoret, Kenya".

Your proposal has been granted a Continuing Approval with effect from 29th August, 2020. You are therefore permitted to continue with your study.

Note that this approval is for 1 year; it will thus expire on 28th August, 2021. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc:	CEO	-	MTRH
	Principal	-	CHS
	Dean	-	SOM
	Dean	-	SPH
	Dean	-	SOD
	Dean	-	SON

APPENDIX 5: HOSPITAL APPROVAL

IREC/2019/173

An ISO 9001:2015 Certified Hospital

MOI TEACHING AND REFERRAL HOSPITAL

Telephone :(+254)053-2033471/2/3/4
Mobile: 722-201277/0722-209795/0734-600461/0734-683361
Fax: 053-2061749
Email: ceo@mtrh.go.ke/directorsofficemtrh@gmail.com

Nandi Road
P.O. Box 3 – 30100
ELDORET, KENYA

Ref: ELD/MTRH/R&P/10/2/V.2/2010

3rd September, 2019

Dr. Dorcas Jepchumba Kogo,
Moi University,
School of Medicine,
P.O. Box 4606-30100
ELDORET-KENYA.

APPROVAL TO CONDUCT RESEARCH AT MTRH

Upon obtaining approval from the Institutional Research and Ethics Committee (IREC) to conduct your research proposal titled:-

"Psychiatric Morbidity among Patients with Attempted Suicide Admitted at Moi Teaching and Referral Hospital, Eldoret, Kenya".

You are hereby permitted to commence your investigation at Moi Teaching and Referral Hospital.

for **DR. WILSON K. ARUASA, *MBS***
CHIEF EXECUTIVE OFFICER
MOI TEACHING AND REFERRAL HOSPITAL

cc - Senior Director, (CS)
- Director of Nursing Services (DNS)
- HOD, HRISM

APPENDIX 6: NACOSTI APPROVAL

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **845916**

Date of Issue: **01/October/2019**

RESEARCH LICENSE

This is to Certify that Dr,. Dorcas Kogo of Moi University, has been licensed to conduct research in Uasin-Gishu on the topic: Psychiatric Morbidity among patients with attempted suicide admitted at Moi Teaching and Referral Hospital,Eldoret, Kenya for the period ending : 01/October/2020.

License No: **NACOSTI/P/19/1569**

845916

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013

The Grant of Research Licenses is Guided by the Science, Technology and Innovation (Research Licensing) Regulations, 2014

CONDITIONS

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