MODELING RISK FACTORS FOR PSYCHOTIC CONDITIONS AND DEPRESSION AMONG ADULTS IN NAMIBIA

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ABSTRACT

Mental disorder is a growing global health concern. Mental disorder is categorized into anxiety, depression, schizophrenia, alcohol and drug dependency. Depression is ranked by the WHO as one of the largest contributors to global disability and suicide. There are only two affordable mental health services in Namibia, this leads to underdiagnosed and untreated cases of people suffering from depression and psychotic disorders. The overall objective of this study was to identify socio-demographic factors associated with psychotic disorders and depression among adults in Namibia. The specific objectives of this study was to: estimate the prevalence of psychotic disorders and depression among adults in Namibia, construct an index of depression and identify factors influencing psychotic disorders and depression among adults in Namibia. This study adopted a quantitative cross-section study design, based on secondary data from the NDHS 2013. The study used a sample of 14234 participants, 9906 women aged 15 – 49 and 4328 men aged 15 – 64. Binary logistic regression was used to establish factors contributing to psychotic disorders. Factor analysis (Principal component analysis) was used to construct an index for depression and grouped the single factor into terciles. Then multinomial logistic regression was used to establish factors influencing depression. The results indicated that psychotic disorder had a prevalence of 13 percents while depression had 30 percents prevalence, in 2013. The psychotic disorder was found to be significantly associated with region, educational level, marital status and sex using binary logistic regression. Multinomial logistic regression results indicated that both mild and severe depression conditions were found to be significantly related to the region, smoking, marital status, sex, and employment status. Moreover, smoking cigarettes and place of residence were significantly associated with mild depression. There is a need for more mental disorder services to be promoted and rolled out to all health facilities in Namibia. It is also emphasized that there should be mental health education campaigns in primary schools and communities in the country. Marital relationships (marriages) should be promoted in society. Smoking should continue to be discouraged by increasing the price of cigarettes.

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DEDICATION

I am dedicating this thesis to my beloved grandmother Elina Main who has meant and continues to mean so much to me. Although she is no longer of this world, her memories continue to regulate my life.

DECLARATIONS

I, Adolf Haufiku, hereby declare that this study is my own work and is a true reflection of my research and that this work or any part thereof has not been submitted for a degree at any other institution.

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Name of Student	Signature	Date

ABBREVIATIONS

CBT	Cognitive Behavioral Therapy
CI	Confidence Interval
DALYs	Disability Adjusted Life-Years
EA	Enumeration Areas
EFA	Exploratory Factor Analysis
FA	Factor Analysis
GBD	Global Burden of Disease
GLM	General Linear Model
HIV	Human Immunodeficiency Virus
ICD	International Classification of Diseases
ICF	Inner City Fund
IHME	Institute for Health Metrics and Evaluation
KMO	Kaiser Meyer Olkin
MDD	Major Depressive Disorder
MHL	Mental Health Legislation
MNLR	Multinomial Logistic Regression
MoHSS	Ministry of Health and Social Services
NDHS	Namibia Demographic and Health Survey

NIP	National Institute of Pathology
NSFAF	Namibia Students Financial Assistance Fund
NSA	Namibia Statistics Agency
NSSI	Non-Suicidal Self-Injury
OLS	Ordinary Least Square
OPU	Oshakati Psychiatric Unit
OR	Odds Ratio
PC	Principal Components
PCA	Principal Component Analysis
PE	Psychotic Experience
PSQ	Personality Structure Questionnaire
RR	Relative Risk
SADC	Southern African Development Community
SPSS	Statistical Package for the Social Sciences
UNAM	University of Namibia
USAID	United States Agency for International Development
WHO	World Health Organization
WMHCC	Windhoek Mental Health Care Centre

CHAPTER 1: INTRODUCTION

1.1 Background of the study

Mental disorder is a growing global health concern. According to WHO (2015), mental disorder is a combination of abnormal thoughts, emotions, behaviors, and relationships with others. Mental disorder is categorized into anxiety, depression, schizophrenia, alcohol and drug dependency. The less commonly used term, mental illness, refers to depression (feelings of severe despondency and dejection) as well as psychotic disorders (a severe mental disorder that causes abnormal thinking and perceptions) (Gallagher, 2018). Depression is associated with an increase in suicides and significantly contributes to the disability of comorbid physical diseases. Most of these disorders can be successfully treated (Husain et al., 2016).

Depression is ranked by the WHO (2015) as one of the largest contributors to global disability and suicide. The WHO (2015) reported that depression is the leading cause of disability as measured by years lived with disability, and the 4th leading contributor to the global burden of disease. It is worldwide estimated that about 788 000 people died due to suicide with 78 percents of the deaths occurring in low and middle-income countries in 2015. Further, Whiteford et al. (2013) found out that mental health problems have become one of the main causes of the burden of diseases and mortality worldwide from 1990 to 2013. Recent statistics show that the total number of people living with disabilities in Namibia is 18 766 of which 8 percents are due to depressive disorders (WHO, 2017a).

Dhaka and Musese (2017) stated that many countries, particularly in Sub-Sahara Africa, have failed to effectively revise and implement mental health policies. Mental

disorders issues are often considered as the factors that contribute to psychosocial problems in Namibia which lead to a high rate of mortality (WHO, 2015).

1.2 Problem Statement

There is a lack of understanding of mental disorders among the public, human rights are being violated. There are also a considerable stigma and discrimination against people with mental disorders both inside and outside psychiatric institutions (WHO, 2017b). Many people do not enjoy their adulthood because of mental disorders (Dhaka & Musese, 2017).

In sub-Saharan Africa, particularly in countries with low and middle-incomes, there are many people who required treatment, but they do not have access to it, nor seek for help, because it is believed that all people with mental disorders are dangerous and they do not recover (Rathod et al., 2017). The ministry of health and social services in Namibia looked a blind eye in communities on people who may require mental health services. There is insufficient provision of health services to people who may require it, and there are limited tracking strategies of such people from societies. Similar studies on this topic concentrated on descriptive statistics, but no inferential statistical models were fitted to establish risk factors for mental disorders in Namibia. Therefore, this study establishes risk factors that contribute to psychotic disorders and depression in Namibia.

1.3 Objectives of this study

The main objective of this study is to identify socio-demographic factors associated with psychotic disorders and depression among adults in Namibia.

1.3.1 Specific objectives

The specific objectives of this study are to:

1. estimate the prevalence of psychotic disorders and depression among adults in Namibia
2. construct an index of depression
3. identify factors influencing psychotic disorders and depression among adults in Namibia

1.4 Significance of the study

The estimation of the prevalence of psychotic disorders and depression among adults in Namibia and the identification of risk factors would enable targeted interventions for both government psychiatric facilities and other institutes dealing with mental disorders, in order to implement relevant policies toward mental health among the Namibian people.

1.5 Limitations of the study

The NDHS (2013) collected data on mental health-related questions in general, but this study attempts to sprit those into psychotic disorders and depression according to their definitions. Some important questions to measure depression and psychosis disorders could have been omitted because the study was based on a limited number of questions available in the NDHS 2013. Since the data was self-reported, some errors may be inherited as the respondents were reporting on their own experiences. There were no limitations experienced when applying the methods on the study data. As shown in table 4 (in chapter 3), the first depended variable (psychotic disorder) had only two categories (fig 4) a binary logistic regression model was appropriate. Although the second dependent variable (depression) has three ordinal categories

(figure 5) a multinomial logistic regression was fitted. This was due to a notation of the parallel lines assumptions for ordinal logistic regression.

1.6 Delimitation of the study

This study was based on secondary data from the 2013 Namibia Demographic Health Survey (NDHS). The survey also does not collect data on other measures that would be desirable to include in this analysis, such as long-term inpatient stays in hospitals, psychiatric centers, and residential treatment facilities.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of existing literature on psychotic disorders and depression. This chapter links the purpose of the study to various theoretical perspectives and the current nature of variables related to the phenomenon.

This chapter is focusing on psychotic disorders and depression. It also explores the linkages, measurements and how psychotic disorders and depression have been applied in other studies. The chapter comprises pieces of literature that focus on world mental health, Sub-Saharan mental health as well as South Africa and Namibia mental health. This chapter further focuses on the factors associated with psychotic disorders as well as with depression, statistical methods to assess depression and psychotic disorders and treatment of depression and psychotic disorders. In addition, the chapter includes conditions like self-injury, negative thoughts, and behaviors, suicidal ideas, plans and attempts, non- suicidal, untreated mental disorders as well as the prevalence of mental disorders.

2.2 Review on depression and psychotic disorder

Depression is a largely unrecognized problem among adolescents. Depression is associated with increased levels of psychosocial dysfunction and intervention at middle school achievements (Torikka, 2017). Psychotic Experiences (PEs) are conditions, including hallucination and delusion-like experiences resembling the warning signs of psychotic disorders, but with less intensity, associated distress, persistence and treatment need (Bromet et al., 2017). It was recently found in a systematic review that psychotic experiences are transitory in about 80 percents of

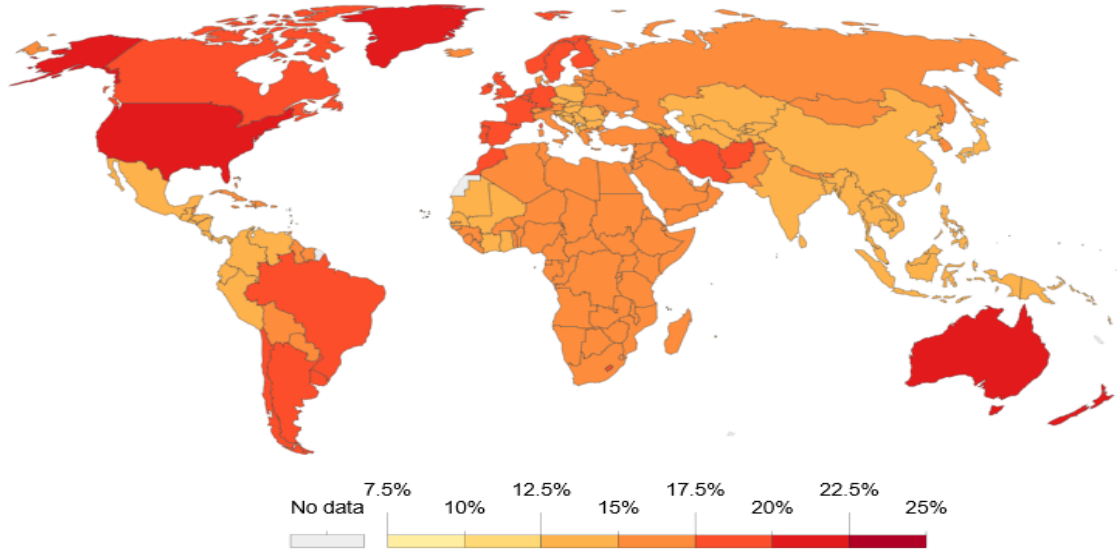
individuals; while around 20 percents go on to develop persistent psychotic experiences and 7 percents for psychotic disorders (van Os & Reininghaus, 2016).

According to Kendall, Hollis, Stafford, and Taylor (2013) psychosis include schizophrenia and other major groups of psychotic disorders characterized by hallucinations or delusions (psychotic symptoms) that change people's behavior perceptions, thoughts and perceptions. This can weaken a child's or young person's development, relationships, and physical health. Children and young people with transient psychotic symptoms are at high risk of developing long term psychosis disorders or schizophrenia if access to treatment delayed (Kendall et al., 2013).

2.3 World mental health

Hannah & Max (2019), estimated that more than 1.1 billion people worldwide had a mental disorder in 2016. Figure 1 shows the distribution of population with any mental disorders or substance use disorders, this includes depression, anxiety, bipolar, eating disorders, alcohol or drug use disorder, and schizophrenia. Due to the widespread under-diagnosis, these estimates use a combination of sources, including medical and national records, epidemiological data, survey data, and meta-regression models.

Figure 1: Distribution of population with mental health and substance use disorders, 2016



Source: IHME Global Burden of Disease (2016)

The determinants and severity of mental disorders are complex, they can barely associate with a single factor. To identify potential risk factors in mental health researches, potential prevention and in some cases, appropriate treatment, nonetheless, many risk factors remain only correlates of observed patterns in mental health (Hannah & Max 2019).

The WHO (2015) synthesizes the potential contributors to mental health and wellbeing into three categories: Individual attributes and behaviors: these can be particularly genetic factors or personality traits, social and economic circumstances, and environmental factors.

Table 1: World mental health and wellbeing

Level	Adverse Factors	Protective Factors
Individual attributes	Low self-esteem	Self-esteem, confidence
	Cognitive/emotional immaturity	Ability to solve problems & manage stress or adversity
	Difficulties in communicating	Communication skills
	Medical illness, substance use	Physical health, fitness
Social circumstances	Loneliness, bereavement	Social support of family & friends
	Neglect, family conflict	Good parenting/family interaction
	Exposure to violence/abuse	Physical security & safety
	Low income & poverty	Economic security
	Difficulties or failure at school	Scholastic achievement
	Work stress, unemployment	Satisfaction & success at work
Environmental factors	Poor access to basic services	Equality of access to basic services
	Injustice & discrimination	Social justice, tolerance, integration
	Social & gender inequalities	Social & gender equality
	Exposure to war or disaster	Physical security & safety

2.4 Africa or Sab-Sahara Africa mental health

All countries have sanctioned that the right to health is a critical issue; many countries, particularly in Sub-Saharan Africa have failed to effectively revise and implement mental health policies (Dhaka & Musese, 2017). There is still a significantly under-reported proportion of mental health and substance use disorders. This is true across all countries, particularly in lower and middle-income countries where data are scarcer, and there are less attention and treatment for mental disorders (Hannah & Max 2019).

According to James and Mwiti (2013), within Southern Africa, many indigenous healers work 'from health versus psychopathology mindset' which also suggests an emphasis on preventive care. Moreover, emphasizing health versus psychopathology in understanding mental illness implies the value of a holistic mindset (such as ill physicality affects one's mind).

The integrated of mental disorder care in the Southern African Development Community (SADC) countries and policy analysis approach was implemented (Rensburg & Fourie, 2016). A key part of policy analysis is to consider the evidence and arguments over health system operations and policy change within them. National policy documents of five countries were scrutinized: Namibia, Botswana, Malawi, South Africa, and Zambia. Apart from Zimbabwe, these are the only countries in the SADC region, with established national mental health policies. Attempts to gain access to Zimbabwe policy documents were unsuccessful as shown in table 2 (Ghaffar, Gilson, Tomson, Viergever, & Røttingen, 2016). Three policy documents were analyzed from each country, namely, the national health policy, the national health strategy, and the national mental health policy.

Table 2: Policy documents included in the study

Country	Document
Botswana	*National Health Policy: towards a healthier Botswana (2011)* *Integrated Health services plan: a strategy for changing the health sector for healthy Botswana 2010-2020 (2010)* *National policy on mental health (2003)*
Malawi	*To the year 2020: a vision for the health sector in Malawi (1999)* *Malawi health sector strategic plan 2011-2016 (2010)* *National mental health policy (2001)*
Namibia	*National health policy framework 2010-2020 (2010)* *Ministry of health and social services strategic plan 2009-2013 (2009)* *National policy for mental health (2005)*
South Africa	*White paper for the transformation of the health system in South Africa (1997)* *department of health strategic plan 2014/15-2018/19 (2014)* *National mental health policy framework and strategic plan 2013-2020 (2012)*
Zambia	*National health policy (2011)* *National health strategic plan 2011-2015 (2011)* *Mental health policy (2004)*

2.5 Namibia and South Africa mental health

Understanding psychological distress in Namibia requires grasping the meanings associated with abnormal thoughts and behaviors. However, what constitutes mental illness in some cultures is not necessarily abnormal in another part of the world (Bojuwoye & Sodi, 2010).

The perceptions of mental illness and the means by which these experiences are treated have unique features in Namibia despite the growing nature of this literature (Bartholomew, 2016). Namibia is still depending on the Mental Health Legislation (MHL) that is currently being utilized in the South African Mental Health Act no. 18 of 1973 (Dhaka & Musese, 2017). Evidence from other Southern African countries suggests that the value of taking a culturally sensitive and specific orientation to conceptualize mental illness and treatment may be useful in Namibia. Psychology, as the field continues to internationalize and gain greater attention in places like Namibia, can do better to focus on the cultural content and phenomenological meanings of symptoms, rather than the apparent, surface-level appearance (Bartholomew, 2016).

2.6 Mental health treatment in Namibia

In Namibia, mental health services are offered by both the private sector and the public hospitals. The affordable mental health services in Namibia are only available at the two psychiatrics at the Windhoek Mental Health Care Centre (WMHCC) and the Oshakati Psychiatric Unit (OPU) (Ashipla, 2013). Mental health has been neglected in Namibia for many years, According to a research on mental health policy implementation in Namibia, mental health still receives low priority because of the limited resources which are often directed to communicable and life-threatening

diseases (Ashipla, 2013). This contributes to lack of services, poor treatment and rehabilitation outcomes of individuals diagnosed with common mental disorders.

Suicide is the third most common cause of death in adolescence and young adults (Kaxuxuena, Bakare, & Janik, 2017). Generally, women attempt more suicide than men however men tend to be successful in committing this act. Kaxuxuena et al. (2017) stated that a suicide attempt is one of the major public health concerns in Namibia. People with suicidal ideation undergo a variety of emotional and physical tensions such as self-blame, feelings of worthlessness and hopelessness, emotional fatigue and often self-esteem. In most cases many people who commit suicide suffer from mental illnesses or have mental disorders and thus need psychological interventions. It is reported that depressive disorders are the leading many to suicide attempts that can be treated, and alcoholism can be overcome (LeardMann et al., 2013; Weitz, Hollon, Kerkhof, & Cuijpers, 2014). This goes to show that difficult life moments that seem unbearable can be surpassed with better solutions, given some times; and that negative emotions people experience when depressed such as feelings of hopelessness and worthlessness amongst others can be overcome with proper psychiatric or psychological help which results in suicide prevention (Kaxuxuena et al., 2017).

2.7 Depression

Depressive disorders occur with varying severity. The WHO's International Classification of Diseases (ICD-10) classified the set of disorders into three categories, namely: mild, moderate, and severe depression. The IHME adopts the WHO definition with minor changes (i.e; mild, persistent depression (dysthymia) and major (severe) depressive disorder) (Degenhardt et al., 2013).

Individuals with the depressive disorders show some of the following symptoms: reduced concentration and attention, reduced self-esteem and self-confidence, ideas of feeling guilt and unworthiness (even in a mild type of episode), bleak and pessimistic views of the future, ideas or acts of self-harm or suicide, disturbed sleep and diminished appetite.

Mild and persistent depression (dysthymia) tend to have the following diagnostic guidelines (Hannah & Max 2019): depressed mood, loss of interest and enjoyment, and increased fatigue. These symptoms are usually regarded as the most typical symptoms of depression. A combination of at least two of these, plus at least two of the symptoms described above can be used as a definite diagnosis. None of the symptoms should be present to an intense degree. An individual with a mild depressive episode is usually distressed and has some difficulty in continuing with ordinary work and social activities, but will probably not cease to function completely (Walker, 2012).

The severe depressive disorder tends to have the following diagnostic guidelines: in a severe depressive episode, the sufferer usually shows considerable distress or agitation, unless retardation is a marked feature. Loss of self-esteem or feelings of uselessness or guilt is likely to be prominent, and suicide is a distinct danger in particularly severe cases. It is presumed here that the somatic syndrome will almost always be present in a severe depressive episode. During a severe depressive episode, it is improbable that the sufferer will be able to continue with social, work, or domestic activities, except to a very limited extent (American Psychiatric Association, 2013).

According to WHO (2018), depression is characterized by sadness, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, tiredness, and

poor concentration. People with depression may also have several physical complaints with no specious physical cause. Depression can be long-lasting or recurrent, substantially prejudicing people's ability to function at work or school and to cope with daily life. At its most severe, depression can lead to suicide and is the main cause of death for about 850,000 every year, and by 2020, depression will be the second leading cause of disability (Shidhaye & Giri, 2014).

Prevention programs have been shown to reduce depression for children (e.g. protection and psychological support against physical and sexual abuse) and adults (e.g. through psychosocial assistance after disasters and conflicts) (WHO, 2018).

There are also effective treatments. For example, mild to moderate depression can be successfully treated with talking therapies, such as cognitive behavior therapy or psychotherapy. Also, antidepressants may be an effective form of treatment for moderate to severe depression but they are not the first line of treatment for cases of mild depression. This should not be used for treating depression in children nor in adolescents, among whom they should be used with caution (WHO, 2018).

According to WHO (2018), the management of depression should consider including psychosocial aspects and identifying stress factors, such as financial problems, difficulties at work or physical or mental abuse, and lack of support from family members or friends. The maintenance or reactivation of social networks and social activities is important.

2.8 Depression Combined with Other Issues and Challenges

There are numerous other issues and challenges that adults may have in addition to depression which can also affect people mentally. These additional issues make things

more complicated; however, it is common that depression generally presents with more than one issue (Weitz et al., 2014). Depression can go hand in hand with emotional and suicidal individuals, substance use issues, and financial barriers (Weitz et al., 2014). Regarding substance use, Weitz et al. (2014) indicated that youth use substances to cope with their depression as discussed earlier, having substance use concerns such as alcohol and drug use would require a focus on safety planning and the involvement of more complex programs like alcohol anonymous rather than psychological therapies. Also, Garvik, Idsoe, and Bru (2016) added that in order to effectively minimize depression among youth; one should also explore other aspects of depressed youth such as social functioning and academics, rather than just exploring effects on depressive symptoms. In addition, youth may face issues like sexual minorities including gay, lesbian, or bisexual. The same individuals may also be facing many other challenges including discrimination, stigma towards their group, family disapproval, social rejection, and violence (Harper et al., 2013).

2.9 Self-injuries, thoughts and behaviors

Thoughts and behaviors of harming oneself are not common in childhood but increase during adulthood years. They can cause serious complications in a young person's social, family and school life. According to Bosquet, Englund, and Egeland (2018), self-injurious thoughts refer to thinking about hurting oneself. Self-injurious behaviors or actions are harmful to oneself. The authors added that both can be suicidal or non-suicidal. Suicidal self-injurious thoughts are thoughts about killing oneself and can include making suicide plans. Suicidal self-injurious behaviors (suicide attempts) are behaviors that are unsafe to oneself and can lead to injury (e.g., attempted overdose).

Non-suicidal self-injury (NSSI) refers to injuries caused by oneself, but in most cases, a child has no intention to die. The most common forms are skin cutting, burning, scratching, and banging oneself. These NSSIs are used to make oneself feel better and to stop feelings of sadness, anxiety, and anger (Costello, 2016).

According to Kanowski, Jorm, and Hart (2009), there are different types of self-injuries which include: cutting, scratching, or pinching the skin, enough to cause bleeding or a mark which remains on the skin, banging or punching objects or self to the point of bruising or bleeding, ripping and tearing skin, carving words or patterns into the skin, interfering with the healing of wounds, burning skin with hot water, matches or cigarettes, compulsively pulling out large amounts of hair, deliberately overdosing on medications, drugs or substances when this is not meant as a suicide attempt and deliberately consuming poisons.

2.9.1 Effective Therapies for Self-Injurious Thoughts and Behaviours

According to Bosquet et al. (2018), there are currently no well-established, effective therapies for self-injuries, thoughts, and behaviors. But many therapies appear to work, including Cognitive-behavioral therapy (CBT), CBT for the youth and his/her family, psychodynamic therapy for the youth and his/her family, interpersonal therapy for the youth and two different treatment using family-based treatments (FBT) include attachment-based and parent training.

There are also some child therapy activities that may improve treatment of people with self-injurious thoughts or behaviors, even though there is no clear-cut, evidence-based therapy for these individuals: maintaining family and developing positive relationships (e.g., increased parent/teen communication), improving parenting education and training (e.g., parental monitoring, including restricting access to things that teens

could hurt themselves with) and teen strengthen their coping skills (e.g., emotion regulation).

When the behaviors interfere with daily living, such as employment and relationships, and health lead to life-threatening, therefore, a specialized self-injury hospital program with an experienced staff is recommended (Kanowski et al., 2009). The effective treatment of self-injury is most often psychotherapy called cognitive/behavioral therapy, and interpersonal therapy, supplemented by other treatment services as needed. Medication is often useful in the management of depression, anxiety, obsessive-compulsive disorder, and the racing thoughts that may accompany self-injury. Cognitive/behavioral therapy succors individuals to understand and manage their negative thoughts and behaviors. Contracts, journals, and behavior logs are useful tools for overcoming the compulsion to self-harm. Interpersonal therapy helps individuals in gaining skills for the development and maintenance of relationships. Health services for alcohol/substance abuse, eating disorders, trauma, and family therapy should be made available and integrated into treatment, depending on individual needs (Kanowski et al., 2009).

2.10 Suicidal idealization, plan and attempts

The study done by Subramaniam et al., (2014) on suicidal ideation, suicidal plan and suicidal attempts among those with Major Depressive Disorder (MDD); found the prevalence of suicidal behavior among those with MDD was considerable in their population with the prevalence of ideation, plan and attempt among those with lifetime MDD being 43.6 percents, 13.7 percents, and 12.3 percents, respectively. They found that suicidal behavior was significantly associated with ethnicity.

Marital status is significantly associated with suicidal behavior; those who were divorced/separated were significantly more likely to report suicidal attempts than those who were single (Subramaniam et al., 2014). They added that respondents with higher annual incomes had a significantly lower risk of suicidal behaviors than those with lower annual incomes. Furthermore, their study found that as compared to those with tertiary education, those with primary education were significantly more likely to have suicidal ideation, plan, and attempt. Lower education and income levels are both "individual-level disadvantages" which reflect a person's socio-demographic factors that may influence suicidal behavior. It has been suggested that low socio-economic position may restrict the access of the individual to material, psychosocial, or institutional resources, thus limiting an individual's development of self-control or strategies for managing stressful situations, seeking support and help, or it may lead to differential exposure to risk factors such as negative life events (divorce, unemployment, and financial loss) thus predisposing them to adverse outcomes. Comorbid mental disorders, especially alcohol abuse and dependence are significantly associated with suicidal plan and attempt (Subramaniam et al., 2014)

It is believed that not all suicides or suicide attempts are attributed to underlying mental disorders or substance use disorders. According to Ferrari et al (2014), there is not a direct relationship between mental disorders prevalence and suicide rates. A study done by Ferrari et al (2014), attempted to determine the share disease burden of suicide which could be attributed to mental disorders or substance use disorders. The previous study done by Hannah & Max (2019) used meta-analysis, the authors estimated that about 68 percent of suicides across China, Taiwan, and India were attributed to mental disorders and substance use disorders; across other countries this share was

approximately 85 percent. The estimates of total attributable disease burden concluded that mental disorders and substance use disorders were responsible for 62 percent of total Disability Adjusted Life-Years (DALYs) from suicide. Mental and substance use disorders were responsible for two-thirds of the suicide burden in 2010, adding a further 22 million DALYs to their global burden. According to Ferrari et al (2014), more consideration needs to be given to the populations at high risk of mental and substance use disorders as an effective strategy for suicide prevention.

According to the estimates from the WHO (2015), over 800,000 people die due to suicide every year. This relates to an age-standardized suicide rate of around 11.5 per 100,000 people – a figure equivalent to someone dying of suicide every 40 seconds.

Mental and substance use disorders were the cause of two-thirds of all suicide DALYs reported in GBD (Degenhardt et al., 2013). Apart from emphasizing these as a debilitating group of disorders, the findings of Ferrari et al (2014), highlight the importance of prioritizing the prevention, early detection and effective management of mental and substance use disorders – particularly MDD – as a key suicide prevention strategy. Presenting the differences in the attributable burden between regions and countries also provide a beginning for developing policies or intervention strategies that are applicable at the national level (Ferrari et al., 2014). Such interventions can be labeled as ‘selective’ in the sense that they target subgroups of the population whose members have yet to manifest suicidal behaviors, but exhibit risk factors (in this case, mental and substance use disorders) that predispose them to do so in the future (Ferrari et al., 2014).

2.11 Factors associated with depression and psychotic disorders

There are several variables used by different studies that are found to be associated with mental disorders. Lund et al. (2010) and Silva, Loureiro, and Cardoso (2016) found socio-economic positions, levels of education and financial strain to be associated with a mental disorder. Social class was also found to be a risk factor for mental disorders (Bannink, Broeren, van de Looij–Jansen, de Waart, & Raat, 2014; Barrow, 2016; Lund et al., 2010). There are also other variables used like social support, gender, employment status and perceived discrimination (Silva et al., 2016), food insecurity and housing (Lund et al., 2010).

Several authors have shown that psychotic experiences in adulthood are associated with physical health problems and common mental disorders (Moreno et al., 2013). This is caused by the use of several addictive substances (such as tobacco, alcohol or cannabis) (Bertholet, Faouzi, Studer, Daeppen, & Gmel, 2013). Table 3 below shows questions used in the Psychosis Screening Questionnaire (PSQ) (Heuvelman, Nazroo, & Rai, 2018). Psychotic experiences, such as hearing voices or experiencing delusions, are surprisingly common, but can also lead to diagnoses such as schizophrenia or bipolar disorder (Jacob, Haro, & Koyanagi, 2018).

Table 3: Psychotic experiences based on the Psychosis Screening Questionnaire

CATEGORY	QUESTION	DESCRIPTION
Hypomania/Mania	Question 1	Over the past year, have there been times when you felt very happy indeed without a break for days on end?
	Question 1a	Was there an obvious reason for this?
	Question 1b	Did people around you think it was strange?
Thought control	Question 2	Over the past year, have you ever felt that your thoughts were directly interfered with or controlled by some outside force or person?
	Question 2a	Did it come about in a way that many people would find hard to believe, for instance, through telepathy?
Paranoia	Question 3	Over the past year, have there been times when you felt that people were against you?
	Question 3a	Have there been times when you felt that people were deliberately acting to harm you or your interests?
	Question 3b	Have there been times when you felt that a group of people was plotting to cause you serious harm or injury?
Strange Experiences	Question 4	Over the past year, have there been times when you felt that something strange was going on?
	Question 4a	Was it so strange that other people would find it very hard to believe?
Auditory hallucinations	Question 5	Over the past year, have there been times when you heard or saw things that other people could not?
	Question 5a	Did you at any time hear voices saying quite a few words or sentences when there was no one around that might account for it?
Note: The skip pattern was the following: If yes to 1, then asked 1a. If no to 1a, then asked 1b; If yes to 2, then asked 2a; If yes to 3, then asked 3a; If yes to 3a, then asked 3b; If yes to 4, then asked 4a; If yes to 5, then asked 5a.		

2.12 Modelling psychotic disorder and depression

Several statistical models have been used to identify risk factors that contribute to mental disorders. Most study designs used longitudinal studies (Bannink et al., 2014; LeardMann et al., 2013), while others used cross-sectional studies (LeardMann et al., 2013; Meyer, Castro-Schilo, & Aguilar-Gaxiola, 2014; Silva et al., 2016; Soltanian,

Naderi, & Roshanaei, 2016). Studies on mental disorders have mostly employed binary logistic regression (Bannink et al., 2014; Cross-Disorder Group of the Psychiatric Genomics Consortium, 2013; Silva et al., 2016); Path analysis (Cross-Disorder Group of the Psychiatric Genomics Consortium, 2013; Meyer et al., 2014); Multivariate Cox models (Falconer et al., 2017; LeardMann et al., 2013) and Hierarchical Bayesian models (Kokaua, 2015; Silva et al., 2016; Soltanian et al., 2016). The binary logistic regression was used in this study to establish factors contributing to psychotic disorders.

2.12.1 Binary logistic regression model

Binary logistic regression (also called logistic modeling or the logit model) is a statistical technique used to predict group membership from independent variables, regardless of whether the independent variables are continuous, discrete, or a combination of both. The binary logistic regression model was introduced by Cox (1970). Faul, Erdfelder, Buchner, and Lang (2009) added that binary logistic regression models address the relationship between a binary dependent variable Y and one or more independent variables X_i, with discrete or continuous probability distributions. Binary logistic regression does not require the dependent and independent variables to be linearly related to the response variable, nor does it require an equal variance within each group, which also makes it a less stringent procedure for statistical analysis (Starkweather & Moske, 2011).

A binary logistic regression model is a generalized linear model that is used to computes the probability of the selected response as a function of the values of the independent variables. A common problem with the linear probability model is that probabilities lie between 0 and 1, but linear functions are inherently unbounded. To

transform the probability is a solution to remove bounds. Transforming the probability to odds removes the upper bound and lower bound to natural logarithm of odds (Sarkar, Midi, & Rana, 2011).

Suppose that the outcome variable is denoted by *Y* and the covariates are denoted by a vector *X* with elements X_j *(Y* is $n\times1$*)*, where *Y* has two possible values 0 and 1 and j=1, 2, ⋯, *k*. Usually, $\mathcal{Y} = 1$ is considered as a "success" and $\mathcal{Y} = 0$ as "failure". *X* is an $n\times(k+1)$ design matrix of explanatory variables, β is a $(k+1)\times1$ vector of parameters and ε is also an $n\times1$ vector of unobserved random errors. The random variable *Y* is Bernoulli distributed, denoted by $Y \sim Ber(\pi_i)$, is completely characterized by the probability:

$$\pi = p(\mathcal{Y} = 1) \text{ so that } p(\mathcal{Y} = 0) = 1 - \pi \quad \textbf{(1)}$$

The key quantity in any regression problem is the mean value of the outcome variable, given the values of the covariates. This quantity can be expressed as $E(Y|x)$, where *x* denotes all specific values *X* can take on. The general form of the logistic regression model was given by Hosmer Jr, Lemeshow, and Sturdivant (2013) as:

$$logit(\pi_i) = b_0 + b_1X_1 + b_2X_2 + \cdots + b_kX_k \quad \textbf{(2)}$$

A transformation of π_i that is central to the study of logistic regression. The logit transformation is defined as: $\pi_i = ln\left[\frac{\pi_i}{1-\pi_i}\right]$, leads to obtain:

$$\pi_i = \beta_0 + \beta_1X_i \quad \textbf{(3)}$$

Where "π" is the probability that a case is in a particular category and can only range from 0 to 1, $logit(\pi_i)$ scale ranges from negative infinity to positive infinity and is

symmetrical around the logit of 0.5 (which is zero), β_0 is the constant of the equation and β_1 is the coefficient of the predictor variables X_i (i=1,2,…,k).

The most commonly used method of estimating the parameters of a logistic regression model is the method of Maximum Likelihood instead of Ordinary Least Square (OLS) method (Sarkar et al., 2011).

The sample likelihood function is defined as the joint probability function of the random variables whose realizations constitute the sample *n* with observations of $(y_1, y_2, \dots, y_n)$. Since the Y_i is a Bernoulli random variable, the probability mass function of Y_i is:

$$f_i(Y_i) = \pi_i^{Y_i}(1-\pi_i)^{1-Y_i};\ Y_i = 0\ or\ 1\ and\ i = 1,2 \dots n \quad \textbf{(4)}$$

Note that $f_i(1) = \pi_i$ and $f_i(0) = 1 - \pi_i$. Hence $f_i(y_i)$ is simply the probability that $y_i = 1$ or 0. Suppose $y_i,\ i = 1,2, \dots, n$ are independent observations. Then the joint probability distribution is:

$$(\pi, y) = \Pi_{i=1}^{n} f_i(y_i) = \Pi_{i=1}^{n} \pi_i^{Y_i}(1-\pi_i)^{1-Y_i} \quad \textbf{(5)}$$

Where $\pi = \pi_1, \pi_2, \dots, \pi_n$ and $y = y_1, y_2, \dots, y_n$ **(6)**

The logarithm of the likelihood function is given by:

$$l(\pi, y) = logL(\pi, y) = log_e \Pi_{i=1}^{n} \pi_i^{Y_i}(1-\pi_i)^{1-Y_i} = \sum_{i=1}^{n} \left[Y_i log_e \left(\frac{\pi_i}{1-\pi_i} \right) \right] + \sum_{i=1}^{n} log_e(1-\pi_i) \quad \textbf{(7)}$$

In the method of the maximum likelihood, the likelihood function or logarithm of the likelihood function can be maximized because both they lead to the same answer for

the parameters. By using Eq (3) the logarithm of the likelihood function can be written in matrix notation as

$$log_e\left(\frac{\pi_i}{1-\pi_i}\right) = \beta_0 + \beta_1 X_i \quad \textbf{(8)}$$

Similarly, the multiple logistic regression is given by:

$$l(\beta; y) = \sum_i \beta X_i y_i - \sum_i \log\left(1 + \exp\left(\beta X_i\right)\right) \quad \textbf{(9)}$$

Where:

$$X = \begin{bmatrix} 1 & X_{11} & X_{21} & \cdots & X_{k1} \\ 1 & X_{12} & X_{22} & \cdots & X_{k2} \\ \vdots & \vdots & \vdots & \cdots & \vdots \\ 1 & X_{1k} & X_{2k} & \cdots & X_{kn} \end{bmatrix}_{n\times(k+1)}, Y = \begin{bmatrix} Y_1 \\ Y_2 \\ \vdots \\ Y_n \end{bmatrix}_{n\times 1} and\ \beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \beta_n \end{bmatrix}_{n\times 1}$$

In fact, the maximum likelihood estimates of β in the multiple binary logistic regression models are those values of β that maximize the log-likelihood function. No closed-form solution exists for the value of β that maximize the log-likelihood function (Liu, Wu, & Meeker, 2015).

Assumptions of Binary logistic Regression

According to Matuschek, Kliegl, Vasishth, Baayen, and Bates (2017), most statistical tests rely upon certain assumptions about the variables used in the model, the violation of model assumptions can lead to serious misinterpretation of the results. The assumptions of the binary logistic regression model are as follows (Tabachnik & Fidell, 2013):

1. *Absence of Multicollinearity*

A limitation of binary logistic regression is that it is sensitive to variables that have very high correlations with each other. Variables that are highly collinear often produce very large standard errors and inflated regression estimates. Therefore, the collinearity between the independent variables in the model had to be checked. The tolerance measures the influence of one independent variable on all other independent variables; the tolerance is calculated with an initial linear regression analysis. Tolerance is defined as $T = 1 - R^2$ for these first step regression analysis. With $T < 0.1$ there might be multicollinearity in the data and with $T < 0.01$. A higher tolerance value suggests low levels of collinearity. The Variance Inflation Factor (VIF) is also used to test for multicollinearity. The VIF of the linear regression is defined as $VIF = 1/T$. With $VIF > 10$ there is an indication that multicollinearity may be present; with $VIF > 100$ there is certainly multicollinearity among the variables. If multicollinearity is found in the data, the simplest way to address the problem is to remove the independent variables with high VIF values (Kirtland, 2017).

2. *The ratio of Cases to Variables*

When there are too few cases in relation to the number of discrete variables, parameter estimates may inflate, which could produce large standard errors, and ultimately cause the model not to converge.

3. *Independence*

Logistic regression also requires that the dependent variable only has pairwise mutually exclusive and exhaustive categories. The errors $\varepsilon_1, \varepsilon_1, \ldots, \varepsilon_n$ should be independent of one another: the pairwise covariances should be zero. This assumption

is not directly based on the distribution of the data but on the study design and it requires the sampling method to be truly random (Cohen, West, & Aiken, 2014). A residual plot, or inspection of the autocorrelation of the residuals, is a better approach.

2.12.2 Ordinary logistic regression

Ordinal logistic regression model has been applied over the past few years in epidemiological studies (Abreu, Siqueira, & Caiaffa, 2009). OLR is a type of logistic regression analysis used when the response variable has more than two categories with having natural order or rank (Reddy & Alemayehu, 2015). Ordinal logistic regression is a useful tool used to analyze the relationship between multiple independent variables and dependent variable. An ordered logit model has the form:

$$\log\left(\frac{P_1}{1\text{-}P_1}\right) = \alpha_k + \beta'X \qquad \textbf{(10)}$$

$$\log\left(\frac{P_1 + P_2}{1\text{-}P_1\text{-}P_2}\right) = \alpha_k + \beta'X \qquad \textbf{(11)}$$

.
.
.

$$\log\left(\frac{P_1 + P_2 + \ldots + P_k}{1\text{-}P_1\text{-}P_2\text{-}\ldots\text{-}P_k}\right) = \alpha_k + \beta'X \qquad \textbf{(12)}$$

The equation series indicates the odds of belonging to the group represented by $Y = 1$ against belonging to the groups represented by $Y = 2$ to k. The numbers of equations modeled in this series are the number of ordered categories minus one. Suppose Y has 3 ordered levels, the number of equations modeled are 2. Each such equation represents its own logit model, and hence the individual equations are called logits. The sum of the probabilities from P_1 to P_k is 1. One important assumption in modeling with OLR is called an assumption of parallel line (Norusis, 2008). This assumption is

designed to make judgment concerning the model adequacy. The null hypothesis stated that the corresponding regression coefficients are equal across all levels of the dependent variable. A high significance value ($p > 0.05$) indicates that the null hypothesis cannot be rejected. The ordering of dependent variables can be forgotten and fit a multinomial logistic regression that ignores any ordering of the values of the dependent variables. This, however, requires fitting of many parameters, so the number of degrees of freedom used in the model-fitting process can make excessive demands on the dataset (Warner, 2008).

2.12.3 Exploratory Factor Analysis

According to Everitt and Hothorn (2011), the exploratory factor analysis (EFA) is used to identify the relationship between the assumed latent variables. EFA is a useful tool for investigating the relations among observed variables. To test the suitability of data for factor analysis, there are two main issues to take into consideration to determine whether a particular set of data is appropriate for factor analysis; number of samples (sample size) and the strength of the relationship between indicators (variables) (Pallant, 2013). The adequacy of sampling is tested through Kaiser-Meyer-Olkin (KMO) (Kaiser, 1974); While the strength of the relationship among variables is assessed through Bartlett's test of sphericity (Bartlett, 1954).

According to Bhattacharya and Dunson (2011), the generic form of a latent factor model is:

$$y_i = \theta\pi_i + \varepsilon_{i,} \;\; \varepsilon_i \sim N_p(0, \Sigma) \quad (i = 1, \dots, n), \tag{13}$$

where y_i is a p-dimensional vector of observable random variables, θ is a $p \times k$ factor loading matrix (matrix of fixed coefficients known as loadings), π_i is a vector of

unobservable random variables (latent variables known as factors), ε_i ~$N_p(0, \Sigma)$ and is a vector of error terms with covariance $\Sigma = dia(\sigma_1^2, \dots, \sigma_p^2)$. The independence of the error terms is standard in factor analysis and implies that the factors are the only source of correlation between the observed variables. The statistical model requires a specification for the distribution of the latent factors. A default option in the literature is that of a Gaussian distribution.

2.12.4 Odds ratio

Hosmer Jr et al. (2013) show the algebra associated with the odds ratio (OR) and how it can be used to help the interpretation. The OR is determined by the following equation:

$$OR = e^{\beta_1} \quad \textbf{(14)}$$

The OR is simplified as a function of β_1 coefficient and interpreted as follows; if OR is equal to 1, and then increase the variable x_1 has no influence on the response probability. If OR is greater than 1, then increasing the variable x_1 will increase the probability of the binary event occurring. And if OR is less than 1, increasing the variable x_1 will decrease the probability of the binary event occurring. They further explain that the challenge lies in the fact that it is very difficult to understand and visualize the slope or rate of change that is associated with a given odds ratio and relating the odds ratio to the span of the input variable is not straightforward. Understanding how a change in the coefficients in logistic regression influences the response is not too easily observed as it is in linear regression.

2.12.5 Multinomial logistic regression model

The multinomial logistic regression (MNLR) model is an extension of the binary logistic regression, which means the response variable has more than two categories. The dependent variable (*Y*) is used to predict the likelihood of categorical response variable or to model the relationship between a polytomous response variable or multi-category responses and a set of independent variables. The polytomous or multi-category responses could be discrete numerical, nominal (unordered categories) or ordinal (ordered categories) (El-Habil, 2012). The multinomial logistic regression model is defined as follows:

$$\pi_{ij} = \frac{e^{x_i' \beta_j}}{\sum_{i=0}^{n} e^{x_i' \beta_j}} \qquad \text{j = 1,2,…, n} \qquad \textbf{(15)}$$

Results 1,2,…, *n* are supposed for y and the explanatory variables are defined as *X*. it is also assumed that there are *n* = 3 results, which are unordered. This property of the categorical variable *y* is typical of multinomial regressions.

In the multinomial logistic regression model, a set of coefficients β^1, β^2 and β^3 are estimated, corresponding to each result the following probabilities for each case of the value of the depended variable:

$$p(y = 1) = \frac{e^{x\beta(1)}}{e^{x\beta(1)} + e^{x\beta(2)} + e^{x\beta(3)}} \qquad \textbf{(16)}$$

$$p(y = 2) = \frac{e^{x\beta(2)}}{e^{x\beta(1)} + e^{x\beta(2)} + e^{x\beta(3)}} \qquad \textbf{(17)}$$

$$p(y = 3) = \frac{e^{x\beta(3)}}{e^{x\beta(1)} + e^{x\beta(2)} + e^{x\beta(3)}} \qquad \textbf{(18)}$$

This model is indeterminate if there exists more than one solution for β^1, β^2 and β^3 which lead to the same probability for $y = 1$, $y = 2$ and $y = 3$. If a value of 0 is assigned to β^1, the remaining coefficients β^2 and β^3 will measure the relative risk for $y = 1$. On the other hand, if $\beta^2 = 0$, the remaining coefficients β^1 and β^3 will measure the relative risk for $y = 2$. The coefficients may differ because they have different interpretations, but the odds of $y = 1$, $y = 2$ and $y = 3$ are the same.

Also, if there are *n* independent observations with *p* predictors and the qualitative response variable has *k* categories, then one of the categories should be chosen as the reference level, and all other logits in the multinomial case will be constructed relative to this reference level. Pretty much, any category can be selected as the base or reference level. If there is no order, we would select category *k* as the base level.

2.12.6 Relative risk ratio

Relative risk (RR) is an important and commonly used term. The relative risk ratio of an event is the likelihood of its occurrence after exposure to a risk variable as compared with the likelihood of its occurrence in a control group (Bodemer, Meder, & Gigerenzer, 2014).

According to Andrade (2015), the relative risk does not provide any information about the absolute risk of the event occurring but rather the higher or lower likelihood of the event in the exposure versus the non-exposure group. The relative risk ratio formula is given as:

Relative Risk = (Probability of event in the exposed group) / (Probability of event in not exposed group)

Relative risk is a ratio of the probability of an event occurring in the exposed group versus the probability of the event occurring in the non-exposed group. The relative risk does not provide any information about the absolute risk of the event occurring but rather the higher or lower likelihood of the event in the exposure versus the non-exposure group (Andrade, 2015).

The relative probability (relative risk) of y = 2 relative to the base category is:

$$\frac{P(y = 2)}{P(y = 1)} = e^{x\beta(2)} \quad \textbf{(19)}$$

Suppose, X and $\beta_n^{(2)}$ are vectors equal to $X_1, X_2, \ldots, X_n$ and $\beta_1^2, \beta_2^2, \ldots, \beta_n^2$ respectively, the relative risk ratio for change of one unit in X_1 is:

$$\frac{e^{\beta_1^{(2)} x_1 + \ldots + \beta_i^{(2)} x_{(i+2)} + \ldots + \beta_n^{(2)} x_n}}{e^{\beta_1^{(2)} x_1 + \ldots + \beta_i^{(2)} x_i + \ldots + \beta_n^{(2)} x_n}} = e^{\beta_i^{(2)}} \quad \textbf{(20)}$$

Then the exponential value of a confidant is the rate of relative risk explained by the change of one unit over some variable. A relative risk ratio of 1.00 means that the risk is lower in the exposed sample and if the OR is greater than 1.00 means that the risk is increased in the exposed sample.

Assumptions of multinomial logistic regression

In any multinomial logistic regression, the observations are assumed to be independent. The response variable is assumed to have a multinomial distribution, and the probabilities are linked to the predictors with logit link functions. The logits are assumed to be linearly related to independent variables. To get good results from the multinomial logistics analysis, it is recommended that the data need to be large, at least

10 cases for each individual variable are required. Some statisticians recommend a minimum of 30 cases per each variable (Starkweather & Moske, 2011). Multicollinearity problems can be addressed by either centering the variables or employing the method of factor analysis (Hosmer Jr et al., 2013).

CHAPTER 3: RESEARCH METHODS

This chapter describes research methodological approaches used to test the risk factors associated with psychotic disorders and depression. It consists of the research design, sample, procedures and data analysis.

3.1 Research Design

Data for this analysis was drawn from a quantitative cross-section study, conducted by the Ministry of Health and Social Services in collaboration with the Namibia Statistics Agency (NSA) and the National Institute of Pathology (NIP) as part of the 2013 Namibian demographic health survey (NDHS). Technical support was provided by the Inner City Fund (The Nambia MoHSS and ICF International) international, with financial support from the government of Namibia, the United States Agency for International Development (USAID), and the Global Fund (The Nambia MoHSS and ICF International, 2014).

3.2 Sample

The sampling frame was a complete list of all enumeration areas (Heinz, Deserno, & Reininghaus) covering the whole country. Each EA is a geographical area covering the number of households to serve as a counting unit for the 2011 Namibian housing and population census. A sample of 9906 women aged 15 – 49 and 4328 men aged 15 – 64 was randomly selected from urban and rural areas in the 13 regions of Namibia to participate in the NDHS survey (The Nambia MoHSS and ICF International, 2014).

3.3 Procedures

The 2013 Namibia demographic health survey data were collected using a two-stage stratified cluster sampling technique. The country was divided into 554 enumeration areas, 269 in urban areas and 285 in rural areas. The sample for the 2013 NDHS was

a stratified sample selected in two stages. The size of an EA is defined according to the number of households residing in the EAs, as recorded in the 2011 Namibia population and housing census. In the first stage; the 13 regions were stratified into 26 sampling strata: 13 rural and 13 urban areas. And in the second-stage, samples were systematically selected independently in each stratum, with a predetermined number of enumeration areas.

3.4 Data analysis

The analysis was performed using R-console and Statistical Packages for Social Sciences (SPSS) version 25 software. Descriptive statistics including percentages, frequency tables, and Chi-square tables were computed to summarize the data and establish prevalence of psychotic disorders and depression. Binary logistic regression was used to establish factors influencing psychotic disorders. Factor analysis was used for data reduction and generating three indicators of depression and then multinomial logistic regression was used to establish factors influencing depression.

3.4.1 Independent variables

The independent variables were chosen according to literature reviews and to the available data in the NDHS (sex, age group, region, educational level, place of resident employment status, smoking and marital status) however, some of the variables like Human Immunodeficiency Virus (HIV) status, wealth index, and domestic violence were excluded due to the missing values exceed 30 percents of the total database.

3.4.2 Dependent variables

Yes/No questions were used to detect the presence of how common it is for a person's well-being to be affected by mental disorders. Mental disorders were categorized into

psychotic disorders and depression. Table 4 below shows the dependent variables used in this study.

Table 4: Dependent variables

Question	Description	Variable
Q1	Are there times you see or hear things that are not there?	Psychotic disorder
Q2	Have you ever felt seriously worthless, hopeless, or wished you were dead?	Depression
Q3	Have you ever felt that you had little interest or pleasure in doing things?	Depression
Q4	Have you felt very low in energy, been in a bad mood, or been sad all the time?	Depression

Psychotic indicators

The single yes/no question that asked whether the respondent has seen or hear things that are not there, represents psychotic disorder.

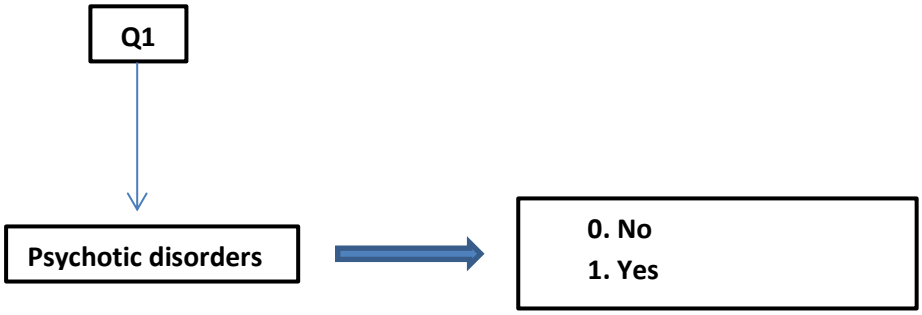


Figure 2: Psychotic disorders

Depression indicators

According to the definition of depression, questions 2, 3 and 4 in table 4 above are components that measure depression. Therefore, factor analysis (Principal component analysis) was used to construct an index of depression and grouped the single factor into tertiles (3 groups). For decision making, the depression was used a dependent variable with, the first tertile indicates no depression (if the total scores of question 2, 3 and 4 equal to 0) ; second tertile indicates mild depression (if the total scores of

question 2, 3 and 4 equal to 1), whereas the third tertile indicate severe depression (if the total scores of question 2, 3 and 4 equal to 2 or 3). Figure 3 below demonstrates the construction of a single dependent variable (depression).

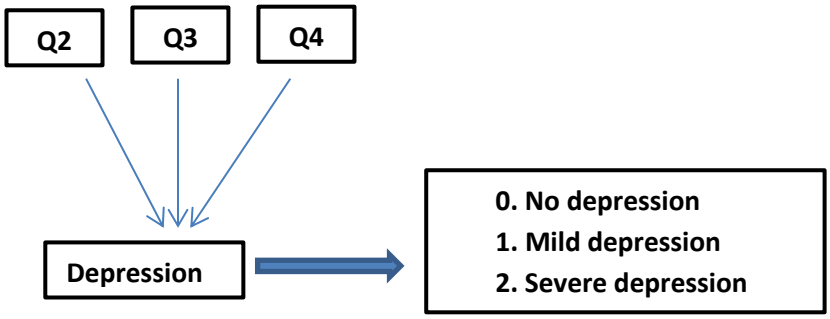


Figure 3: Depression Tertiles

a) Negative thoughts

The dichotomous question asked as to whether they felt worthless or hopeless or wished they were dead during the past 12 months. The score was derived, either a 1 if they felt worthless or hopeless or wished, they were dead and 0 if they never felt worthless or hopeless or wished, they died during the past 12 months.

b) Little interest

The binary score was used to construct the indicator of little interest, that on the average number of days in the past two weeks they had little interest or pleasure in doing things. 1 if they had little interest or pleasure in doing things and 0 if they never had little interest or pleasure in doing things in the past two weeks.

c) Bad mood

For this variable, the study uses a binary question asked whether they had felt low in energy, being in a bad mood or being sad. The score was as follows: 1 = yes and 0 = no to the question.

3.5 Research Ethics

The approval of using secondary data was granted by the UNAM research and ethics committee and the center for postgraduate, respectively. The data was obtained from the Namibia Statistics Agency (NSA).

CHAPTER 4: RESULTS AND DISCUSSION

This chapter presents the analysis of the psychotic disorders and depression data, interpretation and the discussions of the results.

4.1 Descriptive analysis

4.1.1 Socio-demographic information

The socio-demographic information included sex, age, region, level of education, place of residence, employment status, smoke cigarettes status and marital status of the respondents**.** The summary statistics for these variables are presented in Table 5 given below.

Table 5 shows that 9909 females and 4328 males participated in the NDHS survey. 36.2 percent of respondents were aged 15 – 24, followed by 26.8 percent of respondents aged 25 – 34, with the least age group being of respondents aged 45 or more with 16.8 percent.

The regional distribution shows that there was a little different between the number of respondents from different regions with a range from the smallest 6.1 percent of Omaheke region and largest 10.1 percent of the Khomas region (Table 5).

The majority (60.2 percent) of the respondents had secondary education as their highest level of education whereas only 7.5 percent of respondents had attained a higher level of education. Urban and rural areas were almost also almost equally represented (50.8 percent and 49.2 percent respectively). There was also not much difference in the respondent's employment status (unemployed = 50.5 percent, employed = 49.5 percent). The same table shows that about 89.0 percent indicated that they do not smoke while only 11 percent indicated that they were smoking Lastly, the

distributions of respondents' marital status were largely different with 55.1 percent of respondents were never in union (highest) and 1.2 percent were divorced (lowest).

Table 5: Socio-demographic information (n=14234)

Variable	Frequency	Percentage
Sex		
Male	4328	30.4
Female	9906	69.6
Age group		
15-24	5158	36.2
25-34	3809	26.8
35-44	2878	20.2
45+	2389	16.8
Region		
Caprivi	996	7.0
Erongo	1362	9.6
Hardap	1008	7.1
Karas	1220	8.6
Kavango	1106	7.8
Khomas	1440	10.1
Kunene	919	6.5
Ohangwena	1027	7.2
Omaheke	870	6.1
Omusati	1107	7.8
Oshana	1017	7.1
Oshikoto	1045	7.3
Otjozondjupa	1117	7.8
Educational level		
No education	1184	8.3
Primary	3414	24.0
Secondary	8574	60.2
Higher	1062	7.5
Place of resident		
Urban	7233	50.8
Rural	7001	49.2
Employment status		
Unemployed	7188	50.5
Employed	7046	49.5
Smoking		
No	12663	89.0
Yes	1571	11.0

Variable	Frequency	Percentage
Marital status		
Never in union	7839	55.1
Married	3051	21.4
Living with a partner	2305	16.2
Widowed	394	2.8
Divorced	176	1.2
No longer living together/separated	469	3.3

4.1.2. Univariate results of psychotic disorders and depression

In this study, 1888 (13.3%) persons in Namibia influenced by psychotic disorders in 2013. The prevalence of psychotic disorders was lower for the male compared to female (4.8% vs. 8.5%). Both men and women go through experiences of depression; however, women compared with men were at a high risk of affected by mild depression (9.1% vs. 5.5%) as well as by severe depression (8.3% vs. 6.9%). The prevalence of depression (both mild and severe) among Namibian adults was 30 percents in 2013 (table 6).

Table 6: Prevalence of psychotic disorders and depression in Namibia 2013

Variable		Male	Female	Total
Psychotic disorders	Yes	678 (4.8%)	1210 (8.5%)	1888 (13.3%)
	No	3650 (25.6%)	8696 (61.1%)	12346 (86.7%)
Depression	No Depression	2575 (18.1)	7427 (52.2)	10002 (70.3%)
	Mild Depression	776 (5.5%)	1292 (9.1%)	2068 (14.5%)
	Severe Depression	977 (6.9%)	1187 (8.3%)	2164 (15.2%)

4.2 Results of chi-square tests of association between the psychotic condition and demographic variables

Table 7 shows that of the respondents that affirmed seeing or hearing things that are not there, 11.2 percent were males and 14.2 females. Also, the results indicate that the variable sex was significantly associated with the psychotic condition at the 5 percents level of significance (p-value = 0.001). It is further shown that the region was significantly related to the psychotic condition at 5 percent (p-value = 0.001). Most people affected by psychotic disorders were from the Oshikoto region (20.8 percent) and //Kharas region (18.0 percent). Kunene region and Erongo region had the least number of people hearing or seeing things that are not there (6.3 percent and 8.3 percent respectively).

The age distribution shown in table 7 indicates that 13.7 percent of the elderly people in their last stage of production 45 years old or more had a psychotic disorder. Teen (15-24 years) and youngsters (25-34 and 35-44 years) had 13.6, 12.3 and 13.6 percent of psychotic disorders respectively. However, the Chi-square test shows that age was not significantly associated with psychotic disorder (p-value = 0.207). Furthermore, table 7 shows that marital status was found to influence psychotic disorders (p-value < 0.001). The same table also shows that widowed had the highest percentage of people seeing or hearing things not there with 20.6 percent. A higher percentage of people affected by psychotic disorders were also noticed among those that were no longer living together/separated (18.1 percent). Married participants experienced less psychotic disorder (10.9 percent).

Individuals that had only primary education as their highest level of education had a higher chance of psychotic disorder (15.4%), followed by people with secondary

education 13.2 percent. The individuals who had no education background (11.1 percent) and those who attained higher level of education (8.9 percent) were less likely to be influenced by psychotic disorders compared to other education groups. The education level was found to be significantly associated with a psychotic disorder (p-value < 0.001).

The employment status was found not to have any effect on psychotic disorders (p-value = 0.905). Unemployed and employed people both admitted to experiencing a psychotic disorder of about 13 percent each (Table 7). Smoking was found not to have any effect psychotic disorders (p-value = 0.898). The smoker and non-smokers both admitted to seeing or hearing things that are not there with 13 percent each.

Table 7 also shows that the place of residence has a significant affect the psychotic disorder (significant at 5 percent, p-value < 0.001). 14.7 percent of people living in rural areas had psychotic disorders while 11.8 percent of those in urban areas experienced psychotic disorders.

Table 7: Results of chi-square tests of association between psychotic disorder and demographic variables

Variable	Times you see or hear things not there		Chi-square p-value
	No	Yes	
Sex			
Male	3844 (88.8%)	484 (11.2%)	p < 0.001 ***
Female	8502 (85.8%)	1404 (14.2%)	
Region			
Caprivi	856 (85.9%)	140 (14.1%)	p < 0.001 ***
Erongo	1249 (91.7%)	113 (8.3%)	
Hardap	885 (87.8%)	123 (12.2%)	
//Kharas	1001 (82.0%)	219 (18.0%)	
Kavango	954 (86.3%)	152 (13.7%)	
Khomas	1258 (87.4%)	182 (12.6%)	
Kunene	861 (93.7%)	58 (6.3%)	
Ohangwena	876 (85.3%)	151 (14.7%)	
Omaheke	765 (87.9%)	105 (12.1%)	
Omusati	942 (85.1%)	165 (14.9%)	
Oshana	883 (86.8%)	134 (13.2%)	
Oshikoto	828 (79.2%)	217 (20.8%)	
Otjozondjupa	988 (88.5%)	129 (11.5%)	
Age group			
15-24	4456 (86.4%)	702 (13.6%)	0.207
25-34	3342 (87.7%)	467 (12.3%)	
35-44	2486 (86.4%)	392 (13.6%)	
45+	2062 (86.3%)	327 (13.7%)	
Marital status			
Never in union	6788 (86.6%)	1051 (13.4%)	p < 0.001 ***
Married	2717 (89.1%)	334 (10.9%)	
Living with a partner	1990 (86.3%)	315 (13.7%)	
Widowed	313 (79.4%)	81 (20.6%)	
Divorced	154 (87.5%)	22 (12.5%)	
No longer living together/separated	384 (81.9%)	85 (18.1%)	
Educational level			
No education	1052 (88.9%)	132 (11.1%)	p < 0.001 ***
Primary	2889 (84.6%)	525 (15.4%)	
Secondary	7438 (86.8%)	1136 (13.2%)	
Higher	967 (91.1%)	95 (8.9%)	
Employment status			
Unemployed	6237 (86.8%)	951 (13.2%)	0.905
Employed	6109 (86.7%)	937 (13.3%)	
Smoke			
No	10985 (86.7%)	1678 (13.3%)	0.898
Yes	1361(86.6%)	210 (13.4%)	
Place of resident			
Urban	6376 (88.2%)	857 (11.8%)	p < 0.001 ***
Rural	5970 (85.3%)	1031 (14.7%)	

4.3 Factors influencing psychotic disorders

The binary logistic regression model was fitted on the psychotic condition and it included only the variables that were found to be significantly related to psychotic disorders from the Chi-square test at the 5 percent level of significance. 95 percents confidence intervals and odds ratios (OR) among other statistics were produced. The common practice of interpreting logistic regression estimates is through odds ratios.

The table 8 shows that men and women from the Oshikoto region (OR = 1.527, 95% CI = 1.204-1.937, $p < 0.001$) and Karas region (OR = 1.377, 95% CI = 1.105-1.715, $p = 0.004$) were at a high risk of experiencing psychotic disorder, compared to those from Khomas region. While men and women from Kunene region (OR = 0.409, 95% CI = 0.297-0.5641, $p < 0.001$) and Erongo region (OR = 0.604, 95% CI = 0.471-0.775, $p < 0.001$) were less likely to experience psychotic disorder, compared to those from Khomas region. The urban residents (OR = 0.880, 95% CI = 0.779-0.994, $p = 0.040$) were less likely to be affected by a psychotic disorder than those rural residents. Men and women who attained primary level (OR = 1.667, 95% CI = 1.310-2.120, $p < 0.001$) and secondary school (OR = 1.438, 95% CI = 1.148-1.803, $p = 0.002$) experienced more psychotic disorders, compared to those who attained higher level of education. Also, the study shows that people who never been in a union (OR = 1.222, 95% CI = 1.067-1.399, $p = 0.004$), no longer living together/separated (OR = 1.706, 95% CI = 1.309-2.224, $p < 0.001$), living with a partner (OR = 1.320, 95% CI = 1.113-1.565, $p = 0.001$) and widowed (OR = 1.807, 95% CI = 1.373-2.380, $p < 0.001$) were more likely to suffer from psychotic disorders, compared to married ones. The results also show that females (OR = 1.287, 95% CI = 1.150-1.440, $p < 0.001$) were at high risk of psychotic disorders than males.

Table 8: Results of factors influencing psychotic disorders

Analysis of Parameter Estimates					
				95% C.I for OR	
Variable		Sig	OR	Lower	Upper
Region					
	Caprivi	0.910	1.015	0.788	1.306
	Erongo	0.001***	0.604	0.471	0.775
	Hardap	0.259	0.866	0.675	1.112
	Karas	0.004**	1.377	1.105	1.715
	Kavango	0.281	0.872	0.679	1.119
	Otjozondjupa	0.076	0.800	0.625	1.024
	Kunene	0.001***	0.409	0.297	0.564
	Ohangwena	0.737	0.957	0.740	1.237
	Omaheke	0.161	0.825	0.631	1.079
	Omusati	0.853	0.976	0.757	1.259
	Oshana	0.570	0.930	0.726	1.193
	Oshikoto	0.001***	1.527	1.204	1.937
	Khomas (reference)		1.000		
Place of resident					
	Urban	0.040	0.880	0.779	0.994
	Rural (reference)		1.000		
Educational level					
	No education	0.068	1.312	0.980	1.756
	Primary	0.001***	1.667	1.310	2.120
	Secondary	0.002**	1.438	1.148	1.803
	Higher (reference)		1.000		
Marital status					
	Never in union	0.004**	1.222	1.067	1.399
	No longer living together/separated	0.001***	1.706	1.309	2.224
	Living with partners	0.001***	1.320	1.113	1.565
	Widowed	0.001***	1.807	1.373	2.380
	Divorced	0.488	1.179	0.741	1.876
	Married (reference)		1.000		
Sex					
	Female	0.001***	1.287	1.150	1.440
	Male (reference)		1.000		
Constant		p<0.001***	0.130		

4.4. Factor Analysis

Factor analysis was used to construct the index of depression among adults. Both Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy were used to test the hypothesis that the correlation matrix is an identity matrix (A square matrix in which all the main diagonal elements are 1's and all the remaining elements are 0's). The test statistic of Bartlett's test of sphericity (p-value < 0.001) was significant at the 5 percent level of significance; which indicates that factor analysis may be useful for the data used in this study. Similarly, the Kaiser-Meyer-Olkin measure is 0.663 which is greater than 0.6 (table 9)

Table 9: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.663**
Bartlett's Test of Sphericity	Approx. Chi-Square	7455631
	df	3
	sig	0.001

Table 10 shows that the total eigenvalues for the first dimension were 1.867 which accounts for 62.237 percent of the variance extracted. Since the second factor has not met the eigenvalue greater than 1 criterion as it has an eigenvalue of 0.627, we can only construct one factor for depression. Similarly, the scree-plot (Figure 3) shows that there is only first factor greater than 1. Therefore, both eigenvalues results and the scree plot support the conclusion that the three questions of depression can be reduced into one factor.

Table 10: The Total Variance Explained

Factor	Rotation Sums of Squared Loadings		
	Total	Percentage of Variance	Cumulative percentage
1	1.867	62.237	62.237
2	0.627	20.903	83.140
3	0.506	16.860	100

Extraction Method: Principal component analysis

The three depression questions (table 4) were converted into a single numerical index that was extracted using Principal component analysis method and then grouped into three levels using tertiles. The 3 tertiles generated were recoded as 0 = no depression, 1 = mild depression and 2 = severe depression.

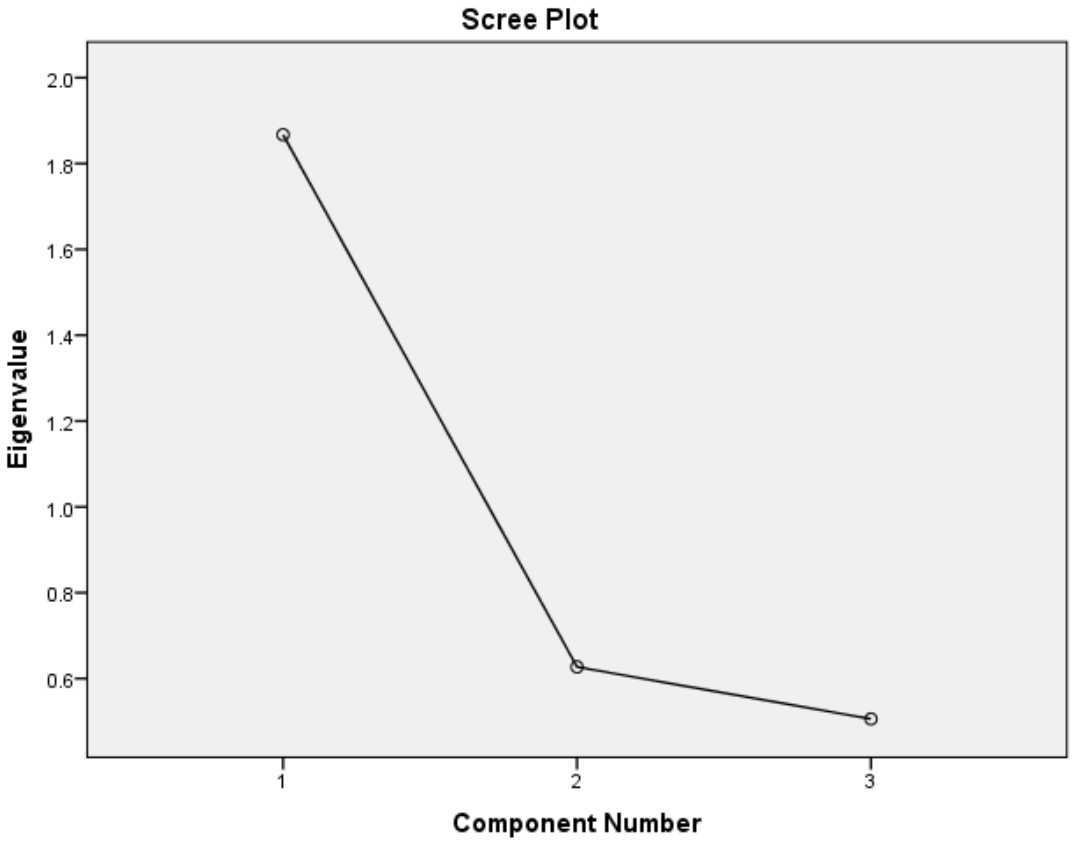


Figure 4: Scree plot of the Components Extracted from Factor Analysis

4.5 Ordinal logistic regression

Ordinal analysis test of parallel lines results in table 11 shows that the p-value < 0.001 we reject the null hypothesis and conclude that there is a significant difference across response categories at the 5 percent level of significance, violating the assumption of ordinary regression. Thus, based on this result, it is appropriate to stop using ordinary logistic regression and proceed using the Multinomial logistic regression to establish risk factors influencing depression among adults in Namibia.

Table 11: Assumption of parallel lines

Model	-2 Log Likelihood	Chi-Square	df	p-value
Null Hypothesis	5536.427	-	-	-
General	5431.392	105.035	23	0.001

4.6 Factors influencing depression

The study presents two multinomial logit equations with no depression as the reference category/baseline category. The first multinomial logit model compares men and women with mild depression to those with no depression and it includes predictor variables such as (region of the participant, residential status, levels of education, smoking status, employment status, marital status, sex and participant's age-group). The second multinomial logit model compares men and women with severe depression to those with no depression using same predictor variables used in the first model. The multinomial logit models presented in table 12 and table 13.

Risk factor for mild depression relative to no depression

The results in Table 12 shows that those from Caprivi region (OR = 1.290, 95% CI = 1.012-1.646, p = 0.040), Karas (OR = 1.406, 95% CI = 1.130-1.750, p = 0.002), Kavango (OR = 1.271, 95% CI = 1.005-1.606, p = 0.045) and Oshikoto (OR = 1.470,

95% CI = 1.168-1.851, p < 0.001) were more likely to experience mild depression than those from Khomas region. While Erongo region (OR = 0.618, 95% CI = 0.493-0.774, p < 0.001), Hardap (OR = 0.603, 95% CI = 0.468-0.776, p < 0.001), Otjozondjupa (OR = 0.704, 95% CI = 0.554-0.895, p = 0.004), Kunene (OR = 0.457, 95% CI = 0.342-0.610, p < 0.001) and Omusati (OR = 0.706, 95% CI = 0.545-0.915, p = 0.009), were less likely to experience mild depression compare to those from Khomas region. The study indicates that no there were significant differentials in the likelihood of mild depression relative to no depression due to marital status. Adult men and women who are no longer living together/separated (OR = 1.596, 95% CI = 1.210-2.106, p < 0.001) were more significantly related to mild depression compare to married couples. The unemployed adults (OR = 0.813, 95% CI = 0.729-0.906, p < 0.001) were less likely to be influenced by mild depression compered to employed individuals. The result further shows that females (OR = 1.502, 95% CI = 1.340-1.683, p = 0.001) experienced more of mild depression compare to males. The results also indicated that, the young one aged 15-24 (OR = 1.469, 95% CI = 1.226-1.761, p < 0.001) was found to be at high risk of mild depression compared to elders aged 45 years or more. The place of residence and smoking cigarettes were insignificantly associated with mild depression (p-value = 0.498 and p-value = 0.113 respectively).

Table 12: Summary statistics for the multinomial regression model of mild depression based on 2013 NDHS data

	Variable	Sig	OR	95% CI of OR	
				Lower	Upper
Mild depression	**Regions**				
	Caprivi	0.040*	1.290	1.012	1.646
	Erongo	0.001***	0.618	0.493	0.774
	Hardap	0.001***	0.603	0.468	0.776
	Karas	0.002**	1.406	1.130	1.750
	Kavango	0.045*	1.271	1.005	1.606
	Otjozondjupa	0.004**	0.704	0.554	0.895
	Kunene	0.001***	0.457	0.342	0.610
	Ohangwena	0.177	1.181	0.928	1.503
	Omaheke	0.071	0.788	0.608	1.021
	Omusati	0.009**	0.706	0.545	0.915
	Oshana	0.094	0.816	0.643	1.035
	Oshikoto	0.001***	1.470	1.168	1.851
	Khomas (reference)		1.000		
	Place of residence				
	Urban	0.498	1.043	0.924	1.174
	Rural (reference)		1.000		
	Smoke				
	No	0.113	0.873	0.738	1.033
	Yes (reference)		1.000		
	Marital Status				
	Never in union	0.913	0.992	0.853	1.152
	No longer living together/separated	0.001***	1.596	1.210	2.106
	Living with a partner	0.547	1.055	0.887	1.254
	Widowed	0.156	1.249	0.919	1.698
	Divorced	0.283	1.276	0.818	1.990
	Married (reference)		1.000		
	Employment status				
	Unemployed	0.001***	0.813	0.729	0.906
	Employed (reference)		1.000		
	Sex				
	Female	0.001***	1.502	1.340	1.683
	Male (reference)		1.000		
	Age group				
	15-24	0.001***	1.469	1.226	1.761
	25-34	0.225	1.112	0.937	1.321
	35-44	0.797	1.023	0.863	1.212
	45+ (reference)		1.000		

a. The reference category is: No depression.
*** p < 0.05 * * p < 0.01 *** p < 0.001**

Risk factor for severe depression relative to no depression

Table 13 shows that men and women from Caprivi region (OR = 2.119, 95% CI = 1.699-2.641, p < 0.001), Karas (OR = 2.239, 95% CI = 1.836-2.731, p < 0.001) and Kavango (OR = 1.422, 95% CI = 1.137-1.779, p = 0.002) were more likely to experience severe depression than those from Khomas region. While Erongo region (OR = 0.589, 95% CI = 0.480-0.744, p < 0.001), Hardap (OR = 0.529, 95% CI = 0.411-0.681, p < 0.001), Otjozondjupa (OR = 0.745, 95% CI = 0.593-0.937, p = 0.012), Kunene (OR = 0.451, 95% CI = 0.339-0.599, p < 0.001), Omaheke (OR = 0.738, 95% CI = 0.570-0.955, p = 0.021), Omusati (OR = 0.569, 95% CI = 0.433-0.749, p < 0.001) and Oshana regions (OR = 0.604, 95% CI = 0.469-0.779, p < 0.001) were less likely to experience severe depression respectively, compared to those from Khomas region. The urban residents in Namibia (OR = 1.284, 95% CI = 1.140-1.446, p < 0.001) were more likely to be affected by severe depression than rural residents.

Interestingly, the study indicates that the cigarette non-smokers (OR = 0.745, 95% CI = 0.633-0.878, p < 0.001) were less likely to have severe depression compared to those who smoke cigarettes. Apart from those who never in union, all the other marital status are significant; those who are no longer living together/separated (OR = 2.462, 95% CI = 1.920-3.157, p < 0.001), living with a partner (OR = 1.322, 95% CI = 1.117-1.564, p < 0.001), widowed (OR = 1.660, 95% CI = 1.237-2.227, p < 0.001) and divorced (OR = 1.750, 95% CI = 1.171-2.615, p = 0.005) were more significantly associated with severe depression compared to married couples. The results also indicated that female (OR = 2.493, 95% CI = 2.194-2831, p < 0.001) were found to have more severe depression compare to male. The result further shows that younger ages; 15-24 years old (OR = 1.658, 95% CI = 1.377-1.977, p < 0.001) and 25-34 years

old (OR = 1.395, 95% CI = 1.172-1.660, $p < 0.001$) were found to be at a high risk of experience severe depression compare to those with 45 years or older.

Table 13: Multinomial regression results in severe depression based on 2013 NDHS data

Variable		Sig	OR	95% CI of OR	
				Lower	Upper
severe depression	**Regions**				
	Caprivi	0.001***	2.119	1.699	2.641
	Erongo	0.001***	0.589	0.480	0.744
	Hardap	0.001***	0.529	0.411	0.681
	Karas	0.001***	2.239	1.836	2.731
	Kavango	0.002**	1.422	1.137	1.779
	Otjozondjupa	0.012*	0.745	0.593	0.937
	Kunene	0.001***	0.451	0.339	0.599
	Ohangwena	0.052	0.771	0.593	1.002
	Omaheke	0.021*	0.738	0.570	0.955
	Omusati	0.001***	0.569	0.433	0.749
	Oshana	0.001***	0.604	0.469	0.779
	Oshikoto	0.116	0.813	0.628	1.053
	Khomas (reference)		1.000		
	Place of residence				
	Urban	0.001***	1.284	1.140	1.446
	Rural (reference)		1.000		
	Smoke				
	No	0.001***	0.745	0.633	0.878
	Yes (reference)		1.000		
	Marital Status				
	Never in union	0.840	1.016	0.873	1.181
	No longer living together/separated	0.001***	2.462	1.920	3.157
	Living with a partner	0.001***	1.322	1.117	1.564
	Widowed	0.001***	1.660	1.237	2.227
	Divorced	0.005**	1.750	1.171	2.615
	Married (reference)		1.000		
	Employment status				
	Unemployed	0.019*	0.878	0.787	0.979
	Employed (reference)		1.000		
	Sex				
	Female	0.001***	2.493	2.194	2.831
	Male (reference)		1.000		
	Age group				
	15-24	0.001***	1.658	1.377	1.997
	25-34	0.001***	1.395	1.172	1.660
	35-44	0.244	1.110	0.932	1.322
	45+ (reference)		1.000		

a. The reference category is: No depression.
*** p < 0.05 * * p < 0.01 *** p < 0.001**

CHAPTER 5

This chapter discusses and concludes the findings that were presented in chapter 4. The main objective of the study was to identify socio-demographic factors for psychotic disorders and depression among adults in Namibia. This chapter also gave recommendations based on the findings.

5.1 Discussion of psychotic disorder and depression results

This study modeled socio-demographic factors for psychotic disorders and depression among adults in Namibia. The study used quantitative secondary data in order to seek answers to the stated objectives. The study analyzed descriptive statistics, Chi-square was used to summarize the data and establish prevalence of psychotic disorders and depression, factor analysis was used to construct an index of depression and fit two models (Binary and Multinomial logistic regression) to identify risk factors influencing psychotic disorders and depression among adults in Namibia.

The results in chapter 4 indicated that there are more female respondents as opposed to male counterparts. Most of the respondents in the study were aged 15 – 24, as indicated by 36 percents. About 10 percents of the respondents are based in Khomas region. Furthermore, 60 percents of the respondents have attained secondary education. However, urban residents constitute 51 percents in the study. Similarly, 51 percents of the respondents were unemployed, the results also constitute 89 percents of non-smokers, and with 55 percents of never-married participants. In addition, it is found that psychotic disorders had a prevalence of 13 percents while depression had 30 percents prevalence, in 2013. To assess the association of socio-demographic factors for psychotic disorders and depression among adults in Namibia, the two models fitted revealed the results discussed below.

This study revealed that women are at higher risk of having psychotic disorders as compare to men. Similarly, the study was done by Kaxuxuena et al. (2017) find out that women try more suicide than men however men tend to be effective in committing this act. Several factors have been suggested as possible explanations for the higher prevalence of late-onset schizophrenia in women. They include neuroendocrine changes, greater longevity, psychosocial stressors and role expectations (Tan & Seng, 2012).

Theoretical explanations for this difference include the view that females who develop antisocial behavior surmount a threshold of higher risk than that of males and are therefore more severely afflicted. According to Oliffe (2009), men tend to deny their illness and endorsed health care services. This can largely be credited due to some of the ways in which men have been taught to view their masculinity. For example, some cultures do not prioritize the use regular medical check-ups to maintain their health (Oliffe, 2009).

This study found women to be twice (RR=2.4) at high risk of severe depression compared to men. These findings go hand in hand with the study done in India by Nakulan, Sumesh, Kumar, Rejani, and Shaji (2015). This was due to increased life expectancy, poor social support or exposure to psychosocial stress among individuals.

Similarly, the study was done by Hussien, Tesfaye, Hiko, and Fekadu (2017) found out that women get depressed more than men because most women are economically dependent on males particularly in low and middle-income countries. In addition, women take most of responsibilities in the house like childbearing, rearing and others, and face dramatic hormonal shifts related to reproductive functioning. According to Albert (2015), the fact that women have a high prevalence of depression as compared

to men may be explained by the correlation between depression and female hormonal fluctuations, particularly during puberty, prior to menstruation, following pregnancy and at menopause. On the other hand, Piccinelli and Wilkinson (2000) in a review of existing literature, determined the risk factors that explain gender differences in rates of depression. They concluded that the reason why women are more likely to be influenced by depressive disorders compared to men is not because of genetic or biological factors but rather an increased likelihood of adverse experiences as a child and stress due to cultural norms, which in turn interacts with how women experience adverse life events.

Teenagers and youngsters (Aged 15-24) indicated a higher percentage of severe depression. The finding was consistent with the results from Hailemariam, Tessema, Asefa, Tadesse, and Tenkolu (2012) that the risk of depression among younger age groups is significantly high compared to latter age category. In addition, the study done by Cesar and Chavoushi (2013) found similar results. It showed that depression is associated with young age group. Furthermore, Merry et al. (2012) explained that depression is a highly prevalent and a serious mental disorders in younger people, and is associated with a range of problems such as problematic peer and family relationships, school difficulties and poor academic achievement, social dysfunction, teenage pregnancy, health problems, increased substance abuse, and suicides.

The study results show that the Oshikoto region and //Kharas region had the highest number of people that affirmed to seeing or hearing things that are not there while Kunene and Erongo Region had the lowest number of people affected by psychotic disorders. High risk of severe depression is recorded in //Karas and Caprivi region. However, it should be noted that The inexpensive mental health services in Namibia

are only available at two psychiatrics at the WMHCC and the OPU (Ashipla, 2013). This can be described as 'selective', in the sense that they target subgroups of the population whose members have yet to manifest suicidal behaviors, but exhibit risk factors (in this case, mental and substance use disorders) that predispose them to do so in the future (Ferrari et al., 2014).

Regarding the level of education, this study found that individuals that had lower lever of education were significantly at a higher risk of psychotic disorders compared to those who attained high level of eduction. Other researchers like Subramaniam et., al (2014) found that as compared to those with tertiary education, those with primary education were significantly more likely to have suicidal ideation, plan, and attempt.

However, the relationship between the level of education and risk of depression is different in the study done by Hailemariam et al. (2012), which reported that tertiary students generally have higher odds of visiting health facilities than people who have completed their education or never attended school.

Participants who were no longer living together with their partners or widowed were found to be significantly related to psychotic disorders and depression as compared to participants who were married. The highest number of people affected by psychotic disorders was also noticed among those who were never in a union compared to married couples. This result is also supported by studies done in South Africa, Uganda, and Ethiopia (Tomlinson et al. (2009); Hailemariam et al. (2012); Oh et al. (2013)). In addition, Subramaniam et., al (2014) also found marital status to be significantly associated with suicidal behavior; those who were divorced/separated were significantly more likely to report suicidal attempts than those who were single.

The finding of this study is supported by the study done in Ethiopia by Hailemariam et al. (2012), which indicated that there was a significantly higher risk of depressive

episodes in widowed and divorced individuals. An unstable marital relationship and the loss of a partner increase the risk of having depressive episodes. Moreover, widowers might have stress when one loses the beloved one (Hailemariam et al., 2012).

People living in rural areas experienced a lower psychotic disorder compared to those that live in urban areas. On the contrary, is indicated in Heinz et al. (2013) that there are significantly higher rates of affective psychosis in those living in urban areas. A study on prevalence and risk factors for depression by Nakulan et al. (2015) showed that in rural societies, women living without male partners can particularly be stressed. Nonetheless, unlike for psychotic disorders and depression are reported to be higher in urban areas as opposed to rural area. Concerning depression, rates in inner urban areas have been found to be high, though to a lesser degree than for non-affective psychosis (Heinz et al., 2013).

This study found smoking cigarettes to be insignificantly associated with both psychotic disorders and mild depression. However, smoking cigarettes was found to be influential toward severe depression. This result goes hand in hand with the findings of the study done by Degenhardt et al. (2013) which found that substance use disorders were the cause of two-thirds of all suicide DALYs. Besides emphasizing these as a debilitating group of disorders, the findings of Ferrari et al (2014) highlight the importance of prioritizing the prevention, early detection and effective management of mental and substance use disorders – particularly MDD – as a key suicide prevention strategy. Several authors have shown that Psychotic experiences in adulthood are associated with physical health problems and common mental disorders (Moreno et al., 2013).

Employment status is generally beneficial to health and quality of life. However, in this study employment status was found to influence both mild and severe depression. This may be associated with the fact that people with low income considered themselves as unemployed. However, Subramaniam et al., (2014). stated that respondents with higher annual incomes had a significantly lower risk of suicidal behaviors than those with lower annual incomes.

Nevertheless, according to the finding retired and unemployed respondents were highly depressed compared to employed people. Social and economic problems related to unemployment and retirement, such as lost productivity, lost output and income opportunity, lost self-esteem and dignity are implicated as possible causes of the association depression showed with unemployment and retirement (Nakulan et al., 2015).

On the contrary, study conducted by Hussien et al. (2017) showed no statistically significant association between depression and employment status. A possible reason for this finding was that the study was done in a clinical setting among patients using relatively small sample size in which diseases and settings could affect the association between depression and employment status of respondents (Hussien et al., 2017).

5.2 Conclusion and recommendations

In conclusion, the results showed that both depression and psychotic disorders are major health conditions among adults in Namibia. Binary logistic regression results showed that regions, place of residence, level of education, marital status and sex significantly influenced the risk of psychotic disorders among the Namibian adults. Multinomial logistic regression results indicated significant differentials in the likelihood of both mild and severe depression due to regions, smoking status, marital status, employment status and sex of the participants. Modifiable risk factors, both

individual and societal, could be the targets for public depression prevention among adult programs in Namibia. There is a need to implement mental health programs that are gender-specific, as different risk factors have been identified for women compared to men. Marital status is a major factor and should be addressed, especially regarding widowed or separated individuals. For this finding, the marriages should be promoted in society. Smoking cigarettes was found to be a major factor for depression disorders therefore, public health preventions at individual levels could focus on the better management of smoking. Smoking should continue to be discouraged by increasing the price of cigarettes. Employed participants were found to be associated with the risks of depression in Namibia. However, this contradicted other scholars on depression. In addition, there is a need for more mental health services to be rolled out to all health facilities in Namibia and to step up mental health educational campaigns, both in primary schools and communities. The government needs to increase the number of mental health facilities and the resources allocated to mental health in the country. Some limitations regarding this study need to be considered in order to put the findings into perspective.

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