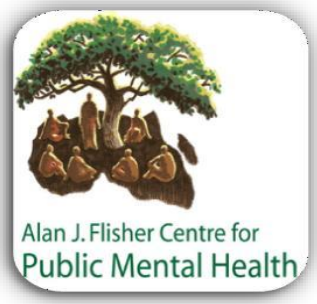

RESEARCH PROTOCOL TITLE:

Associations between HIV, TB and psychological distress among a sub-sample of a nationally representative study of South African adults: a secondary data analysis

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Course: M.Phil. Public Mental Health

Faculty: Department of Psychiatry and Mental Health

Student: Marizanne de Wit

Student Number: DWTMAR016

Supervisors: Dr Emily Garman & Prof Crick Lund

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i. Declarations

I, Marizanne de Wit, hereby declare that the work on which this dissertation/thesis is based is my original work (except where acknowledgements indicate otherwise) and that neither the whole work nor any part of it has been, is being, or is to be submitted for another degree in this or any other university.

This dissertation has been submitted to the Turnitin module and I confirm that my supervisor has seen my report and no concerns have been raised by my supervisor.

Signature: Signed by candidate

Date: 09 February 2022

ii. Abstract

Introduction: South Africa faces an immense burden of disease, considering that it is the epicentre of the global HIV and TB pandemics. Moreover, the burden of mental ill-health is a growing concern due to its prominent association with infectious diseases. While global research evidence has shed some light on the effects of psychological distress on communicable diseases such as HIV and TB and vice versa, including the effects of distress on medication adherence, the association between psychological distress and HIV and TB co-morbidity among South African adults remains elusive.

Aims: This study aims to determine the prevalence of psychological distress among South Africans adults, what socio-demographic factors are associated with psychological distress, whether HIV or comorbid TB and HIV is associated with psychological distress and finally, to investigate the association between depression and non-adherence among adults who live with HIV or those who have both HIV/TB.

Methods: This study made use of cross-sectional data collected in 2017 as part of the fifth wave of nationally representative surveys from the South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM). Only participants between the ages of 18-60 who had data on HIV, TB and psychological distress were included (N=20208). Current HIV status, and TB status in the past year was self-reported; however, final HIV status was confirmed via dry blood spot tests. The Kessler-10 screening tool was administered to obtain information on psychological distress using the recommended cut-off score of >16 to indicate the presence of psychological distress and ≤16 to indicate the absence thereof. Descriptive statistics were used to report weighted socio-demographic-, psychological distress, and HIV and TB- characteristics of the sample. Descriptive statistics were also used to report the point prevalence of psychological distress, HIV and HIV/TB comorbidity. Logistic Regression analyses were conducted to assess the associations between demographic factors, socio-economic characteristics, HIV, TB, and psychological distress. Demographic and socio-economic factors which were significantly associated with psychological distress in univariate analyses were included in subsequent adjusted multilevel logistic regressions to assess the association between HIV, TB, and psychological distress. The association between psychological distress and adherence was assessed among a subsample of participants with

HIV using a logistical regression analysis, adjusting for significantly associated demographic and socio-economic factors. All analyses were adjusted for clustering at the small area layer to account for sampling design.

Results: The prevalence of psychological distress in this sample was 33.7% (n=6479). A total of 22.2% (n=4851) were HIV positive, 0,08% (n=140) had been diagnosed with TB in the past year and 0,04% (n=84) had co-morbid HIV/TB. Age, race, gender, marital status and education were found to be associated with psychological distress. After controlling for these variables, participants living with HIV were 1.13 times as likely (95%CI=1.01-1.27) to suffer from psychological distress compared to people who did not have HIV, while participants with co-morbid TB and HIV were 2.31 times as likely (95%CI=1.16-4.60) to have psychological distress. No association between psychological distress and medication adherence was found (OR=0.75, 95%CI=0.39-1.43).

Conclusion: Unemployed black women who are divorced, separated, or widowed, and who have no education are most likely to suffer from psychological distress. Having a positive HIV status is associated with a greater likelihood of being psychologically distressed, which is concerning given the high prevalence of people living with HIV in South Africa. When people living with HIV also develop TB disease, their likelihood of suffering from psychological distress considerably increases compared to people who are not living with HIV. Current mental health services are grossly inadequate to meet the mental health needs of this particularly vulnerable group of public healthcare patients. Integration of mental healthcare in the public health setting is integral in addressing South Africa's mental health needs.

iii. Acknowledgements

My greatest gratitude goes to Dr Emily Garman, my supervisor, who has been instrumental in my journey in completing this dissertation. Thank you for your guidance, support, and motivation throughout the past three years. This journey has been riddled with many obstacles and learning curves, including a COVID pandemic, among others. I appreciate your leadership and patience.

I am extremely grateful to Prof. Crick Lund, for your expertise, support, and insight. It has been an honour working under your supervision.

Herewith I would also like to express my sincere gratitude to the African Mental Health Research Initiative (AMARI), the Alan J. Flisher Centre for Public Mental Health and the University's Department of Psychiatry for funding my degree. Thank you for recognizing my potential and supporting me in realizing one of my biggest goals.

A heartfelt thank you to my tribe; my family and closest friends, who have helped me kept my sanity. Thank you for always believing in me, for loving me at my worst and celebrating me at my best.

Last but certainly not the least, I acknowledge the power of Source in making all this possible. I am grateful; I am honoured; I am blessed.

I dedicate this to my son. You can do big and scary things – I believe in you.

Table of Contents

iv. List of Tables

v. List of Acronyms

AIDS	Acquired immune deficiency syndrome
CES-D	Centre for Epidemiological Studies Depression Scale
CMD	Common mental disorder
DALY	Disability-adjusted life year
DBS	Dried-blood spots
DSM	Diagnostic and Statistical Manual of Mental Disorders
HIC	High income country
HIV	Human immunodeficiency virus
HSRC	Human Science Research Council
IPT	Interpersonal therapy
K-10	Kessler Psychological Distress Scale
LMIC	Low-to-middle-income Country
PHQ-9	Patient Health Questionnaire
PTSD	Post-traumatic stress disorder
SABSSM	South Africa National HIV Prevalence, Incidence, Behaviour and Communication Survey
SAL	Small area layer
SASH	South African Stress and Health
TB	Tuberculosis
VP	Visiting Point
WHO	World Health Organization
YLD	Years lost to disability

1. Introduction

This study considers the intricate relationship between psychological distress and two of South Africa's most prevalent epidemics, namely the Human Immunodeficiency Virus (HIV) and Tuberculosis (TB). South Africa is characterised by stark income and social inequalities (Burger & Christian, 2018), where 55.5% of the population are considered living below the poverty line (StatsSA, 2017). It is in these low socio-economic landscapes that the burden of HIV and TB are felt the most. According to the South African Health Review (2018), almost 20% of the world's HIV positive population comes from South Africa. With HIV being the greatest risk factor for TB (Berkowitz et al., 2018) due to its effect on the immune system, it is not surprising that the HIV epidemic is fueling the TB epidemic. Like with HIV, South Africa is at the forefront of the TB epidemic, estimating 380 new TB cases per 1000 in the year 2016 (Tomita et al., 2019). While TB is a curable disease, it remains the leading cause of death among South Africans (StatsSA, 2018), especially those suffering from HIV. An estimated 60% of people with TB are also living with HIV (Peltzer & Louw, 2013) and almost half of co-infected people are not aware of their status and are consequently not on the right treatment (UNAIDS, 2018a). This has grave consequences for transmission and morbidity.

The effects of poor mental health on the well-being and livelihood of individuals, and it's rippling effects on families and communities, have also been widely established (Haroz et al., 2017; Havenaar, Geerlings, Vivian, Collinson, & Robertson, 2008; IHME, 2018; Reddy, 2010). Poor mental health incorporates psychological distress, a term used to describe a general state of suffering from various symptoms of depression, such as hopelessness, sadness and loss of interest, and anxiety, such as restlessness and tension (Mthembu, Mabaso, Khan, & Simbayi, 2017). Somatic symptoms, such as headaches and insomnia, may accompany feelings of depression and anxiety (Drapeau, Marchand, & Beaulieu-Prevost, 2012). An exact definition of psychological distress remain a dissensus in the scientific community and the term continues to be ambiguous: on the one hand, psychological distress is deemed an emotional disturbance that carries significant burden for the sufferer, impairing functioning and social life; on the other hand, psychological distress is a criteria used in the diagnosis of some psychiatric disorders and, in conjunction with living impairment, used as a marker of the severity of other disorders (Drapeau et al., 2012). Psychological distress is acknowledged as a non-specific mental health problem. It differs from a common mental disorder in the sense that it refers to a

broader range of symptoms without warranting a clinical diagnosis of a mental illness. In other words, while both conditions cause significant burden and incorporate depressive, anxiety and somatoform symptoms, those with common mental disorders (CMD) present with a more severe spectrum of symptoms and can be classified as having a psychiatric condition (Patel & Kleinman, 2003). Nonetheless, both psychological distress and CMD are of great public health significance due to the morbidity and disability it causes (Patel & Kleinman, 2003). For the purpose of this study, the definition of psychological distress encompasses symptoms of depression and anxiety.

More specifically, the burden of depressive symptoms, or depression, in general is a global phenomenon that affects 4.4% of the world population (World Health Organization, 2017). Now recognised as a global health priority, alongside illnesses such as HIV and TB, depression causes significant and varying disability across continents and cultures (Whiteford et al., 2013). The global lifetime prevalence of depression is estimated at 10.8% (Lim et al., 2018) and South African figures from a nationally representative study are comparable, indicating a 9.7% lifetime prevalence of depression (Tomlinson, 2009). While the literature has shown that depression is generally more common in developed countries (Steel et al., 2014), the increase in the prevalence of depression in developing countries is noteworthy (World Health Organization, 2017). Poor mental health being strongly associated with economic stressors (Patel, Abas, Broadhead, Todd, & Reeler, 2001), is worrisome when considering South Africa, a country characterised by unequal economic and social landscapes. It is therefore not surprising that an estimated 26% of South Africans experience significant symptoms of depression and associated disability (Mungai & Bayat, 2019).

While global and local epidemiological data on anxiety is limited, anxiety ranked as the 9th leading cause of global disability in 2015 (Vos et al., 2016). In 2010, the global pooled prevalence for anxiety was estimated at 4.4% (Baxter, Vos, Scott, Ferrari, & Whiteford, 2014). Local research indicates that South Africans suffer from elevated levels of anxiety when compared to the global population, estimating an 8.1% 12-month prevalence of generalized anxiety disorder among a nationally representative sample (Herman et al., 2009). Anxiety or anxiety symptoms are characterized by significant fear and distress (Xiong, Liu, Liu, & Hall, 2022) and it can have an adverse impact on quality of life and functioning. Evidence has shown that divorce, high rates of unemployment and increased risk of suicide is associated with patients who suffer from social anxiety disorder (Khan, Leventhal, Khan, & Brown, 2002).

Anxiety and depression often present comorbidly in individuals (Tesfaw et al., 2016), hence rise of the term psychological distress to encompass a broader range of symptoms.

Depressive symptoms or depression negatively affect the emotional, physical, psychological, and functional well-being of individuals (Duko, Gebeyehu, & Ayano, 2015), with dire consequences for their social connectedness and economic circumstances (Hammer-Helmich et al., 2018). Anxiety symptoms also cause considerable impairment in sufferers (Saal, Kagee, & Bantjes, 2019), cause both health and psychosocial problems (Xiong et al., 2022) and are negatively associated with education and income (Mendlowicz & Stein, 2000). The burden of psychological distress more generally also extends to families, who first-hand experience the breakdown in interpersonal relationships (Hammer-Helmich et al., 2018) and suffer the economic consequences of poor mental health (Lepine & Briley, 2011), as well as to countries, who suffer considerable losses due to employee absenteeism, loss of productivity and treatment costs (Hu, He, Zhang, & Chen, 2007).

Risk factors for psychological distress can occur within many systems of the environment, each one influencing the individual while influencing one another. Risk factors may vary across different cultures and contexts (Offord & Kraemer, 2000), though some have been widely and consistently identified as important for the development of psychological distress. These include being female, unemployed, experiencing financial strain, having a lower level of education, and living in poverty. A more detailed review of the risk factors for psychological distress is provided in the next chapter.

An important relationship to consider is the relationship between HIV, TB, and psychological distress. There is preliminary research suggesting that depression is more common among individuals with HIV, TB, or co-infected population when compared to the general population (Duko et al., 2015). The relationship between psychological distress and HIV or TB seems to be bidirectional. On the one hand, suffering from HIV increases the risk of developing psychological distress because of living with a life-threatening illness, stigma, and the need to adhere to strict treatment regimen (Boarts, Buckley-Fischer, Armelie, Bogart, & Delahanty, 2009; Nel & Kagee, 2013).On the other hand, suffering from psychological distress increases the risk of acquiring HIV because distressed individuals are more likely to engage in risky sexual behaviour (Smit et al., 2006) or may be less inclined to look after their health due to feeling helpless or hopeless (Govender & Schlebusch, 2012). While limited, research has been conducted on the relationship between TB and psychological distress, and it is acknowledged

that a positive TB diagnosis increases the risk for the development of psychological distress (Peltzer, Naidoo, et al., 2012), with some evidence suggesting that people suffering from a mental illness may be at an increased risk to develop TB disease (Prince et al., 2007). Stigma among people living with TB play a significant role in the development of psychological distress, and the authors have also highlighted the association between substance use and TB disease in the risk for psychological distress (Peltzer, Naidoo, et al., 2012). Elevated rates of TB disease among psychiatric in-patients could be explained by the nature of the disease transmission and poor institutional preventative measures. It has been found that those with mental illness who also have a substance use disorder are at an increased risk for the development of TB disease (Prince et al., 2007), suggesting that substance use is an important variable in the relationship between psychological distress TB disease.

Psychological distress not only affects the mental well-being of primary care patients with HIV or TB, but it also has grave implications for adherence to treatment, disease progression and health outcomes. Disruption in treatment regimens increases the likelihood of treatment failure, the development of medication resistance and continued transmission (Ogundele, Moodley, Pillay, & Seebregts, 2016; Uthman, Magidson, Safren, & Nachega, 2014). Directly observed therapy, a strategy adopted by the South African health care system in an attempt improve adherence, has failed to achieve the successes it intended to have (Nohaji & Sokhela, 2016). In order for improvements in treatment completion and cures, calls have been made to incorporate approaches or interventions that consider health care communication, levels of education, beliefs, attitudes and economic barriers (Prince et al., 2007). Improving mental health care services and establishing a stronger integration into the public health care system may also be a means of addressing adherence and will consequently improve health outcomes of people with HIV or TB.

While some international research has been done on the associations between psychological distress and communicable diseases, there is a dearth of South African literature on this topic. There is a need to better understand the association between psychological distress and communicable diseases in a representative sample of South Africa, so that mental health needs can be addressed among these vulnerable populations and the patients' prognoses improved. This study will therefore provide insight into the association between psychological distress, HIV and TB, or both, among the general representative adult population in South Africa. It will advocate for the integration of mental health services into primary TB/HIV care.

1.2. Purpose of Study

1.2.1. Research Question

What is the association between psychological distress, HIV and TB among a sub-sample of a nationally representative sample of South African adults?

1.2.2. Objectives

a.) What is the prevalence of psychological distress among a sub-sample of a nationally representative sample of South African adults?

b.) What are the socio-economic and demographic factors associated with psychological distress among a sub-sample of a nationally representative sample of South African adults?

c.) Are HIV and TB/HIV co-morbidity associated with psychological distress among a sub-sample of a nationally representative sample of South African adults?

d.) What is the association between psychological distress and non-adherence to HIV or TB treatment among a sub-sample of a nationally representative sample of South African adults who live with HIV or both HIV and TB?

2. Literature Review

This section will begin by describing the burden and prevalence of psychological distress and its impact on daily life and functioning. It will then use the socio-ecological framework to guide a discussion on risk factors for psychological distress. Finally, it will conclude with a focus on HIV and TB as risk factors for psychological distress, particularly in South Africa. While psychological distress is experienced as a state of emotional suffering, symptoms of depression and anxiety remain its hallmark. Therefore, the review of literature will include research on both depression and anxiety symptoms to encompass the term "psychological distress".

2.1. The burden and the prevalence of psychological distress

Findings from the 2017 Global Burden of Disease Report indicate that mental disorders, mainly depression and anxiety, are a leading cause of disability for people world-wide (IHME, 2018; James et al., 2018). In fact, James et al. (2018) confirms that mental disorders have prevailed as one of the leading causes of disability for the past three decades, persistently causing major global non-fatal health loss from 1990 – 2017. Like the rest of the world, a systematic analysis on the Global Burden of Disease study maintains that mental disorders are also a leading cause of disability in Sub-Saharan Africa, among other conditions such as HIV/AIDS, iron deficiency, anaemia and lower back- and neck pain (Vos et al., 2016).

Recent figures indicate that depression affects more than 300 million people globally, or approximately 4.4% of the world's total population (World Health Organization, 2017). The lifetime prevalence of depressive disorders is estimated to be between 3 and 17% (Duko et al., 2015). A more recent meta-analysis on the prevalence of depression, specifically, in communities from 30 different countries over a 30-year period, found the prevalence of depression in the past 12-months to be 7.2% and the lifetime prevalence to be 10.8% (Lim et al., 2018). From 2005 to 2015, an 18.4% increase in the prevalence of people living with depression was reported and the growing population trends are seen across age groups (World Health Organization, 2017).

According to the 2017 WHO Report on common mental disorders, 27% of depression cases were from the South East Asia region, 21 % from the Western Pacific region, 16% from the

Eastern Mediterranean region, 15% from the region of the Americas, 12% from the European region and 9% from the African region (World Health Organization, 2017). While research indicates that depression is more common in the developed world (Steel et al., 2014), the prevalence of depression is increasing in developing countries due to population growth and the fact that more people are reaching the age where common mental disorders affect people the most (World Health Organization, 2017). Strongly associated with economic stressors, depression has been described as being one of the most significant contributors to morbidity and disability in developing countries (Patel et al., 2001).

Depression is the 3rd leading cause of global disability (Vos et al., 2016). According to projections, it is believed that by 2030, depression will be the leading cause of disease burden worldwide (Lepine & Briley, 2011). It is estimated that the number of all-age Years of healthy life lost to disability (YLD) attributed to depressive disorders increased by 34% during 1990 – 2017 (James et al., 2018). According to the WHO 2017 report, depressive disorders account for 7,2% of all YLD in South Africa, which has the third highest rate of depression in the African region (World Health Organization, 2017), indicating that depression is a considerable burden for the country.

While depression ranked as the 3rd leading cause of global disability in 2015, anxiety ranked as 9th (Vos et al., 2016). Global estimations for anxiety associated YLD was 27 million in 2010 (Baxter, Vos, Scott, Ferrari, et al., 2014). Findings from the 2010 Global Burden of Disease study confirms that 272.2 million people had a diagnosable anxiety disorder in that particular year (Baxter, Vos, Scott, Norman, et al., 2014), indicating a 4% overall pooled point prevalence (Baxter, Vos, Scott, Ferrari, et al., 2014) They also identified differences in the point prevalence across different regions, which ranges from 2.1% in East Asia to 6.1% in North Africa and Middle East. The highest prevalence of anxiety disorders was noted in regions of high conflict exposure, which includes Africa, and high-income countries (Baxter, Vos, Scott, Ferrari, et al., 2014). The limited global studies that have been conducted on the global burden of anxiety conclude that it is a significant burden of disease due to the high prevalence, early age of onset, level of impairment and extended duration (Baxter, Vos, Scott, Ferrari, et al., 2014; Xiong et al., 2022).

There are limited epidemiological data and research available on the prevalence and burden of depression and anxiety globally as was well as in South Africa. The South African Stress and Health (SASH) study is the only nationally representative household study which measured

mental disorders in the population (Herman et al., 2009). The study was conducted between 2002-2004 and formed part of the World Health Organization (WHO) World Mental Health (WMH) Survey Initiative (Herman et al., 2009). It was found that 1 in 6 South Africans had a diagnosable mental disorder in the past year, as classified using the Diagnostic and Statistical Manual of Mental Disorders (DSM) (Herman et al., 2009). Anxiety was found to be the most prevalent mental disorder for both 12-month and lifetime categories (Herman et al., 2009). This study found a 8.1% 12-month prevalence and 15.8% lifetime prevalence for generalized anxiety disorder, while the 12-month prevalence for social phobia was 1.8% and the lifetime prevalence was 2.8% (Herman et al., 2009). They also identified a 4.5% 12month prevalence and a 9.8% lifetime prevalence for depression. While South Africa faces a great burden of mental disorders, data measuring psychological distress, including depressive and anxiety symptomology, paints even a more dire picture.

2.2. The impact on daily life and functioning

Psychological distress causes significant impairment in daily life. It not only affects an individual's mood, thoughts and behaviour negatively, but also has implications for physical heath. Those who suffer from psychological distress have a compromised quality of life. People who suffer from anxiety experience intense emotions of fear, nervousness, and stress for extended periods of time (Baxter, Vos, Scott, Ferrari, et al., 2014). These troubling emotions are often accompanied by physiological symptoms, such as an increased heart rate, sweating and hyperventilation. Anxiety is associated with health problems, trouble concentrating and fatigue (Xiong et al., 2022). Sufferers of anxiety have a decreased quality of life due to the many ways it affects and debilitates individuals. For example, having trouble focusing means productivity and performance will be impacted. This is also the case for fatigue. Indeed, research has shown that anxiety is associated with many disadvantages across the lifespan, which includes a lowered economic status, educational attainment, and impairment of personal relationships (Xiong et al., 2022).

Depression is also associated with many disadvantages and a significant burden. More than a passing experience, depression has long term effects. It is experienced through the following debilitating symptoms: loss of interest in things previously found pleasurable, low mood, decrease in energy, feelings of insignificance and guilt, a disturbance in sleep patterns and

eating behaviours, and trouble concentrating (Duko et al., 2015). Depression leaves sufferers incapacitated in their abilities to take action, to think, to feel, to experience love and to show affection (Ahlstrom, Skarsater, & Danielson, 2010). Depression affects different life domains, creating significant economic and social burdens felt on both individual and societal levels. Functional impairment experienced by sufferers of depression has been shown to be equally or even more severe than impairments associated with other chronic illnesses, like diabetes or congestive heart failure (Hammer-Helmich et al., 2018). For example, it was found that 24% of people suffering from a chronic medical disorder reported severe functional impairment, compared to 42% of people who suffer from a mental disorder (Lepine & Briley, 2011). While some people experience psychological distress and not necessarily meet criteria for a clinical disorder, they experience functional impairments which undoubtably have a negative impact on their different domains of life. People suffering from depression also struggle to perform activities associated with daily living and work productivity becomes challenging (Hammer-Helmich et al., 2018). This leads to under performance, high rates of absenteeism and unemployment among people with depression (Lepine & Briley, 2011). Mental illness burdens society with various costs, which can be measured either directly or indirectly. Direct costs, such as the cost of medical care and services, are more easily measured. However, most studies agree that the indirect costs, such as loss of productivity and unemployment, are more detrimental to society and the economy than direct costs (Jacob & Coetzee, 2018). While DALY's provide some insight to the burden of mental health, it does not include indirect costs of mental illness, such as the negative effect it has on family units or caregiver burnout, for example (Jacob & Coetzee, 2018)

A national survey conducted in a nationally representative sample in the United States found that depressed employees lose an average of 27 workdays per annum (Kessler et al., 2006), a finding comparable to South African literature. Using data from the SASH study, researchers measured "days out of role" (the number of days where an individual felt that they were completely unable to work or carry-out their day-to-day functioning) due to mental or physical and illness and found that South Africans with depression spent an average of 22.7 days out of role in the 12 months preceding baseline interviews (Mall et al., 2015). Role limitation as a result of mental illness has important consequences for national productivity losses. A Kenyan study assessed the cost of mental and behavioural disorders among institutionalised patients and found it to be a considerable economic burden to the country, with a total loss off more than US$ 13million due to costs for institutionalised patients with mental and behavioural

disorders (Kirigia & Sambo, 2003). Another study conducted in China, which measured both direct (US$8,090 million) and indirect (US$43,280 million) costs of depression, concluded that depression has a significant economic impact on the country (Hu et al., 2007). The financial burden of depression is even greater in South Africa, where data from the South African Stress and Health Study indicate that the estimated income lost per adult per annum suffering from severe depression or anxiety costs $4,798, with projections of total annual costs to South Africa in lost earnings amounting to $3.6 billion (2,2% Gross Domestic Product (GDP)) in 2003 (Lund, Williams, Myer, Stein, & Flisher, 2013).

The financial burden of mental health conditions is not only a great expense to countries; it extends to families as well. Family structures and their well-being are directly affected by loss of income due to workplace absenteeism or unemployment (Lepine & Briley, 2011). Family structures are also further affected as those affected by depression find it difficult to cultivate new and maintain established interpersonal relationships (Hammer-Helmich et al., 2018). Research indicates that people with more severe depressive symptomology report lower perceived levels of family functioning (Keeler & Siegel, 2016). A qualitative analysis on depressed parents report that they feel tired and unable to invest in relationships (Ahlstrom et al., 2010). Furthermore, depressed parents' capacity to show love and affection to their families is compromised (Ahlstrom et al., 2010). This weighs heavily on intimate partners and other family members, especially children.

Research shows that approximately 90% of people who commit suicide have a psychiatric illness at the time of their death, and suicide data is often used as a proxy for the burden of mental illness (Jacob & Coetzee, 2018). In particular, there is a strong association between suicide and depression (Prince et al., 2007). Indeed, depression has been identified as the leading risk factor for suicide (Keeler & Siegel, 2016). With approximately 788 000 people dying as a result of suicide in 2015, 78% of which occurred in LMIC, it is one of the top 15 leading global causes of death (World Health Organization, 2017). Globally, it is reported that 50% of all people who committed suicide had a formal diagnosis of depression (Reddy, 2010). Findings from the SASH study indicated a 9,1% lifetime prevalence for suicidal ideation, a 3,8% prevalence for suicidal plans and a 2,9% for suicide attempts (Sorsdahl, Stein, Williams, & Nock, 2011). Moreover, 61% of people with suicidal ideation and 70% of people who attempted suicide had a previously diagnosable mental condition (Khasakhala et al., 2011), thus supporting global evidence. Among the total sample suffering from depression, 27.1% had made a suicide attempt and 23.6% were thinking about or had a plan for suicide (Khasakhala

et al., 2011). Furthermore, this study found that the presence of more than one mental disorder increased the risk of suicide attempts. While suicide data is an important factor in the estimation of the burden of mental illness on society, it is a gross underestimation of underlying mental disorders when considered in isolation (Jacob & Coetzee, 2018).

Given the threats that psychological distress poses to the livelihood and mortality of individuals across the lifespan, and to familial structures and society, research in the field has focused on identifying the key risk factors for depression and anxiety.

2.3. Risk Factors for Psychological Distress

2.3.1. Theoretical Framework

The socio-ecological framework will be used to explore risk factors associated with psychological distress. Vulnerability to psychological distress is significantly influenced by the intricate interaction of stress-related and socio-demographic factors (Mthembu et al., 2017). The socio-ecological model for understanding human development was first conceptualised and introduced by Urie Bronfenbrenner in the 1970's, and placed the individual at the centre of various systems which interact and influence each other and the individual (Bronfenbrenner, 1977). This model was later developed into a theory in the 1980s and has been adapted for use in various fields, such as public health and behavioural sciences (Kilanowski, 2017). Socio-ecological models are still widely used today as a framework to understand the dynamic and interactive interaction between the individual and the environment, as it recognizes that the social, economic, political and contextual systems in which people are rooted significantly influences health behaviours, resource availability, health status and disease (McDaniel, 2018). Four nested hierarchical levels, namely intrapersonal, interpersonal, community and societal, describe the components of the socio-ecological model, and these will be used to guide the exploration of risk factors for depression. The following review of risk factors will focus on evidence from LMIC and South Africa more specifically, where available.

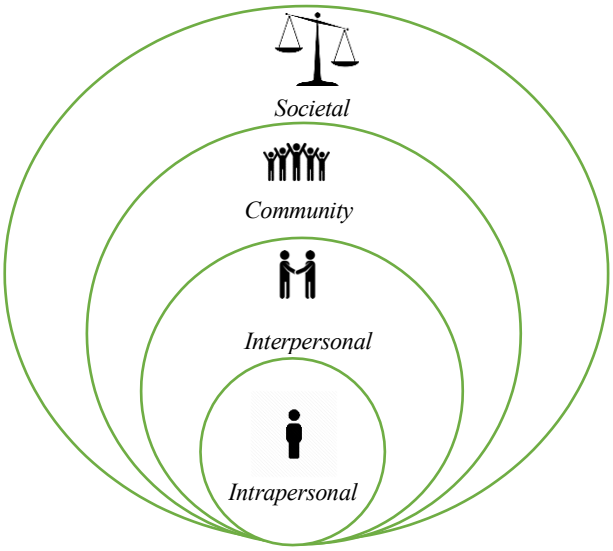

Figure 1: Socio-ecological Model (SEM)

2.3.2. Risk factors within the Socio-ecological Model

The first level is known as the "intrapersonal" level, the level closest to the individual and referring to the biological and personal factors that increase the likelihood of developing depression. At the intrapersonal level, age, sex, genetics, and family history have been identified as risk factors for the development of depression.

While depressive disorders often start during early adulthood, they are recurrent in nature and are experienced over the individual's lifespan (Hammer-Helmich et al., 2018). Globally, the average age of onset for depressive disorders is 37.1 years (Ustun, Ayuso-Mateos, Chatterji, Mathers, & Murray, 2004). However, the burden associated with depression peaks in adolescence and early adulthood (10 – 29 years), which makes this population a target for prevention and early intervention efforts (Whiteford et al., 2013). The prevalence of depression also seems to peak in older adulthood (55-74 years) (World Health Organization, 2017). For example, a South African study conducted in a resource-poor setting found that older age was associated with greater scores for anxiety, depression, and hopelessness (Pillay & Sargent, 1999). According to the World Health Organization (2017), depression in older adults (aged 55-74) affects 7.5% of females and 5.5% of males, compared to the general female (5.1%) and male (3.6%) population. Studies have consistently shown that the risk of depression increases with age, and it is no different in the South African context. Ardington and Case (2010) used data from the South African National Income Dynamics study's first Wave to investigate

associations between mental health and socio-economic status and how the correlates of depression change over the life cycle. Researchers found that older adults more often report symptoms of depression, with reporting peaks in young and middle adulthood (Ardington & Case, 2010).

Being female is one of the greatest risk factors for the development of depression, as most research across cultures and geographical regions consistently identifies higher rates of depression among women. Global Health Estimates (2017) showed that even across the lifespan, the prevalence of depressive disorders is more common among the female population (5.1%) than the male population (3.6%). In line with international studies, data from the SASH study also indicates that women are twice as likely to suffer from depressive and anxiety disorders in South Africa (Lund et al., 2013). Similarly, Ardington and Case (2010) found that in a nationally representative South African sample, women had greater scores of depression across all population groups. Other South African literature supports this finding, consistently reporting being female as a risk factor for depression (Adjaye-Gbewonyo, Avendano, Subramanian, & Kawachi, 2016; Pengpid & Peltzer, 2018; Tomlinson, 2009). However, data from the first Wave of the NIDS study showed that as the socio-economic status of individual's increased, the gender gap between the severity of depressive symptomology became more narrow (Ardington & Case, 2010).

At the intrapersonal level, research has shown that biological and familial factors also play an important role in the development of depressive disorders. Data from family studies show that first degree offspring of patients suffering from depression are at a two to three-fold increased risk for the development of depression, (Shadrina, Bondarenko, & Slominsky, 2018) and a review on the genetic susceptibility for the development of depression reports heritability of 40-50%, (Levinson, 2006). Using data from the South African National Income Dynamics Study, Eyal and Burns (2017) conducted research on the intergenerational transmission of depression in South African adolescents. They estimated that 17% of South African adolescents suffer from depression, a total which increases to 50% if they have parents who suffers from depression. They have concluded that parental mental health significantly impacts on child mental health, supporting international literature as described above.

The second level of the socio-ecological model is known as the "interpersonal" level, and it refers to the relationships in an individual's life that play a role in either buffering or increasing the risk of the development of depression. At the interpersonal level, low social support, marital status and family environment are identified as risk factors for the development of depression.

Low perceived social support is one of the most commonly reported risk factors for depression (Cross-Denny & Robinson, 2017). While there are comprehensive literature reviews claiming that social support offers protection for the development of depression (Gariepy, Honkaniemi, & Quesnel-Vallee, 2016; Lund et al., 2018), limited studies on the association between social support and depression in LMIC are available. A South African study exploring food insecurity, depression, and the role of social support among women in a peri-urban informal settlement near Cape Town, found that women experiencing food insecurity and who had little social support were more likely to suffer from compromised mental health, while women who had high levels of social support were found to be more resilient (Tsai, Tomlinson, Comulada, & Rotheram-Borus, 2016).

Literature has established that marital status and family composition is another protective factor for the development of depression (Clavarino et al., 2011). Cross-sectional data from household surveys in 15 countries from the WHO World Mental Health survey initiative, which includes data from both LMIC and HIC, found that being married, in comparison to never married, was associated with a lower risk for the development of most mental disorders across genders (Scott et al., 2010). According to the same study, however, marriage is a protective factor for depression only for men (Scott et al., 2010). Results from the SASH study showed that mood disorders are more common among those who are separated or divorced (Herman et al., 2009). Another South African study, representative of the older population, found that depression was more common among divorced or separated (5.1%) older adults than among those who are married (4.1%) or widowed (3.6%). While no nationally representative data on the association between depression and romantic relationships are available, the NIDS study provide important insights into the association between depressive symptoms and romantic relationships. It was found that adults who are married or partnered are less likely to experience significant symptoms of depression when compared to single adults (Adjaye-Gbewonyo et al., 2016).

Marriage is usually associated with family life and associated responsibilities. No explicit data from LMIC provide information on depression in the context of family life but research from HIC show that childcare responsibilities have been associated with an increased experience of depressive symptoms among parents (Cunningham & Knoester, 2007). Further research from HIC show that marital discord has been associated with poorer mental and physical health (Clavarino et al., 2011), and parties are at an increased risk for the development of psychopathology and physical illness (Atkins, Bortnik, Hahlweg, & Klann, 2011). One South African study of 435 participants showed that family attachment plays an important role in the

development of depression, where weak familial bonds are a risk factor (Wouters, Masquillier, & le Roux Booysen, 2016). Another major risk factor is the effect that parental depression has on adolescents' risk to develop depression themselves. Analysing panel data from a nationally representative sample of adult South Africans, researchers discovered that parental depression is the single strongest determinant for adolescents to develop depression (Adjaye-Gbewonyo et al., 2016). While the average prevalence for depression among adolescents is 17%, that number increases to 50% when a parent also suffers from depression (Adjaye-Gbewonyo et al., 2016).

Furthermore, evidenvce has shown that a negative life event experienced on an individual level has mental health consequences for the whole family unit. Longitudinal data from the first three waves of the NIDS found a positive and significant correlation between a negative life event, such as health related problems or death, and symptoms of depression in adults family members (Burger, Posel, & von Fintel, 2017). The fact that 30% of South African households experienced a negative life event over a 2-year period (Burger et al., 2017) is concerning given the mental health affects it has on family units and functioning.

The third level of the socio-ecological model is known as "community" and it explores the context of the individual and the setting in which relationships occur. Poverty, community-level crime and violence and associated trauma are identified as risk factors for the development of depression.

LMIC sustain the greatest burden of poverty (Lund & Cois, 2018) as well as a significant burden imposed by common mental disorders (Lund, Breen, et al., 2010). A systematic review, which included studies published from 1990 to 2008, found that the social and economic conditions of poverty in LMIC were associated with common mental disorders (Lund, Breen, et al., 2010). Results from a review of data from Zimbabwe, a LMIC in Sub-Saharan Africa, found that economic stressors are associated with both the onset of depression as well as with the persistence of existing episodes (Patel et al., 2001). Research indicates that depression rates and symptomology are markedly more common among marginalised and vulnerable groups, such as those with disease burdens and those living in resource-poor settings (Tomlinson, 2009). Data from Wave 1 of the National Income Dynamics study showed marked differences in mean scores across population groups, where African men and women scored greater averages than their white counterparts, (Ardington & Case, 2010). The difference in scores between population groups highlights South Africa's social and income inequalities and are

directly related to socio-economic status and rooted in the footprints of colonialism and Apartheid.

South Africa faces extreme resource limitations as the country struggles to battle poverty and inequality. More than half (55%) of the South African population is classified as being poor, according to the national upper bound poverty line (World Bank, 2018a). Not only are people living in poverty at a higher risk for the development of depression, but depression perpetuates the poverty cycle resulting from the associated disability and health care costs. This bi-directional association between poverty and depression is characterised by social causation and social drift pathways (Lund & Cois, 2018). According to the social causation pathway, individuals experiencing multiple socio-economic deprivations are more likely to have poor mental health outcomes while the social drift pathway conversely maintains that socio-economic status is affected by an individual's mental health status.

Poverty and social inequality have led to South Africa being one of the countries with the highest rates of crime and violence world-wide (Seedat, Van Niekerk, Jewkes, Suffla, & Ratele, 2009; Shaw, 2003). Interpersonal violence (Selin et al., 2019), child abuse (Kaminer, Hardy, Heath, Mosdell, & Bawa, 2013) and crimes of a sexual nature (Jewkes & Abrahams, 2002) are common in South Africa. Findings from the SASH study shows that one third of South Africans were exposed to trauma in their lifetime (Kaminer, Grimsrud, Myer, Stein, & Williams, 2008). While the experience of traumatic events is commonly associated with Post traumatic stress disorder (PTSD), research has shown that depression is another common psychiatric response to trauma (Kaminer et al., 2008; Wyatt et al., 2017). A review and meta-analysis on trauma in childhood showed that the experience of neglect, physical, emotional, and sexual abuse and domestic violence during childhood is significantly associated with an increased experience of depressive symptoms in adulthood (Mandelli, Petrelli, & Serretti, 2015). South African women are more vulnerable to being victims of violent crime and abuse than their male counterparts. Research statistics has found that the constant fear of being criminally victimised is a major stressor and source of anxiety for South African females and contributed substantially to their experience of significant depressive symptoms (Mungai & Bayat, 2019).

The fourth level is known as the "societal" level, and it refers to the local and national policies and laws of the broader society wherein individuals and communities' function. At the societal level, employment and inequality, education, stigma, mental health policy, resource allocation and access to health care are factors influencing the experience of depression This study will

focus on employment, education, and access to treatment; however, an overview of all the risk factors within the societal level of the socio-ecological model is provided below.

Unemployment, consequent financial difficulties, and debt are associated with depression (Moore et al., 2017). A systematic review of literature from developing countries showed that the long-term unemployed are at a two-fold risk for developing mental disorders, of which depression and anxiety is the most common (Herbig, Dragano, & Angerer, 2013). In the third quarter of 2017, South Africa's unemployment rate was estimated at 27.7%, with a youth unemployment rate of a staggering 38.6% (World Bank, 2018a). Similarly to other developing countries, unemployment in South Africa has been associated with negative mental health outcomes (Lund, Breen, et al., 2010) and a higher risk of developing depression (Burns, Tomita, & Lund, 2017).

Employment status is directly linked to an individual or household's income, with unemployment significantly affecting ability to secure resources and necessities. Data from the South African National Income Dynamics Study showed that there exists a negative relationship between household income and depression, meaning the prevalence of depression increases as household income decreases (Adjaye-Gbewonyo et al., 2016; Lund & Cois, 2018).

While a lack of income and financial difficulties are definite factors contributing to the risk of the development of depression, the literature has recognized the pivotal role that inequality plays in the risk for depression. A study found that an increase in income inequality increased the risk of depression; when making social comparisons, individuals were more likely to feel depressed in unequal environments (Burns et al., 2017). Measured by the World Bank through the Gini index of poverty, South Africa has been described as the most unequal country in the world (World Bank, 2018a), with many people living in absolute poverty. South African research has been clear in identifying a positive relationship between low income and depression (Burns et al., 2017; Dowdall, Ward, & Lund, 2017) or income security and depression (Lund, Breen, et al., 2010; Patel & Kleinman, 2003). Conversely, it has been found that physical and financial assets are protective factors against the risk of developing depression (Dowdall et al., 2017).

Extreme financial strain experienced by South African families limit higher level studies and research has shown that by Grade 12, only 52% of the age-appropriate group are still enrolled (Weybright, Caldwell, Xie, Wegner, & Smith, 2017). In their systematic review on poverty and mental illness in LMIC, Lund et al (2010) found that 67% of the 53 analysed studies identified that less education was associated with a greater prevalence of common mental disorders

(Lund, Breen, et al., 2010). Another systematic review, which included 11 studies from Africa, Asia and Latin America, found that 10 studies indicated a significant and consistent relationship between prevalence and low levels of education (Patel & Kleinman, 2003). Nationally representative studies from South Africa has shown that lower levels of education have been associated with a higher prevalence of depression (Tomlinson, 2009), while having a higher level of education, especially tertiary education, has been identified as protective factors against the development of depression (Adjaye-Gbewonyo et al., 2016; Burns, 2014). This is supported by other local research studies. For example, Ardington and Case (2010) found a negative correlation between these two variables when analysing the first wave of South Africa's National Income Dynamics Study (NIDS), where lower scores on the CESD-10 were noted in participants with a higher level of education (Ardington & Case, 2010). Similarly, when analysing data from the first four waves of the NIDS study, South African adults with no education had much worse outcomes of significant symptoms of depression than adults who had a tertiary level of education (Mungai & Bayat, 2019). This longitudinal data (2008 – 2014) also identifies education as an important tool for individuals to be able to move out of experiencing significant symptoms of depression and likely transition out of their poor social circumstances (Mungai & Bayat, 2019).

Furthermore, mental illness in South Africa is stigmatized and associated with a loss of self-esteem and empowerment. Although results cannot be generalized, one study found that participants believed that their broader community held negative attitudes towards those suffering from mental illness (Sorsdahl, Kakuma, Wilson, & Stein, 2012). Stigma is a reported barrier to seeking mental health treatment, which is an additional barrier to care due to the fact that depression decreases motivation levels to seek treatment for mental health difficulties (Collins, Holman, Freeman, & Patel, 2006). This is concerning given the fact that a nationally representative sample from South Africa found that only 53% of the population had adequate access to healthcare (Burger & Christian, 2018). Those living in poverty experience the greatest burden, with only 37% of poor participants reporting healthcare that is available, affordable, and acceptable, compared to 64% of non-poor participants (Burger & Christian, 2018).

When individuals fail to receive treatment to address depression, morbidity and disability increases (Patel et al., 2001), as well as the risk for poverty and social exclusion (Prince et al., 2007). Depression is a global burden with substantial impact on the developing world. As described above, there is a significant interplay between the range of risk factors and the development of depression in LMIC, including South Africa.

2.4. HIV, TB and Mental Health

This section will begin by describing the global prevalence of HIV and TB, followed by prevalence rates of TB and HIV within the Sub-Saharan African region. The section will continue by exploring the relationship between HIV and TB, specifically in the South African context. It will go on to explore TB and HIV as risk factors for psychological distress. The section will end by describing the implications for TB, HIV or co-morbid people with psychological distress, focusing on treatment non-adherence and its consequences on individual, community and societal level.

2.4.1. The prevalence of HIV

After decades and billions of dollars invested to eradicate the epidemic, HIV continues to be a global health threat and burden. The global HIV population is estimated at 38 million, with 1,7 million new infections in 2019 (UNAIDS, 2018a, 2019a, 2020). In 2019, 690 00 people suffered from acquired immunodeficiency syndrome (AIDS) related deaths (UNAIDS, 2019a). There has been steady global progress towards reducing AIDS related deaths over the last few years, with numbers decreasing by an estimated 30 000 – 40 000 annually from 2015 – 2019 (UNAIDS, 2019a). However, the success of saving lives is not matched by successes in preventing new infections. There is a prevention crisis as HIV incidence rates remain high with no future commitments to increase resources to address the problem (UNAIDS, 2018b). The 2020 Global AIDS report confirms that too few resources were invested, too few people were provided with services and efforts to bend the curve for new HIV infections were unsuccessful (UNAIDS, 2020). Efforts to end the global AIDS pandemic by 2030 were already off course before the COVID-19 pandemic. However, the global COVID-19 threat has the potential to completely disrupt progress in the AIDS field. Indeed, access to ARV treatment has adversely been impacted and fewer people are starting and renewing scripts (UNAIDS, 2021); HIV prevention programs have been interrupted, and people living with HIV have been experiencing an increase in COVID related stigma associated with their status (UNAIDS, 2021).

Sub-Saharan Africa is home to 54% of the global HIV population (UNAIDS, 2019b). While a reduction in new infections over recent years is noted, it remains the epicentre of the HIV pandemic, with 61% of the 5000 daily new infections occurring in this region (UNAIDS, 2019b). Girls from Sub-Saharan Africa between the ages of 15 and 24 are twice as likely to live with HIV and in 2019, 59% of new HIV infections in Sub-Saharan Africa were among

women (UNAIDS, 2019a). Unlike other parts of the world, women and young girls in Sub-Saharan Africa experience the greatest HIV burden, where 56% of people living with HIV are female (UNAIDS, 2020).

Despite the fact that, in 2019, 12.3 million women were living with HIV compared to 7.3 million men, HIV related mortality rates in Southern and Eastern Africa were higher amongst the male population (130 000 vs 120 000) (UNAIDS, 2020). This is likely due to higher testing, treatment coverage and viral load suppression among the female population (UNAIDS, 2020). For example, 78% of infected females compared to 64% of males in Southern and Eastern Africa were accessing anti-retroviral therapy (UNAIDS, 2020). Indeed, approximately 81% of the world's HIV infected population knew their status, of which 67% were accessing treatment and 59% were virally supressed (UNAIDS, 2019a).

According to the South African Health Review (2018), 7.1 million of the world's 37 million people living with HIV are from South Africa. Of the 7.1 million infected people, only 65% are on treatment and 14% are not aware of their status. While 89% of South African women living with HIV are aware of their status, only 78% of their male counterparts know their status (*South African Health Review 2019*, 2020). South Africa has the largest anti-retroviral treatment program globally, with 4.4 million people living with HIV using this service (*South African Health Review 2019*, 2020). The prevalence of HIV in South Africa unduly affects certain population groups. Mapping of epidemiological data reveals important differences between HIV prevalence in certain geographical areas where HIV is concentrated, referred to as HIV "hotspots" (UNAIDS, 2018b). HIV prevalence is highest among people living in urban informal settlements (19.9%) and rural informal settlements (13.4%), with lower prevalence rates in formal rural (10,4%) and formal urban (10,1%) settlements (Bunyasi & Coetzee, 2017). Besides being concentrated in lower resourced communities, like the rest of Sub-Saharan Africa, South African women are especially vulnerable for HIV infection. A 12-month study conducted in the province of Kwazulu-Natal found a weighted HIV prevalence of 36.6%, of which 44,1% of women and 28% of men were infected with HIV (Kharsany et al., 2018). This study also shows that HIV prevalence remains highest in the female population across the lifespan, with HIV prevalence rates in females, especially aged 15-24 (22.3%) being consistently higher when compared to their male counterparts of the same age group (7.6%) (Kharsany et al., 2018). UNAIDS (2019) support this finding, stating that, in Sub-Saharan Africa, 5 out of 6 new HIV infections in the 15–19-year-old adolescent age group are girls. Globally women and girls account for 48% of all new HIV infections. This is in contrast with

the global phenomenon where 59% of all new HIV infections in Sub-Saharan Africa are among females (UNAIDS, 2019a).

2.4.2. The relationship between HIV and TB

The HIV epidemic unduly affecting Sub-Saharan Africa is fuelling another crisis, namely the TB epidemic. Africa has the highest TB burden world-wide (*Global Tuberculosis Report*, 2018) and with HIV infection being the single strongest risk factor for the development of TB disease (Berkowitz et al., 2018), it is not surprising that Sub-Saharan Africa faces a dual epidemic. TB is an opportunistic bacterial infection transmitted from one person to another through tiny airborne droplets released into the air through coughing or sneezing. It is claimed that that half of new TB disease cases in Africa occur among people already living with HIV (Heltzer, 2008). Figures for Sub-Saharan Africa are daunting, where it was found that 72% of all newly diagnosed TB cases in people living with HIV come from this region (Berkowitz et al., 2018). Statistics from 2016 show that 25% of the world's population who developed TB disease came from Africa, and 44% of people dying from TB disease came from this region as well (Mohammed, Assefa, & Mengistie, 2018). The fact that Africa is home to only 13% of the world's total population (Mohammed et al., 2018) puts these figures into perspective, highlighting the immense burden faced by this region. With such a high TB incidence rate, it is worrisome that the 2018 Global Tuberculosis Report states that only 52% of patients from the African region had TB treatment coverage (*Global Tuberculosis Report*, 2018). While TB is a completely curable disease, 665 000 people in the African region died of TB in 2016, of which 413 000 people were co-infected with TB and HIV (*Global Tuberculosis Report*, 2018).

South Africa is one of the 30 global TB high burden countries, which together accounts for 87% of the world's TB cases. It was estimated that South Africa had 380 new TB cases per 1000 in 2016 (Tomita et al., 2019) which places the country at the forefront of the TB epidemic. While TB is one of the top 10 global causes of death (*Global Tuberculosis Report*, 2018), TB is the leading cause of death in South Africa (StatsSA, 2018). In a rural community just outside of Cape Town, the TB case load increased six-fold from 1996 to 2004, a phenomenon which is replicated throughout South African communities (Heltzer, 2008). As in the rest of Africa, TB is fuelled by the HIV epidemic. With only 0.7% of the world's total population, South Africa is home to 28% of the global TB/HIV co-infected community (Peltzer, Naidoo, et al., 2012). In 2016, 258 000 people living with HIV in South Africa developed TB disease

(UNAIDS, 2018b). A study using data from three of South Africa's nine provinces found that 59.9% of their TB sample who had tested for HIV were positive (Peltzer & Louw, 2013). Unfortunately, it is estimated that 49% of people with co-morbid HIV and TB are unaware of their co-infection and are therefore not receiving the appropriate treatment (UNAIDS, 2018a). Due to the large co-infection rate and the relationship between these two diseases, it has been recommended that that treatment for both be incorporated into interventions (Gilbert et al., 2015).

The prevalence of HIV, TB and co-morbid HIV and TB are serious health concerns for South Africa, affecting marginalized groups, like women and those from poorer communities to a much greater extent than the general population (Foster et al., 2015; UNAIDS, 2018a).

2.4.3. HIV, TB and psychological distress

2.4.3.1. Prevalence of psychological distress among people living with HIV

In recent years, a considerable increase can be noted in African research studies focusing on psychological distress in people living with HIV (Bernard, Dabis, & de Rekeneire, 2017; Breuer, Myer, Struthers, & Joska, 2011), indicating growing attention to an emerging public health concern.

A meta-analysis on depression and HIV in Sub-Saharan Africa found a statistically significant relationship between HIV and depression, where people living with HIV were twice as likely to have had a recent episode of major depressive disorder (Ciesla & Roberts, 2001). Another meta-analysis reporting on the prevalence of mental illness in people living with HIV in Sub-Saharan Africa found that prevalence ranged from a low of 5% in the Democratic Republic of Congo (1994) to a high of 83% in Uganda (2005), with substance abuse disorder, posttraumatic stress disorder and depression being the most common (Breuer et al., 2011). A more current meta-analysis on depression among people living with HIV in the Sub-Saharan region analysed 66 studies and reported that 13% of people living with HIV on antiretroviral therapy (ART), and 24% of HIV-positive untreated patients had a major depressive disorder (Bernard et al., 2017). Research studies that used large sample sizes and internationally accepted diagnostic criteria found the average prevalence of depression in people living with HIV in Sub-Saharan Africa to be 8%, with notably higher rates in certain population groups such as post-natal mothers (Abas, Ali, Nakimuli-Mpungu, & Chibanda, 2014).

The prevalence of depression in people living with HIV varies greatly between different populations and settings (Nyirenda, Chatterji, Rochat, Mutevedzi, & Newell, 2013). In South Africa specifically, literature has shown that, when compared to the general population, depression among people living with HIV is twice as common (Peltzer, Szrek, Ramlagan, Leite, & Chao, 2015). Indeed, the lifetime prevalence for depression among people living with HIV ranges from 22% to 45% (Govender & Schlebusch, 2012). One study analysing data from 342 South African adults using the CES-D 10 screening tool, found that 22% of an HIV positive sample screened above the threshold, suggesting a high risk for depression, compared to only 13% of HIV negative people falling into the high-risk category (Peltzer et al., 2015). Another smaller (N=41) South African study conducted in the Gauteng province, using the Beck Depression Inventory, report depressive symptoms among more than half of their sample of adult HIV positive out-patients (Moosa, Jeenah, & Vorster, 2005). A nationally representative sample of older adults (N=3840), aged 50 years and above, found a low prevalence rate (4%) of past 12-month clinically significant depression among people living with HIV, asserting that depression was more notable in younger rather than older community dwelling individuals (Peltzer & Phaswana-Mafuya, 2013). This finding is not consistent with what is seen in the general population, where the prevalence of depression is highest among younger and older populations. A smaller (N=422) study measuring depressive episodes in older HIV-infected adults from rural South Africa found that 14.8% had experience a major depressive episode and 24.6% had experienced a brief depressive episode within the past 12 months (Nyirenda et al., 2013).

To my knowledge, there is no recent evidence on the association between HIV and depression or anxiety among a nationally representative sample in South Africa. Although research on anxiety and HIV in South Africa is limited, some insights are provided by authors who investigated this relationship. A study included 716 patients who just initiated antiretroviral therapy (ART), yielding from 12 different clinics in the Free State, and measured levels of anxiety using the Hospital Anxiety and Depression Scale, finding a 30.6% prevalence of anxiety (Pappin, Wouters, & Booysen, 2012). Another study included 485 individuals recruited from five different testing sites and administered a range of questionnaires related to psychological distress, depression, and anxiety. They found that 43.9% of their sample met the criteria for clinically significant psychological distress as measured with the 25-item version of the Hopkins Symptom Checklist, 38.4% had moderate to severe depression according to the Beck Depression Inventory and 21.2% had moderate to severe anxiety based on scores from

the Beck Anxiety Inventory (Kagee, Saal, & Bantjes, 2017). The latter study was not specifically amongst an HIV positive population, but rather those who sought out testing services. A higher rate of people living with HIV would be found in this sample compared to the general population, although test outcomes were not confirmed. Another study did confirm HIV testing outcomes when they included 363 adults coming for HIV testing at a clinic and were able to compare results from the two groups (Belus, Cholera, Miller, Bassett, & Gaynes, 2019). Depression was the most common mental condition among both HIV positive (15%) and HIV negative (9%) participants. Interestingly, social anxiety was most common among the HIV positive sample and the prevalence ratio thereof was found to be 1,86 times larger than the HIV negative sample (Belus et al., 2019).

The relationship between HIV and depression can be described as bi-directional, where living with HIV increases the likelihood of developing depression, and where suffering from depression increases the likelihood of acquiring HIV (Breuer et al., 2011).

2.4.3.2. HIV as risk factor for depression

On the one hand, the diagnosis of HIV is a traumatic experience for many individuals, and the reality of living with a chronic and life-threatening illness has been associated with the development of depression (Boarts et al., 2009). A South African research study found significant psychological distress experienced by patients upon, and shortly following, a positive HIV test, as patients have to come to terms with the meaning of their diagnosis and the impact it has on their future (Wouters et al., 2016). Although the small sample size is a limitation, a qualitative study on the experience and manifestation of depression in people with HIV/AIDS in South Africa provide important insights in finding that the majority of participants attributed HIV as the cause of their depression (Andersen, Kagee, O'Cleirigh, Safren, & Joska, 2015).

Furthermore, evidence has indicated that inflammation may play a role in the relationship between chronic physical illness and depression. A secondary analysis with a sample of 5437 adults found that the odds for depression is higher in almost all inflammatory vs non-inflammatory diseases (Caneo, Marston, Bellon, & King, 2016). Considering HIV is a chronic illness, and that HIV itself gives rise to chronic inflammation, people who are HIV positive are at a greater risk for depression.

HIV/AIDS has been described as the most stigmatized medical condition in the world. Stigma has been found to be one of the strongest risk factors associated with the development of

depression for people living with HIV (Wouters et al., 2016). Research across countries and cultures has consistently shown that people hold unfavourable views towards people living with HIV/AIDS (Simbayi et al., 2007). Researchers analysed data from 420 HIV-positive males and 643 HIV-positive females accessing HIV services in Cape Town, South Africa, and found that 40% of participants had experience discrimination as a result of their status (Simbayi et al., 2007). Stigma was often internalized, resulting in feelings of guilt and shame in more than 30% of participants (Simbayi et al., 2007). Simbayi et al. (2007) found that internalized stigma was closely associated with signs of cognitive-affective depression.

2.4.3.3. Depression as a risk factor for HIV

On the other hand, it is widely established that depression is a risk factor for engaging in risky sexual behaviours (Collins et al., 2006; Nduna, Jewkes, Dunkle, Shai, & Colman, 2010), and there is evidence supporting that people with mental disorders are at an increased risk to become infected with HIV (Prince et al., 2007). Indeed, research shows that adults with mental disorders are disproportionally affected by the HIV epidemic (Meade & Sikkema, 2005). A systematic review of empirical data focusing on adults with severe mental disorders and risk for depression included 63 studies from across the globe and concluded that common mental disorders may impact HIV risk through several pathways (Meade & Sikkema, 2005), The review showed that across all included studies, more than half of people with mental disorders were sexually active and a concerning number of these engage in risky sexual behaviours,, including unprotected sexual intercourse and multiple sexual partners, which are established drivers of the HIV epidemic.

A study conducted on approximately 2000 young women and men aged between 15 and 26 from the Eastern Cape provides interesting information regarding depressive symptoms, sexual behaviour and relationship characteristics (Nduna et al., 2010). Both men and women who presented with depressive symptomology at baseline were more likely to have transactional sex within the following 12 months or be in a relationship with a non-monogamous partner (Nduna et al., 2010). Moreover, men with depressed symptoms were more likely to report not using a condom correctly with their main partner during the last sexual encounter as well as at the 12 month follow-up questionnaire (Nduna et al., 2010). The authors concluded that symptoms of depression were indicators of an increased risk for the development of HIV (Nduna et al., 2010). Research has found that reducing depression through behavioural

interventions also reduce sexual risk-taking behaviours (Lennon, Huedo-Medina, Gerwien, & Johnson, 2012).

2.4.3.4. Prevalence of psychological distress among people living with TB

In contrast to the wealth of literature on the association between psychological distress and HIV in developed countries, there is a paucity of research on the association between psychological distress and TB disease in Sub-Saharan Africa, with an even greater scarcity of South African literature on the subject. An Ethiopian study measuring depression among 417 TB patients found a 43.4% prevalence rate among their sample (Duko et al., 2015). Another Ethiopian study analysed data from 648 TB patients and found that at baseline, as measured by the Patient Health Questionnaire (PHQ-9), a total of 53.9% met criteria for probable depression (Ambaw, Mayston, Hanlon, Medhin, & Alem, 2018). While limited, there is some local evidence on the association between depression and TB. Data from a South African sample of 4900 TB patients accessing primary health care services found that 81% of participants presented with psychological distress according to their Kessler-10 screening scores (Peltzer, Naidoo, et al., 2012). A much smaller study in another area of South Africa found a 64.3% incidence of depression among 166 TB patients accessing primary health care services (Naidoo & Mwaba, 2010). All the studies described above are cross-sectional in nature, thus, it is not possible to infer the direction of the relationship between TB and depression. However, a systematic review on global literature found that although research is limited, people with mental disorders may be at an increased risk of becoming infected with TB disease (Prince et al., 2007).

2.4.3.5. Psychological Distress and HIV/TB comorbidity

Psychological distress, HIV and TB are all highly prevalent in South Africa, and evidence suggests that the risk of psychological distress is even greater among individuals with HIV and TB. A Sub-Saharan African study, conducted in Uganda, screened 500 people living with HIV for depression and found that those with sub-clinical and current depressive disorders, compared to those without depressive disorders, were more likely to have TB disease (Nakimuli-Mpungu, Musisi, Katabira, Nachega, & Bass, 2011). There is also some emerging literature indicating that the prevalence of psychological distress is even greater among HIV/TB co-infected patients. Researchers assert that people co-infected with HIV and TB are likely at an increased risk for the development of common mental disorders, such as depression, due to higher perceived stigma (Duko et al., 2015). One study among 4900 South African adults

showed that HIV/TB co-infection and psychological distress were associated with suicidal behaviour (Peltzer & Louw, 2013). In the same study, Peltzer, Naidoo, et al. (2012) also reported that there was an association between psychological distress in people with TB and being HIV positive.

2.4.4. Adherence, TB/HIV and Psychological Distress

Untreated depression amongst people living with HIV, TB or both, has been linked to poor health outcomes, disease progression (Hand, Phillips, & Dudgeon, 2007; Prince et al., 2007) and mortality (Uthman et al., 2014).

Firstly, literature has established a clear association between depression and low, or non-adherence to both ART and anti TB treatment (Graham, Wouters, Booysen, Ponnet, & Baron Van Loon, 2012; Peltzer et al., 2015; Tesfaw et al., 2016). Indeed, it has been reported that adherence is 42% lower in people living with HIV who suffer from depression (UNAIDS, 2020). People living with HIV and suffer from depression are less likely to initiate treatment as well as to adhere to their prescribed treatment regimens (Breuer et al., 2011). A review of existing literature on depression and ART adherence found that people living with HIV who also had depression had a 55% lower chance of achieving optimal adherence across both LMIC and HIC (Uthman et al., 2014). A systematic review and meta-analysis on HIV and depression in Sub-Saharan Africa maintains that depression is a predictor of non-adherence to ART (Bernard et al., 2017). Compared to their adherent counterparts, patients who do not comply to their ART regimes have a 3-fold increased risk of presenting with moderate to severe symptoms of depression (Bernard et al., 2017). A recent South African study observed a low (7%) prevalence of depressive symptoms among people living with HIV on stable ART and who were consequently virologically suppressed, compared to a higher prevalence of depression (40%) among people who had a recent elevated viral load (Winston et al., 2018).

Like HIV, treatment defaulting among people who have TB is a significant problem in South Africa. While national targets for TB default rates were set at lower than 5% for the years 2003 to 2011, these failed to be met, with statistics reflecting higher than hoped for default rates of 6-12% (Kigozi, 2017). Evidence suggests that adherence to TB treatment is even more difficult among individuals with comorbidities (Kigozi, 2017), including depression (Ambaw et al., 2018). High rates (42.4%) of self-reported treatment non-adherence were found among a sample of 757 HIV/TB comorbid patients from 14 South African primary healthcare facilities (Naidoo et al., 2013). While this finding may seem high, the authors confirm that it is in line

with related South African literature. The reason for non-adherence among comorbid patients could also be attributed to the greater pill burden as part of their dual therapy experience, including the drug interactions which may cause adverse side effects, possibly leading to treatment default (Louw et al., 2012). These treatment related challenges are sure to impact and be impacted by psychological distress. Low or no adherence remains a concern due to its association with morbidity and mortality (Prince et al., 2007).

Secondly, research conveys that greater depression is associated with more advanced stages of the disease. A meta-analysis on mental health in people living with HIV in Sub-Saharan Africa found that depression in people who are HIV-positive is associated with more advanced stages of the disease, where patients who had a CD4 count of less than a 100 were significantly depressed compared to those who had CD4 counts greater than 500 (Breuer et al., 2011).

Besides a faster disease progression, non-adherence and partial adherence to medication leads to mutations and drug resistant strains (Peltzer, Ramlagan, et al., 2012). It is imperative to follow treatment regimens exactly as clinically indicated as high rates of adherence is imperative to reduce the risk of drug resistance (Sethi, Cenlentano, Gange, Moore, & Gallant, 2003).

Research has also specifically investigated the role of anxiety and medication non-adherence. It has been suggested that patients who suffer from high levels of anxiety may experience impaired ability to focus on the preparatory tasks involved with taking medication (Nel & Kagee, 2013). Both depression and anxiety have an intricate relationship with HIV and TB.

2.4.5. Mental Health Services for people with HIV/TB

Despite the strong evidence presented above on the increased risk of depression among the HIV, TB or co-infected populations in South Africa, there are no adequate mental health services available to address the high rates of depression among the HIV, TB or co-infected populations. Instead, HIV and TB care and treatment is offered for free in the public health sector, where full treatment regimens and basic counselling services are offered at community health facilities (Meehan et al., 2018). Standard pre- and post-test counselling services are conducted by lay counsellors which focusses on educating clients on the testing procedure and the legal and ethical consequences thereof, as well as on medication and safe practices. Thus, treatment for HIV and TB in South Africa excludes psychosocial support, despite the global

emphasis of social support and the value of using a person-centred treatment approach to maximise treatment outcomes (Ambaw et al., 2018).

In fact, mental health services in South Africa are scarce and under-resourced in general (Lund, Kleintjes, Kakuma, Flisher, & Consortium, 2010). In 2002-2003, the SASH study revealed that a mere 25% of people who met the criteria for mental illness at primary care level sought treatment (Herman et al., 2009). Since the rise of a Democratic South Africa, mental health has been recognized as an important inclusion within the national health care policy and some efforts have been made in the prioritization thereof (Lund, Kleintjes, Kakuma, Flisher, et al., 2010)(Janse van Rensburg, Khan, Fourie, & Bracke, 2019), although the implementation of guidelines and policies have been cited as a concern (Omar et al., 2010)(Marais & Petersen, 2015). Indeed, resource allocation to address public health needs and inequality, especially in rural areas, are grossly inadequate and there is a continued unmet need for mental health services (Jacob & Coetzee, 2018)(Lund, Kleintjes, Kakuma, Flisher, et al., 2010). Several barriers further contribute to non-treatment initiation and non-completion, such as access to and availability of services, lack of help seeking behaviours, stigmatization, cultural beliefs and acceptability of treatments (Seedat, Williams, et al., 2009).

A new Mental Health Policy Framework and strategic action plan was adopted in 2013, committing to prioritize the integration of mental health into South Africa's primary healthcare services (Marais & Petersen, 2015). The integration of mental health services into the primary healthcare system and the strengthening of community-based services are supported by evidence-based research and legislation (Jacob & Coetzee, 2018). While there has been advocacy for the inclusion of professional non-specialised mental health professionals into the public health care system, resource availability is a definite barrier to this integration (Jacob & Coetzee, 2018). Instead, research studies have approached this problem through the concept of task-sharing, where current medical staff are trained to screen and deliver brief mental health interventions for common mental disorders (Jacob & Coetzee, 2018). However, a high burden of disease in a constrained public health care system, with limited human and financial resources, has resulted in healthcare professionals facing high patient loads, multiple tasks, poor referral networks and limited supervision (Jacob & Coetzee, 2018).

There is a call to integrate mental health services within the public health care system to address the mental health needs of the South African population (Myer et al., 2008). For this integration to happen, more local research, is required to understand the associations between

psychological distress and communicable diseases so that mental health interventions can be developed accordingly. The integration of mental healthcare into public healthcare will offer a more holistic approach to health and better prognoses and health outcomes can be expected.

This study will therefore provide insight into the association between psychological distress, HIV and TB, or both, among a sub-sample of the general nationally representative adult population in South Africa. It will thereby generate data that can be used to inform the integration of mental health services into primary TB/HIV care.

3. Research Methods

3.1. Study Design

To address this research question, this study uses a cross-sectional survey design. The study makes use of cross-sectional data collected as part of a series of nationally representative surveys from the South African National HIV Prevalence, Incidence, Behaviour and Communication Survey (SABSSM). With its inception in 2002, the survey is conducted every few years by a consortium of researchers led by the Human Science Research Council (Simbayi et al., 2019) The aim of the SABSSM study is to determine the HIV status and exposure to ARVs among South Africans, as well as to identify the prevalence and social factors that put South Africans at risk of becoming infected with HIV (Simbayi et al., 2019). It contributes to the monitoring and surveillance of the HIV pandemic in South Africa, and it supports one of the goals of the National Strategic Plan for HIV (2017 – 2022), which is to strengthen strategic information to drive progress towards achieving the 90-90-90 targets. The present study will focus on the fifth survey, collected in 2017.

3.2. Setting

South Africa is a diverse Sub-Saharan African country with many different cultures and groups. With its 11 official languages, South Africa is divided into 9 different provinces. The 9 provinces are further divided into a total of 52 districts, which together constitute South Africa (Yu, 2013). Being a nationally representative sample, SABSSM collected data from all 9 provinces.

Classified as an upper middle-income country, South Africa is one of the countries facing the highest inequality in the world (World Bank, 2018a). This is evident from South Africa's latest (2014) Gini Coefficient rating of 63%, indicating a great gap between the country's rich and poor (World Bank, 2022). In fact, research has shown that 71% of the country's wealth is held by only 10% of the population, while the poorest 60% of the nation are only in power of 7% of the country's wealth (World Bank, 2022). The World Bank acknowledges much diversity between countries on the middle-income list, drawing a distinction between lower and upper middle income ends (World Bank, 2018b). South Africans find themselves at both ends, as the

population can be divided into a big concentration of low-income earners and smaller categories of middle- and high-income earners. With a 27.7% unemployment rate, almost half of South African's population live in chronic poverty (World Bank, 2018a), which is associated with a range of social and health disparities.

3.3. Sampling

The SABSSM 2017 used a similar design to the 2014 study. The survey used a multi-stage stratified random cluster-sampling approach to recruit participants. A master sample of 84 907 small area layers (SALs) were stratified by province and locality type (urban, rural and farming communities) and 1000 SALs were randomly selected for sampling purposes (Shisana et al., 2014). Fifteen visiting points were then selected from each SAL, using aerial maps yielding a total of 15 000 households (Marinda et al., 2020). SALs were the primary sampling units, while visiting points (VP's) and households were used as secondary sampling units. VPs could consist of one or more households, with a household being defined as people who lived under the same roof and shared the same pot of food. In cases where more than one household existed within a visiting point, one responding household was selected randomly (Simbayi et al., 2019). The selection of households was restricted to private households and hostels, and excluded collective residencies such as facilities, educational institutions, assisted living homes, hospital and uniformed-service barracks (Simbayi et al., 2019).

3.4. Recruitment and Enrolment

Household members of all ages who resided in the identified households were invited to participate, regardless of factors such as age, race or health status (Simbayi et al., 2019). All consenting adults within any given household were classified as the ultimate sampling unit. Those who were unable to provide clear consent according to their understanding and comprehension of the informed consent process were excluded from participation in the survey.

Heads of households were approached first. Field workers made up to four visits to each selected household to ensure maximum participation. During the first visit, a field worker visited the identified household to explain the purpose of the study and obtain informed

consent. Consent forms were available in all official South African languages and participants had a choice in which language they preferred the questionnaire administration process to be completed in. The fieldworker gave more information about the study and confirmed with the household that the same questionnaire administrator would conduct interviews with each household member who were at home on that day or at a later pre-arranged visit. In instances where any household member was absent during the first visit, the field worker revisited the household up to three more times, on pre-arranged times with the household (Simbayi et al., 2019). Household members who refused to participate in the survey were appropriately recorded by the field supervisor. This ensured that all members of households were accounted for (Simbayi et al., 2019). Among valid households, permission to participate in the survey was granted by 82.2% of household heads.

3.5. Study Sample

From the intended target of 15 000 households (VPs), a total of 12 435 (82.9%) were approached and 11 776 (94.7%) were determined to be valid (Marinda et al., 2020). A household was declared invalid when the house was demolished, when no one resided there or when the structure was non-residential (Marinda et al., 2020).

While all residents from selected households were eligible to participate, given the difference in risk for depression during the lifespan (Maughan, Collishaw, & Stringaris, 2013), and the different risk factors associated with depression depending on age (Gertner, Domino, & Dow, 2017; Haarasilta, Marttunnen, Kapiro, & M., 2004), the current study only includes adults between the ages of 18 and 60. It is recognised that the cut-off age of 18 years is an arbitrary cut-off where risk factors for depression are concerned since risk factors can occur at any point throughout the life span and often occur early in the life course. Only participants with full data for the K-10, HIV and TB status were included in the analyses (N= 20208).

The study sample was nationally representative of South Africa's racial make-up, and included Black, Coloured, White and Indian participants. It should be noted that the term "Coloured" refers to a specific multi-racial ethnic group from South Africa and the term is not considered derogatory in this context.

3.6. Procedure and Data Collection

The SABSSM population-based household survey of 2017 was conducted from November 2017 to March 2018 (Marinda et al., 2020). Survey Coordinators were research trainees from the Human Science Research Council (HSRC), and field supervisors were externally recruited. Coordinators and supervisors were integral in providing support to the field workers. The supervisors and field workers received three intensive thirteen-day training sessions to provide them with the necessary knowledge and skills, which included special training on the collection of dried-blood spots (DBS) specimens. Training manuals were developed to provide staff with guidelines and support on topics such as informed consent procedures; interviewing skills for administering tablet-based questionnaires; the collection of DBS specimens; and procedures related to quality control, ethics, and general conduct.

Once informed consent obtained, the fieldworker administered the household questionnaire to the head of the household or a proxy. The head was then informed that the fieldworkers would return at an arranged time to conduct one-on-one interviews with any household members who were not present on that day.

Fieldworkers used tablets to record data electronically. This approached proved beneficial for several reasons: collected data were saved automatically, data quality improved due to automatic validation and error checking, and the transferring of electronic data from tablets to the laptops of coordinators or supervisors were effortless, thus minimizing the number of compromised data in case the device was stolen, lost or damaged (Simbayi et al., 2019).

The survey process consisted of two parts, namely the behavioural questionnaire and the biomedical specimen collection and testing. After completion of the behavioural questionnaire, participants who consented underwent home-based rapid testing and then provided the study team with dried blood spot samples through finger-prick. Participants could choose to receive their HIV results immediately or instead retrieve their test results from their nearest clinic or at their household 8-12 weeks after study participation. Alternatively, both options were available. Participants were immediately linked with their nearest and relevant HIV public healthcare service facility. Participants were also offered pre-test counselling, and should they receive a positive result, post-test counselling was also available.

The original study used 4 different types of questionnaires to collect data, namely:

- Household questionnaire (also known as a visiting-point questionnaire)
- Questionnaire for parents and guardians of children aged 0–11 years
- Questionnaire for children aged 12–14 years
- Questionnaire for people aged 15 years and older

The present study used data from 2 types of questionnaires, namely the household questionnaire and the questionnaire for people ages 15 and older, by excluding anyone younger than 18 years of age in the analysis. The fieldworkers administered the questionnaire on a oneon-one basis either inside or outside of the participants' home. (Simbayi et al., 2019). The present study used the household questionnaire and the questionnaire for people above the age of 15, although only those respondents of 18 years and older were included in the analysis.

The questionnaires were available in the 11 official South African languages and were administered by trained fieldworkers. The focus of the questionnaires was on sexual health and behaviour, but new sections on TB, HIV communication campaigns and Intimate Partner Violence were incorporated

3.7. Measures

The primary focus of the survey questions was on sexual health and behaviour, although modules on TB, exposure to HIV campaigns and intimate partner violence were also included. Other types of data collected included socio-demographic information, knowledge, attitudes and beliefs, drug and alcohol use, health status and mental health. Only measures relevant to the present study are described in more detail below.

For the purposes of this analysis, the present study will include both demographical information, such as age, labour market participation, income, and education, as well as health-related characteristics (HIV or TB diagnosis, adherence, and emotional health).

HIV status were both self-reported and confirmed through a rapid test consisting of a DBS specimen sent for laboratory analysis. HIV results could be obtained immediately after the test. participants could visit their nearest clinic 2-3 months after study participation; or could choose both options. Adherence to ARVs was measured according to a self-reported answer of either

"yes" or "no" to having taken all your medication in the past 30 days. TB status was self-reported only: only participants who report having received a formal diagnosis of TB over the past year were considered to have TB.

Psychological distress was measured using the interview administered Kessler Psychological Distress Scale (K10). The K-10 is a brief 10-item screening tool measuring psychological distress, which includes symptoms of depression and anxiety, over the preceding 30 days in the general population (Kessler et al., 2002). It was originally developed for inclusion into the redesigned US National Health Interview survey to meet the time requirements for a brief screening scale. Depending on the severity of the respondent's psychological distress, scores on the K-10 range from 10 to 50. The K-10 has become a popular measure and was included in the World Health Organization World Mental Health Survey.

The K10 has been used and verified across the globe in different settings, for example in Australia, Canada, Indonesia, and Turkey. Its validity for use on the African continent has also been established. In South Africa specifically, it has been validated across both nationally representative and population-based samples. Using nationally representative data from the SASH study, 4077 adults participated in a study on the psychometric properties of the K-10 in screening for depression and anxiety. The authors of the SASH study, Andersen et al. (2011), identified the optimum cut-off score to be ≥16, yielding 0.70 sensitivity and 0.67 specificity for both depression and anxiety. Another study among 429 HIV positive people enrolled in ART services sought to validate the K-10 in the South African primary healthcare setting (Spies, Kader, et al., 2009). Similarly, they found good specificity (0.77) and sensitivity (0.67%) and the K-10 was able to accurately identify cases of major depressive disorders by using a cut-off score of ≥28. Finally, Peltzer, Naidoo, et al. (2012) analysed K-10 data from 4900 South African primary care TB patients using both cut-off scores of ≥16 and ≥28. The study authors suggested using a cut-off score of ≥16 in South African primary healthcare setting, which yielded a moderate discriminating ability in the identification of depression (0.73) and anxiety (0.72), Thus, the present study used a cut off score of ≥16 to suggest the presence of psychological distress, characterised by moderate to severe symptoms of depression and anxiety.

3.8. Data Analysis

The Statistical Package for Social Sciences (SPSS) version 27 software program was used to analyse the SABSSM data. All descriptive and inferential statistical analyses were corrected for clustering at primary sampling unit level (Small Area Level) and weighted to consider the complex sampling design. Descriptive statistics were used to report weighted socio-demographic-, psychological distress, and HIV/TB-characteristics of the sample. Descriptive statistics were also used to report the point prevalence of psychological distress, HIV and comorbid HIV/TB. Unadjusted logistic regressions were performed to ensure that the final sample used for this study did not differ on key socio-demographic characteristics compared to participants with missing data and excluded from the study.

To understand the associations between demographic factors (individual level), socioeconomic characteristics (household level), and HIV, TB and psychological distress, unadjusted logistic regression analyses was first performed for each risk factor separately. Using Bronfenbrenner's socio-ecological framework, age, sex, and race were analysed under the Intrapersonal level; marital status under the interpersonal level, while education and employment were analysed under societal levels. In this analysis, the risk factors were the independent variables and psychological distress the dependent variable. Psychological distress was analysed as a binary outcome where participants were considered psychologically distressed if they scored ≥16 on the K-10 (Peltzer, Naidoo, et al., 2012).

Demographic and socio-economic factors which were significantly associated with psychological distress in the univariate analyses were included in subsequent adjusted multilevel logistic regressions, to assess the relationship between HIV, TB and comorbid HIV/TB and psychological distress. Three separate models were used in the analyses to assess the relationship between HIV and psychological distress, TB and psychological distress and HIV/TB comorbidity and psychological distress. Due to the small sample size of TB only participants, a new variable was created to combine those with HIV and TB comorbidity. Thus, a three-group variable was used where participants either had HIV only, both HIV and TB or no HIV. An adjusted multiple regression model was also used to assess the association between adherence and psychological distress. A 95% confidence interval and an alpha level of 0.05 was used.

3.9. Ethical Considerations

Permission to conduct the SABSSM study was granted by the HSRC Research Ethics Committee (REC 4/18/11/15) and The US Centers for Disease Control (Marinda et al., 2020). Appropriately trained questionnaire administrators obtained informed consent from all adult participants prior to enrolment onto the study. Questionnaire administrators ensured that participants understood all aspects of the study and highlighted that participation is voluntary, with the options to withdraw at any point in time. Every effort was made to protect the confidentiality of participants, and no personal identifying information was used during the survey (Simbayi et al., 2019). To protect the privacy of participants, no names were recorded on tracking forms and specimens and instead, unique barcodes were allocated to each respondent. As part of the informed consent process, participants agreed to have their anonymised data shared publicly for future research purposes. Personal information, such as names and contact details, are not released as part of the Public Release Data Set. Participants who were not aware of their HIV positive status, which was confirmed with a rapid DBS test, were offered to visit the nearest clinic to receive their results and mandatory counselling.

4. Results

Of the 66615 participants approached, 2040 refused to take part in the study. Of the remaining 64575 who were approached, 62011 were successfully interviewed. Of those, 22121 (35.7%) participants were between the ages of 18 and 60, and among these, 1913, (8.6%) did not have psychological distress, HIV and TB data. These participants were excluded from the study, thus the final sample consisted of 20208 participants.

Table 1: Demographics of sample included in the analysis (N=20208) vs those excluded (N=1913)

Variable	Included in analysis (N=20208)		Excluded from analysis (N=1913)		OR	95% CI
	N	%	N	%		
Gender						
Male	7626	45.9	783	48.5	REF	REF
Female	12582	54.1	1130	51.5	1.11	0.97-1.27
Age						
18-24	5068	22.1	459	21.6	REF	REF
25-34	5787	33.0	494	31.1	1.038	0.78-1.39
35-44	4083	22.0	403	22.2	0.97	0.75-1.26
45-60	5270	23.0	557	25.1	0.89	0.72-1.11
Race						
African	14090	83.1	1163	75.7	REF	REF
Coloured	2522	8.9	356	12.8	0.64	0.44-0.91
Indian	1056	1.8	81	1.3	1.25	0.80-1.94
White	1053	6.2	188	10.2	0.55	0.33-0.91
Marital status						
Married	5041	27.6	175	28.9	REF	REF
Never married	13869	66.3	473	62.3	1.11	0.84-1.48
Divorced/separated	646	3.4	19	4.7	0.75	0.41-1.39
Widowed	650	2.8	21	4.1	0.71	0.41-1.25
Education						
No education	1421	6.0	98	10.2	REF	REF
Primary level	2896	14.3	131	22.7	1.07	0.73-1.58
Secondary level	6228	36.3	204	35.6	1.73	1.21-2.49
Secondary completed	5762	33.7	143	26.7	2.15	1.42-3.24
Tertiary completed	1268	9.7	29	4.9	3.38	1.75-6.53
Employment						
Unemployed	11241	52.3	408	54.2	REF	REF
Employed/self-employed	6813	37.5	206	37.0	1.05	0.78-1.41
Student	1748	8.5	40	5.4	1.63	1.04-2.57
Other	384	1.7	31	3.4	0.53	0.32-0.87
Income received (past month)						
No	9932	46.5	349	46.8	REF	REF
Yes	10241	53.5	337	53.2	1.02	0.79-1.30

NOTE: Percentages are weighted using province as the strata, the small area layer as the cluster and the weight variable OR: odds ratio; CI: confidence interval.

4.1.1. Socio-economic and demographic characteristics of the sample

The socio-demographic characteristics of the sample are presented in Table 1. The mean age of the respondents was 34.9 years (SD=0.18). Among respondents, 54.1% (n=12582) were female, 83.1% (n=14090) were African, 66.3% (n=13869) were never married, 33.7% (n=5762) completed secondary education, 52.3% (n=11241) were unemployed, and only 53.5% (n=10241) received an income in the last month.

Unadjusted logistic regressions were conducted to identify any differences in socio-demographic characteristics between age-eligible participants included and excluded from the analysis (i.e., who did not have available HIV, TB, and K-10 data) (Table 1). There were no differences in gender, age, marital status, or income received between these two groups. However, some differences were noted in race, education and employment status: compared to those excluded, participants who were included in the sample had fewer odds of being white (OR: 0.55; 95%CI: 0.33-0.91) or coloured (OR: 0.64; 95%CI: 0.44-0.91), but had greater odds of having a secondary level of education (OR: 1.73; 95%CI: 1.21-2.49), having completed secondary level (OR: 2.15; 95%CI: 1.42-3.24), or having completed tertiary level education (OR: 3.38; 95%CI: 1.75 -6.53). Included participants also had greater odds of being a student (OR: 1.63; 95%CI: 1.04-2.57) and lower odds of falling into the "other" Employment category (OR: 0.53; 95%CI: 0.32-0.87), which includes participants who are sick, disabled, or otherwise unable to work.

4.1.2. Psychological distress and HIV/TB characteristics of the sample

When using the K-10 cut off score of ≥16, the recommended cut-off in the South African context by Peltzer, Naidoo, et al. (2012), 33.7% of participants (n=6479) met the criteria for moderate/severely psychologically distressed. Of the respondents, 22.2% (n=4851) had a positive final HIV status, 5.7% (n=2066) reported ever being diagnosed with TB, while 0.8% (n=140) reported being diagnosed with TB within the last year. In this sample, 0.4% of respondents (n=84) had comorbid TB and HIV.

Table 2: Associations between psychological distress and demographic factors

Variable	Distressed (N=6479)		Not distressed (N=13729)		OR	95% CI
	N	%	N	%		
Gender						
Male	2121	40.1	5505	48.9	REF	REF
Female	4358	59.9	8224	51.1	1.43	1.30-1.56
Age						
18-24	1439	20.6	3629	22.9	REF	REF
25-34	1759	32.4	4028	33.3	1.08	0.96-1.22
35-44	1358	22.7	2725	21.6	1.17	1.02-1.34
45-60	1923	24.4	3347	22.2	1.22	1.06-1.41
Race						
African	4812	88.6	9278	80.3	REF	REF
Coloured	700	6.3	1822	10.3	0.56	0.45-0.68
Indian	307	1.4	749	2.0	0.67	0.54-0.83
White	260	3.7	793	7.5	0.44	0.35-0.57
Marital status						
Married	1577	26.0	3464	28.4	REF	REF
Never married	4397	66.8	9472	66.0	1.11	0.99-1.24
Divorced/separated	233	3.7	413	3.2	1.29	1.02-1.62
Widowed	271	3.4	379	2.5	1.49	1.12-1.99
Education						
No education	512	6.3	909	5.8	REF	REF
Primary level	1127	16.4	1769	13.2	1.14	0.94-1.37
Secondary level	2059	36.8	4169	36.0	0.93	0.78-1.37
Secondary completed	1701	32.2	4061	34.5	0.85	0.71-1.02
Tertiary completed	346	8.3	922	10.5	0.72	0.56-0.93
Employment						
Unemployed	3936	56.9	7305	49.9	REF	REF
Employed/self-employed	1934	33.5	4879	39.5	0.74	0.68-0.82
Student	450	7.5	1298	9.0	0.73	0.61-0.88
Other	152	2.1	232	1.6	1.17	0.86-1.58
Income received past month						
No	3242	47.3	6690	46.0	REF	REF
Yes	3216	52.7	7025	54.0	0.95	0.87-1.04

NOTE: Percentages are weighted using province as the strata, the small area layer as the cluster and the weight variable OR: odds ratio; CI: confidence interval.

4.1.3. Correlates of psychological distress

The results of the unadjusted logistic regression models assessing associations between psychological distress and demographic factors are presented in Table 2. All demographic factors, except for receipt of income, were associated with psychological distress. For female participants, the odds of suffering from psychological distress (n=4358, 59.9%) were 1.43 times as high as the odds of male participants suffering from psychological distress (n= 2121, 40.1%; 95%CI: 1.30-1.56). There were no differences in the odds of suffering from psychological distress between those aged 18-24 years (n=1439, 20.6%) and those aged between the ages of 25-34 (n=1759; 32.4%, 95%CI: 0.96-1.22). However, compared to those aged 18-24 years, participants who were 35-44 years-old (n= 1358, 22.7 %) were 1.17 times more likely to suffer from psychological distress (95%CI: 1.02-1.34) and those aged 45-60 years (n=1923, 24.4) were 1.22 times more likely to suffer from psychological distress than 18–24-year-olds (95%CI: 0.06-1.41). When compared to the African population (n=4812, 88.6%), the coloured population was 0.56 times as likely to suffer from psychological distress (n=700, 6.3 %; 95%CI: 0.45-0,68), while the Indian population was 0.67 times as likely (n=307, 1.4 %; 95%CI: 0.54-0.83). and the White population was 0.44 times as likely to suffer from psychological distress (n=260, 3.7 %; 95%CI: 0.35-0.57).

Participants who were divorced or separated (n=233, 3.7%) were 1.29 times more likely to suffer from psychological distress than their married counterparts (n=1577, 26%,95%CI: 1.02-1,62), while the odds of suffering from psychological distress were 1.49 times greater for widowed participants (n=271, 3.4%, 95%CI: 1.12-1.99). Those who were never married (n=4397, 66.8%) were not more likely to suffer from psychological distress compared to those who were married (n=1577, 26%, 95%CI: 0.99 – 1.24). Those who had a primary level of education (n=1127, 16.4%, 95%CI: 0.94-1.37), those with a secondary level of education (n=2059, 36.8%, 95%CI: 0.78-1.37), and those who had completed a secondary level of education (n=1701, 32.2%, CI95%: 0.71-1.02), were not more likely to suffer from psychological distress compared to those who had no schooling (n=512, 6.3%). The only association between education and psychological distress was found in those who had completed a tertiary degree, who were 0.72 times as likely to suffer from psychological distress (n=346, 8.3%, 0.56-0.93) than those without any schooling. Compared to those who were unemployed (n=3936, 59.6%), employed participants were 0.74 times as likely to suffer from psychological distress (n=1934, 33.5%. 95%CI: 0.68-0.82), while students were 0,73 times as likely to suffer from psychological distress (n=450, 7.5%, 95%CI: 0.61-0.88). There was no

significant difference between the participants who fall into the "other" category and those who were unemployed (n=152, 2.1%, 95%CI: 0.86-1.58).

4.1.4. Association between psychological distress, HIV and TB

Table 3: Unadjusted associations between HIV, TB and psychological distress

Variable	Distressed (N=6479)		Not distressed (N=13729)		aOR	95% CI
	N	%	N	%		
No HIV	4674	73.8	10683	79.8	REF	REF
HIV	1754	25.5	3013	20.0	1.38	1.24-1.53
HIV & TB	51	0.7	33	0.3	2.72	1.43-5.16

aOR: odds ratio adjusted for gender, age, race, marital status, education employment; CI: confidence intervals.

Of those who report psychological distress, 73.8% (n=4674) were HIV negative, whereas 79.8% of those without psychological distress were HIV negative. Results of the unadjusted logistic regression assessing the relationship between HIV/TB status and psychological distress indicate that those who are HIV positive only were 1.38 times more likely (95%CI 1.24-1.53) to suffer from psychological distress (n=1754, 25.5%) than not (n=3013, 20.0%). Those with TB/HIV morbidity were 2.72 times more likely (95%CI: 1.43-5.16) to suffer from psychological distress (n=51, 0.7%), than not (n=33, 0.3%).

Table 4: Adjusted associations between HIV, TB and psychological distress

Variable	aOR	95% CI
No HIV	REF	REF
HIV	1.13	1.01-1.27
HIV & TB	2.31	1.16-4.60
Gender		
Male	REF	REF
Female	1.33	1.20-1.48
Age		
18-24	REF	REF
25-34	1.01	0.87-1.17
35-44	1.15	0.97-1.36
45-60	1.22	1.02-1.45
Race		
African	REF	REF
Coloured	0.54	0.44-0.68
Indian	0.67	0.51-0.87
White	0.44	0.36-0.65
Marital status		
Married	REF	REF
Never married	1.09	0.95-1.25
Divorced/separated	1.23	0.97-1.56
Widowed	1.26	0.97-1.64
Education		
No education	REF	REF
Primary level	1.18	0.96-1.43
Secondary level	1.04	0.85-1.27
Secondary completed	1.00	0.81-1.22
Tertiary completed	1.04	0.78-1.37
Employment		
Unemployed	REF	REF
Employed/self-employed	0.84	0.76-0.93
Student	1.08	0.61-1.90
Other	1.16	0.84-1.59

When adjusting for demographic factors associated with psychological distress (gender, age, race, marital status, education and employment), the relationship between HIV/TB status and psychological distress remains significant: compared to people who do not have HIV, people living with HIV were found to be 1.13 times as likely (n=1754, 25.5%, 95%CI: 1.01-1.27), and people with HIV/TB comorbidity were 2.31 times as likely to suffer from psychological distress (n=51, 0.7%, 95%CI: 1.16-4.60).

4.1.5. Association between psychological distress and adherence

Table 5: Adjusted association between psychological distress and adherence in patients living with HIV who are on ART (n=1810)

Variable	Adherent (N1777)		Non-adherent (N=103)		aOR	95% CI
	N	%	N	%		
Moderate Distress						
No	969	55.3	48	45.9	REF	REF
Yes	745	44.7	48	54.1	0.75	0.39-1.43
Gender						
Male	334	27.1	25	35.3	REF	REF
Female	1380	72.9	71	64.7	1.86	0.91-3.81
Age						
18-24	4.9	105	4	2.1	REF	REF
25-34	30.4	491	38	37.1	0.20	0.03-1.20
35-44	36.0	584	30	36.7	0.23	0.03-1.40
45-60	534	28.7	24	24.1	0.22	0.03-1.49
Race						
African	1419	97.0	78	95.6	REF	REF
Coloured	74	2.4	6	4.0	0.44	0.17-1.15
Indian	8	0.1	1	0.2	0.31	0.03-3.20
White	40	0.5	1	0,2	1.34	0.17-10.38
Marital status						
Married	317	22.8	14	7,9	REF	REF
Never married	1225	66.8	74	77.5	0.25	0.08-0.77
Divorced/separated	75	5.0	5	7.8	0.23	0.04-1.33
Widowed	97	5.3	3	6.7	0.26	0.07-1.04
Education						
No education	162	8.8	6	2.5	REF	REF
Primary level	396	23.1	15	12.4	0.45	0.11-1.83
Secondary level	660	42.7	46	63.3	0.15	0.04-0.54
Secon. Completed	360	23.0	18	13.9	0.34	0.08-1.43
Tertiary completed	39	2.4	6	7.9	0.05	0.01-0.36
Employment						
Unemployed	1228	70.8	72	81.1	REF	REF
Employed/self-employed	424	25.8	23	18.2	1.98	0.91-4.30
Student	22	1.5	0	0	-	-
Other	37	1.9	1	0.6	-	-

NOTE: Adherence is defined as having been compliant to ARV treatment regime for the past 30 days

AOR: adjusted odds ratio; CI: confidence interval.

Among those who reported taking ARVs, 44.7% of individuals reported being distressed, and they were not at increased odds of reporting adherence (n=745, 44.7%) compared to those who were not distressed (n=969, 55.3%, OR=0.75, 95%CI 0.39-1.43).

In an adjusted multiple regression model, adjusting for gender, age, race, marital status, education and employment, no association was found between psychological distress and adherence (OR=0.75, 95%CI 0.39-1.43). It is worth noting that marital status and education were associated with adherence (see Table 5).

As per the objectives outlined in Chapter 2, this study found a 33.7% (n=6479) prevalence of moderate to severe psychological distress. A total 22.2% (n=4851) of the sample were HIV positive, 0,08% (n=140) had been diagnosed with TB in the past year and 0.7% (n=51) reported co-morbid TB/HIV. Age, race, gender, marital status and education were found to be associated with psychological distress. After controlling for these variables, participants living with HIV were 1.13 times as likely (95%CI=1.01-1.27) to suffer from psychological distress compared to people who did not have HIV, while participants with co-morbid TB and HIV were 2.31 times as likely (95%CI=1.16-4.60) to have psychological distress. No association between psychological distress and medication adherence was found (OR=0.75, 95%CI=0.39-1.43). Results described in this chapter were influenced by the fact that the sub-sample had fewer odds of being “white” or “coloured” and greater odds of having a secondary/tertiary education or being a student.

5. Discussion

This section will first summarize and interpret key findings presented in Chapter 4 and highlight new insights into the associations between HIV, TB, and psychological distress among a sub-sample of a nationally representative sample of South African adults aged 18-60. All findings will be discussed in the context of the socio-ecological model, which considers the complex interplay between personal and environmental factors and their association with psychological distress. It will continue to discuss the study's limitations, the practical and policy implications of the findings and will make recommendations for future research.

5.1. Key findings

5.1.1. Prevalence of Distress

Using a sub-sample of a nationally representative sample of South African adults (age 18-60 years), this study aimed to establish the prevalence of psychological distress, determine the socio-economic and demographic factors associated with psychological distress, determine whether HIV or TB/HIV co-morbidity is associated with psychological distress and finally, to investigate the association between depression and non-adherence among adults who live with HIV or those who have both HIV/TB.

This study found a prevalence of psychological distress of 33.7% among a sub-sample of a nationally representative sample of South African adults. Although this result falls on the higher end of the spectrum, it is still in line with previous findings from recent South African literature reporting on the prevalence of psychological distress (Mthembu et al., 2017) and common mental disorders (Mungai & Bayat, 2019) among South Africans. For example, in their analysis of the data from the South African National HIV Prevalence, Incidence and Behaviour study conducted in 2012, Mthembu et al. (2017) found that 24% of 25860 adults screened positive for psychological distress using the Kessler 10 item scale. Similarly, in Mungai and Bayat (2019)'s study using data from NIDS, 26% of adults suffered from significant symptoms of distress based on the CES-D-10. Non-representative data from a sample of 1532 South African hospital out-patients found that almost half of the sample (49.7%) had mild, moderate, or severe psychological distress, as measured using the Kessler 10 item scale (Peltzer, Pengpid, & Skaal, 2012).

High levels of psychological distress are an indication of impaired mental health, with symptoms reflecting those of depression and anxiety.

However, the proportion of participants suffering from psychological distress may have been overestimated in this study, since Peltzer, Naidoo, et al. (2012) found that a cut-off score of 28 was more specific and sensitive to depression (0.77) and generalized anxiety disorder (0.78) than a cut off score of 16. Nevertheless, the impact and seriousness of mild and moderate symptoms of depression and anxiety should not be underplayed. Under-estimates of the burden have arisen from the traditional diagnostic classification system (DSM and International Classification of Diseases) whereby only those who meet the criteria for severe mental health impairment are offered treatment and support. The traditional diagnostic classification system negates the importance of addressing mental health difficulties during its early stages of development (Patel et al., 2018), leaving many people burdened with distress yet falling through the cracks. People who suffer from psychological distress, even though not diagnosed as depression or anxiety, need, and deserve mental health care. In fact, it has been shown that even mild/moderate symptoms of depression and anxiety can have adverse effects on one's functioning and, moreover, is thought to represent the highest proportion of DALYs related to common mental disorders (Patel et al., 2018).

The high prevalence of psychological distress reported in the present study is thus a cause of concern due to its individual and societal burden. Since being psychologically distressed means suffering from symptoms of depression and anxiety, a person may become withdrawn, fatigued, anxious, avoidant, and moody (Tola et al., 2015). While psychological distress is experienced on an individual level, it has ripple and debilitating effects at all levels of the socio-ecological framework. Research evidence has established a consistent relationship between psychological distress and a decrease in professional productivity (Richards, 2011), and the impairment is costing individuals, businesses, and the South African economy alike, as indicated by authors Stander, Bergh, Miller-Janson, De Beer, and Korb (2016). A person who suffers from psychological distress may become increasingly absent in their personal relationships. Isolating behaviours within a family environment, where an affected adult withdraws from the familial unit, negatively changes the family dynamic and functioning. This influences the quality of personal relationships and may lead to conflict and increased stress. The strong association between severe symptoms of depression and social isolation comments on how poor mental health disintegrates a person's social network and support structure (Schuster, Bornovalova, & Hunt, 2012).

5.1.2. Distress HIV, and TB

This is especially relevant given the present study's next finding of a higher prevalence of psychological distress among people living with HIV, who represented 24% of the total sample. People living with HIV had greater odds of having depression when compared to their HIV negative counterparts. The prevalence found in the present study aligns with other South African literature investigating the relationship between HIV and mental health, where researchers consistently found higher prevalence of depression or psychological distress among HIV positive versus negative samples (Peltzer et al., 2015; Simbayi et al., 2019). A study conducted amongst 156 HIV-positive South African primary healthcare patients revealed that 82.8% of participants experienced depressive symptomatology and reported a dark outlook on their future (Govender & Schlebusch, 2012).

While the present study identified a relationship between a positive HIV status and distress, it is not possible to conclude which caused which. Indeed, evidence suggests that the relationship between depression, specifically, and HIV diagnosis is bidirectional. While being HIV positive increases the risk of becoming psychologically distressed (Govender & Schlebusch, 2012), research has also shown that psychological distress, particularly depression, can increase the risk of HIV infection (Nduna et al., 2010).

Interpersonal relationships play a key role in the experience and outcome of HIV (Masquillier et al., 2016). A person's household can function as a protective factor in ameliorating the effects of HIV and providing a safe and supportive space for those infected with HIV, which positively influences treatment adherence and psychological well-being (Masquillier et al., 2016; Wouters et al., 2016). However, this is rarely the case due to the shame associated with a positive HIV status, and those infected often become socially isolated with increased stress (Tran et al., 2019). In a Govender and Schlebusch (2012) study, a positive HIV diagnosis was viewed by many as a negative life event which causes distress in other life domains, such as marital and financial difficulties, accessing health care, and stigmatization and fear. Indeed, research evidence has indicated that HIVAIDS accounts for 31% of DALY's amongst the South African population (Coovadia, Jewkes, Barron, Sanders, & McIntyre, 2009).

Since the start of the HIV/AIDS threat, stigma and discrimination has been one of the toughest challenges that infected individuals have had to deal with (Tran et al., 2019). Indeed, research has associated disease related stigma to a loss of power and social status (Daftary & Padayatchi, 2012). Unfortunately, high levels of HIV related stigma in developing countries such as South

Africa means there is much secrecy involved in protecting one's status, for fear of discrimination and ostracization by family, healthcare workers and the wider community (Tran et al., 2019). This drives HIV/AIDS underground and exacerbates the HIV stress response and increases anxiety and depression (Masquillier et al., 2016). Interpersonal relationships are affected by the fear of being "found out" and the consequent disruption of personal relationships; the secret becomes a great burden to carry, affecting mood and social engagements (Masquillier et al., 2016). When there is a positive and open atmosphere surrounding an HIV status, the family environment allows for HIV management to become part of their routine and HIV prevention behaviours, such as frequent testing and remaining cognisant of safe sex practices, are more common (Masquillier et al., 2016). This indicates the influence of the environment in disease management, showing how the individual and their eco-systems are interwoven.

While the present study did not identify a significant association between psychological distress and adherence, literature has established a strong association between medication non-adherence and poor mental health (Uthman et al., 2014). Sub-Saharan African researchers conducted a multinational, multicentre, observational, retrospective cross-sectional analysis on adherence and depression among 2344 adults living with HIV and taking anti-retroviral therapy. They found that adherence reduced as symptoms of depression increased (Memiah et al., 2014). Sub-Saharan African research among 1502 TB and comorbid HIV/TB patients, recruited from 5 different geographical location, showed similar results. Using the Kessler-10 scale, 22% of participants had severe psychological distress which was associated with non-adherence (Theron et al., 2015). Considering the evident relationship between depression and medication non-adherence in mainstream literature (DiMatteo, Lepper, & Croghan, 2000), the lack of association between psychological distress and medication non-adherence found in the present study could be attributable to inadequate variation in the adherence data. Indeed, too few participants reported not being adherent, which reduced the statistical power of the study and increases the margin of error (Dochtermann & Jenkins, 2011). A small sample size in the non-adherent group may have led to a failure in identifying a small but important difference in adherence between those with and without psychological distress. The self-reported measure of adherence only required a simple "yes" or "no" answer from participants. A more thorough assessment of adherence could have provided a more nuanced and accurate picture of adherence behaviour.

Medication non-adherence in the context of HIV has been a topic of grave concern in the medical community and can lead to poor health outcomes, opportunistic infections, drug resistant HIV strains and mortality (Coetzee, Kagee, & Vermeulen, 2011). Treatment regimens are complex and are frequently associated with medication related side-effects, which inadvertently impacts patient motivation (Valjee & Van Dyk, 2014). A stigmatized positive HIV status means that patients often do not disclose and efforts to conceal their status include hiding medication, skipping doses, or delaying treatment (Daftary & Padayatchi, 2012).

A striking finding from the present study is the fact that at 37.7%, less than half of people who are living with HIV reported being on an ARV medication. While South Africa failed to succeed in meeting their 90-90-90 target of having 90% of people living with HIV on ARV's by 2020, research reports that at least an estimated 67% HIV positive South Africans are on ARV's (UNAIDS, 2019a), significantly more than reported in the present study. The discrepancy between the finding in the present study and nationally reported statistics could be attributed to the nature of the self-reported interview questionnaire. While HIV status was established using biomedical specimens, participants who answered the questionnaire had the option to choose whether they feel safe enough to reveal their true status. The role of HIV-related stigma should not be underestimated in this scenario, as participants may have chosen non-disclosure of sensitive information for their own privacy, safety, and well-being, consequently impacting results.

The present study also identified that of all HIV participants on ARV treatment, 94% reported being adherent to their medication. This is much higher than the national average reported by UNAIDS (2019a), or the adherence rates found amongst 735 HIV primary healthcare patients from KwaZulu Natal in South Africa, with a 70.8% adherence rate identified using the Visual Analog Scale and an 82.9% adherence rate identified using the Adults Aids Clinical Trial Group, (Peltzer, Friend-du Preez, Ramlagan, & Anderson, 2010). Besides self-reported measures, another important limitation includes the small sample of non-adherent participants used in the analysis of the present study, since a small sample size impacts the confidence in and precision of results.

The present study found that co-infection of HIV and TB significantly increases the odds of psychological distress. The relationship between psychological distress and HIV or TB respectively, have been established in both global and Sub-Saharan African literature (Bernard et al., 2017; Breuer et al., 2011). However, few studies have investigated psychological distress

in the context of HIV/TB co-morbidity (Peltzer et al, 2013), and none have done so among a nationally representative sample of South African Adults. The present study is the first study to focus on the association between TB/HIV comorbidity and psychological distress amongst a sub-sample of a nationally representative sample of South African adults.

Findings from the present study support non-representative South African research from Peltzer, Naidoo, et al. (2013), introduced in Chapter 2. They found a staggering 81% prevalence of psychological distress and symptoms of post-traumatic stress disorder amongst 4900 TB public healthcare participants. Psychological distress amongst the coinfected was not measured in this specific study, although the authors report that the highest rates of PTSD were found in the HIV/TB co-infected group, with 31.1% of coinfected individuals screened positive for PTSD symptoms (Peltzer, Naidoo, et al., 2013). Another South African research study introduced in Chapter 2 has shown that HIV and TB co-morbidity in adults have negative effects on quality of life and physical functioning (Louw et al., 2012), which supports the relationship between comorbidity and psychological distress found in the present study. Indeed, Duko et al. (2015) found that patients who had perceived TB stigma were 11 times more likely to suffer from depression than those without perceived stigma. This finding is corroborated by Simbayi et al. (2007) who also found a close association between depression and stigmatization.

Those with comorbid TB and HIV experience double stigmatization, which is defined by an additional layer of stigma and discrimination based on their dual diagnosis (Wouters et al., 2020). The foundation of our understanding of stigma is rooted in the works of Goffman (1963), who described stigma as the discreditation of an individual's social standing and self-image and consequent disqualification from total social acceptance.

When compared to each other, HIV is much more stigmatized than TB because of the nature of the infection: HIV infections are permanent and blamed on the individual, whereas TB is curable and blameless (Wouters et al., 2020). This does not mean than TB is not stigmatized; it confirms that it is viewed by society as the lesser of two evils. The overlap of symptoms between the two diseases, such as fatigue, loss of appetite and weight-loss, makes it difficult to judge a person's status by physically looking at them and to avoid discrimination, patients would cover their HIV status with their TB status by only disclosing the latter. (Daftary, 2012). Research evidence has shown that the discrediting of HIV status is what is driving stigma towards people with TB, creating an extra layer of stigma for those co-infected (Wouters et al., 2020). The stress and distress experienced by people with co-morbid HIV and TB is layered not

only because of stigma and discrimination. The double pill burden and extra visits to healthcare facilities increases the psychological load of comorbid patients. Moreover, certain social and demographical factors faced by people with both TB and HIV further increases their risk of psychological distress.

5.1.3. Socio-demographic Factors

Having comorbid HIV/TB are significant risk factors for psychological distress, even after controlling for key socio-demographic characteristics that were found to be associated with distress. Indeed, this study identified age, sex, race, educational level, and employment as factors associated with psychological distress.

5.1.3.1. Age

The present study identified that those aged 45 -60 years of age had significantly greater odds of being distressed compared to 18–24-year-olds. Our findings are in line with a recent systematic review and meta-analysis of the global literature on factors associated with depression, which indicates that depression was greatest among those who are 50 years or older (Bernard et al., 2017). The present findings also corroborate those of other local studies, such as Tomlinson et al. (2009)'s study, conducted between 2002 and 2004 using the World Health Organization Composite International Diagnostic Interview, which found that the prevalence of a major depressive episode was greater among 40 – 49 year old's compared to younger adults. Other research corroborates an increase in psychological distress or depression with old age (Burns et al., 2017).

5.1.3.2. Gender

Results from this study show that women have a 43% increase in the odds of suffering from psychological distress when compared to men, which makes gender the strongest risk factor associated with the development of psychological distress in the study. This finding is consistent with global and local literature in the field (Steel et al., 2014), highlighting the gender differences in the prevalence and risk of psychological distress, where women consistently experience higher rates of internalising problems (Gutierrez-Lobos, 2000; Lund et al., 2013; Tomlinson et al., 2009). An explanation for this phenomenon has been put forward by research as the difference in how men and women cope with emotions, with women being more likely to internalize and men more likely to externalize their emotions. The result is women tend to become more withdrawn, feel lonely or develop depression while men tend to become more

aggressive, impulsive, and coercive (Hodes, Walker, Labonte, Nestler, & Russo, 2017). In South African specifically, women face additional hardships and challenges that poses a threat to their mental well-being and are likely to increase their risk for psychological distress. These include gender-based violence, fears of victimization, fears around safety for self and children and job security (Mungai & Bayat, 2019).

5.1.3.3. Race

Disparities in vulnerability to common mental disorders are not only reported across gender, but also across different races. The findings for the present study corroborate previous evidence, since African participants were more likely to report psychological distress than any other racial group. Indeed, the literature has shown that black South Africans, especially black woman, are the most vulnerable sub-population for psychological distress (Mthembu et al., 2017) as well as for HIV (Mabaso et al., 2019). Results from the various waves of NIDS show that Africans consistently experienced more severe symptoms of depression compared to any other race (Mungai & Bayat, 2019). Researchers also noted that over time and across the four waves, more Africans transitioned into exhibiting severe depressive symptoms in proportion to Whites (Mungai & Bayat, 2019). Research from the SASH also corroborates racial differences in the experience of mental health, reporting that Black people of all groups consistently experienced higher levels of psychological distress when compared to Whites (Williams et al., 2008).

The relationship between race and psychological distress is not straight forward, and a specific ethnicity does not automatically predispose individuals to the development of psychological distress. Jackson et al. (2010) delineates that the phenomenon that Black people suffer from more distress relative to White people can be explained by the difference in their ability to access resources, which is an important factor of multidimensional poverty (Rogan, 2015). Supporting the above stated argument is findings from the nationally representative sample from the South African National Health and Nutrition Examination Survey (n = 15,981), revealing that African participants had greater exposure to social stressors and traumatic events than any other racial group, and also experienced greater rates of psychological distress, measured using the Kessler-10 (Harriman et al., 2021). Indeed, it is noteworthy that the South African Human Rights Commission's report of 2017/2018 indicates that poverty disproportionally affects black people (64%) in relation to Coloureds (41%), Indians (6%) and Whites (1%). Poverty is an established risk factor for psychological distress and therefore, the association found between race and psychological distress could be a result of differences in

socio-economic status and associated contextual challenges.

5.1.3.4. Education

Another indicator of deprivation associated with psychological distress in this paper was educational level. More specifically, in the unadjusted analyses, those who had completed a tertiary degree had lower odds of having psychological distress compared to those who had no formal schooling. This finding corroborates with other local literature, where Bernard et al. (2017) found that the severity of depressive symptoms among people living with HIV was associated with lower levels of education and those who had only a primary school level of education was at a two-fold risk of having more symptoms of depression. These findings also corroborate global literature suggesting that lower levels of education are associated with an increased risk of depression (Lund et al., 2018). The present study thus identifies that having completed a tertiary level of education serves as a protective factor against the development of psychological distress. Yet, South Africa faces high rates of illiteracy and low rates of matriculation among the general population. In fact, research has shown that 5.5% of those older than 20 years of age are illiterate (*General Household Survey*, 2018). While most school aged children have universal attendance up until the age of 15, there is a sharp decline in educational attendance from the age of 15 onwards (*General Household Survey*, 2018). An estimated 13% of South African adults have had either no formal schooling or have not completed grade 7 (*General Household Survey*, 2018).

The South African government has failed to realize their initial commitment to offer free education and healthcare to its citizens (Budlender & Lund, 2011). Putting this onus on individuals and families who likely are already financially crippled increases stress. The burden of poverty and its associated stressors, including the limited resources available to the educational system (World Bank, 2018a), has made education for many South Africans a luxury rather than a necessity. This is potentially why education was no longer associated with psychological distress once other socio-economic factors such as race were accounted for.

5.1.3.5. Employment

It is not surprising that in the present study, according to the adjusted model, those who were unemployed were at a greater risk of suffering from psychological distress compared to those who were employed. An individual's level of education is directly associated with employability, where those with no or low educational levels are less likely to secure a job. Other research in the field has also corroborated this, reporting that being both employed and

having an increased level of education is associated with a reduced risk of depression (Burns et al., 2017). This is concerning, given the high rates of unemployment in South African, especially among younger adults. The majority of youths between the ages of 15 and 34 are unemployed, with data showing a 64.4% unemployment rate among 15–24-year-olds and 42.9% among 25–34-year-olds (Maluleke, 2021). Not being in employment, education, or training (being NEET) has been shown to be a risk factor for depression among young South Africans (Garman, Eyal, Avendano, Evans-Lacko, & Lund, 2021).

Unemployment in South Africa is also associated with a range of stressors and limited resources (World Bank, 2018a). Given the limited economic opportunities available in the country, being unemployed significantly impacts quality of life and prospects for the future (Budlender & Lund, 2011), but also impacts the whole family in terms of securing basic needs like food, sanitization and shelter. The experience of poverty in South Africa is further exacerbated by the fact that most family structures are not nuclear: most households are single-parent or grandparent led and many children are not living with their biological parents (Budlender & Lund, 2011). The burden of childcare in South Africa is thus firmly placed on the shoulders of women, and more specifically, mothers and grandmothers. Given the fact that this study identified gender as the strongest risk factor for the development of psychological distress, a finding corroborated by literature, it emphasizes the vulnerability of women, their increased mental health risks, and the consequent impact thereof on raising a nation. Understanding this in the context of the socio-ecological model and considering the high prevalence of HIV in South Africa, there are clear risks involved for children and families. In examining the role of HIV on caregiving and parenting behaviour, authors Lachman, Cluver, Boyes, Kuo, and Casale (2014) identifies less positive parenting and reduced parenting skills among positive individuals, rendering caregivers less engaged, less nurturing, and more stressed. These behaviours may be exacerbated by the presence of psychological distress among people living with HIV or comorbid HIV/TB.

5.1.3.6. Income

Interestingly, the present study did not find an association between income received in the past month and psychological distress in the adjusted model. This may be related to previous findings that poverty is a complex multi-dimensional construct, and income alone may not be an accurate measure of the association between poverty and psychological distress. Domains such as education, employment, health and living standards may be more relevant than monetary deprivation (Ntsalaze & Ikhide, 2016). Indeed, research on the link between income

and depression has been inconsistent, although income has been identified as a risk factor (Lund, Breen, et al., 2010). Income alone has been described as a too narrow gauge of wellbeing (Rogan, 2015). Perhaps a more accurate predictor of depression is found in neighbourhood level deprivation rather than personal income. Dowdall et al. (2017) analysed data from a nationally representative South African sample and found that significantly more symptoms of depression are experienced in neighbourhood with greater levels of deprivation. Neighbourhoods classified as deprived are characterised by a lack of resources and neighbourhood disorder, including crime and violence (Dowdall et al., 2017).

5.1.3.7. Poverty

The literature has consistently provided evidence for the relationship between multi-dimensional poverty and mental ill-health: the risk for mental ill-health increases with a greater experience of deprivation, which includes inadequate education, low socio-economic status, disempowerment, unemployment, and a lack of social cohesion (Alkire & Foster, 2011; Rogan, 2015). This phenomenon explains mental illness in relation to social causes and is known as the social causation theory. Local literature has provided evidence for the social causation theory in the South African context. Lund and Cois (2018) analysed nationally representative, longitudinal data from the first three waves of the NIDS study and concluded that a worse economic status was associated with a worse depression two years later. However, the relationship between these two variables was found to be more complex when authors also discovered that greater depressive symptoms were associated with a worse economic status at later waves (Lund & Cois, 2018). This phenomenon is termed the social drift theory. Simultaneous social causation and social drift illustrates the vicious cycle between mental ill-health and poverty. In a country where most people are stuck in the deprivation trap, the intricate and bi-directional relationship between poverty and mental illness is an important consideration in understanding the prevalence of psychological distress among South African adults.

Research has provided evidence that mental illness is strongly influenced by the social and economic conditions that an individual is exposed to during their lifetime (Lund et al., 2018). These are known as social determinants of health and refer to the conditions people are born into and live within. Risk factors for the development of psychological distress identified during the present study corresponds with the social determinants of mental health: age, sex, race, and employment. Specifically, in the context of poverty, race and employment are indicators of deprivation as well as determinants of health (Lund et al., 2018). Understanding

these two risk factors through the socio-ecological framework, as described above, highlights the interrelationship of individuals and their environments.

5.2. Historical Context

It is important to recognize these findings within context, which highlights the role that the history of the Apartheid era (1949-1994) played in creating conditions of poverty through inequalities in education, employment, and policies. The Apartheid era is defined by an institutionalized racial segregation system and a rigid hierarchy, where whites were deemed superior to all other races and policies and laws were implemented to afford this racial group with more rights, resources, and opportunities (Coovadia et al., 2009). Following Whites in the hierarchy are Indians, then Coloured and Black. During the Apartheid regime, many non-whites were displaced from their land and forced to move to dedicated rural areas for non-white people. In line with segregation policies, the Apartheid government built special schools and healthcare facilities for Blacks, Indians, and Coloureds (Burger & Christian, 2018). The infrastructure and resource allocation of these services were sub-standard compared to the services minorities received. Government also decreased funding for education and health care for non-whites. For instance, estimations from the 1970's determine that the doctor patient ratio for non-whites were 1:15 000 compared to 1:1700 for whites (Coovadia et al., 2009). This massive disparity shows the unjust and unfair policies all people of colour were subjected to and how these contributed to the creation of the most unequal country in the world (Harriman et al., 2021).

The country's historical milieu provides an understanding for the association between being black and living in poverty in South Africa. The displacement of specific racial groups to segregated rural areas far from the central business district was an attempt by the Apartheid regime to oppress and exclude people of colour from the economy (Harriman et al., 2021). This strategic move coupled with segregation laws and policies ensured a breeding ground for poverty among non-white South Africans. Decades in poverty has created a vicious cycle where generation after generation gets stuck in the poverty loop. Although South Africa has been operational as a Democracy for more than 25 years following the end of the Apartheid regime in 1994, poverty still disproportionally affects people of colour, but especially Black people (Harriman et al., 2021). Regardless of government efforts of reform, black poverty has persisted

and grown into communities trapped in deprivation.

The cycle of poverty and mental ill-health creates contextual, social, and personal barriers to seeking and accessing healthcare. Although the post-Apartheid government expanded the network of health facilities, healthcare services in South Africa are still not accessible for many. The physical distance people are required to travel to access such services, and the associated expenses such as travel or child minding, are definite barriers to help-seeking behaviours (Burger & Christian, 2018). Indeed, rural households and vulnerable sub-groups such as black South Africans, the less educated, the unemployed and the poor are identified as the groups who are the least likely to have access to adequate healthcare (Burger & Christian, 2018).

5.3. Interpreting findings in the context of the South African healthcare system

5.3.1. Available Mental Health Services in HIV/TB Public Health care

Findings from the present study highlight the special mental health needs of people with HIV and TB, and more specifically, those with co-morbid HIV and TB. Current services offered as part of the national treatment guidelines for HIV and TB treatment and management do not sufficiently incorporate mental healthcare. Mental Health systems in South Africa are in general inadequate in addressing the mental health needs of South Africans (Lund, Kleintjes, Kakuma, & Flisher, 2010). A study conducted among participants in the Western Cape, one of South Africa's nine provinces, found that Mental Disorders was the second largest contributor to burden of disease (Ward, Frantz, Struthers, & Lund, 2007). Despite such a large burden of disease, resource and staff allocation towards mental health services are few (Lund, Kleintjes, Kakuma, & Flisher, 2010). Indeed, in 2016/2017, only 5% of South Africa's total annual health budget was allocated to mental health expenditure (Docrat, Besada, Cleary, Daviaud, & Lund, 2019).

The South African National Mental Health Policy Framework and Strategic Action Plan (2013-2020) has effectively expired. The policy framework was intended to give national guidelines on mental health promotion as well as on the prevention, treatment, and rehabilitation of mental illness. This current policy framework is outdated and does not adequately consider the changing mental health needs of South Africans. There exists a gap between the framework and action plan, and what has been practically implemented over the course of 2013-2020.

Currently, the Mental Health Policy Framework and Strategic Plan (2013-2020) acknowledges HIV as a priority disease for mental health promotion and prevention due to the intricate relationship between depression and HIV/AIDS. Due to their vulnerability, all people living with HIV/AIDS have been identified as a target for specific mental health needs. Despite this, and despite research showing that people with HIV have special mental health needs, such as in the present study, options for support and mental health interventions are extremely limited.

As part of the national anti-retroviral treatment program, people diagnosed with HIV are required to undergo two counselling sessions at treatment initiation and one follow-up session shortly after treatment initiation. While a dedicated counsellor conducts the sessions, they are non-specialised mental health workers. Lay counsellors are specifically trained in HIV testing and counselling and obtain a certificate of training following a short course. Anyone with an educational level of grade 10 or higher can qualify for enrolment into an HIV counselling training program. Regardless of the structured counselling sessions offered as part of the ARV treatment program, evidence from research has found that psychological distress remains high among this sub-population (Breuer et al., 2011) which means their mental health needs are not being met.

The Mental Health Policy Framework and Strategic plan also acknowledges the significance and need of mental health promotion and intervention in the context of TB patients within the primary health care setting. Akin to the counselling procedures followed for people living with HIV, people with TB receive structured informational counselling sessions from a non-specialized counsellor. Patients attend a total of four counselling sessions, with the first three being conducted in the first week of treatment initiation during the intensive treatment phase. The last counselling session is conducted right before the start of the continuation phase.

Counselling sessions in the context of primary health care as part of TB or HIV services are psycho-educational in nature and emphasis is on the person's understanding of their condition, knowledge and importance of medication adherence, disclosure and confidentiality of status and safe practices to prevent the spread of the disease. While emotional support and understanding is offered by the counsellor, the structured nature of the sessions and limited time frame available per meeting bound the depth and psychological support counsellor can offer patients.

What the Mental Health Policy Framework fails to acknowledge is the increased vulnerability of psychological distress in people who have both HIV and TB. No mention is made about this

specific category of patients who are more likely to suffer from psychological distress than those with only HIV or only TB. Given the contextual challenges most of these people face because of the low socio-economic environment and deprivation trap, mental health interventions are paramount. The gap between mental health policy and practice needs to be addressed. The situation is so dire that researchers have called this gap, where those who desperately need mental health care cannot access treatment, a violation of human rights (Nguse & Wassenaar, 2021) and a humanitarian crisis (Lund, 2017). Given the state of the current public healthcare sector and the legacy of Apartheid, addressing the mental health care needs of people with co-morbid HIV and TB are not straight forward.

5.3.2. Healthcare Reform

Addressing the mental health needs of people living with co-morbid HIV and TB is complicated by the many healthcare systems and service-related challenges South Africa face. Healthcare in South Africa is divided into public and privatized sectors, with a stark contrast between these two domains. The birth of a new democracy in South Africa in 1994 saw healthcare reform being prioritized for development. Although the government has made efforts to expand the network of health facilities and did away with user service fees, healthcare in South Africa remains polarised and unequal (Burger & Christian, 2018). In fact, while South Africa's private healthcare system was ranked as having the 6th best quality of healthcare out of 48 countries in 2008, the public sector was ranked at a very poor number 40th on the list (Burger & Christian, 2018).

Private healthcare annual per capita expenditure is ten times more than public expenditure, even though 71% of the entire population is dependent on public service delivery (*General Household Survey*, 2018) and the sector is staffed by only 30% of the country's medical doctors (Mayosi & Benatar, 2014).Considering that only 29% of South African citizens are able to afford private healthcare (*General Household Survey*, 2018), the disparities in resource allocation is striking. Government investment into the public sector is grossly inadequate to be able to serve the medical needs of South Africans (Mayosi & Benatar, 2014) and consequently, the primary health care sector is under immense pressure in its responsibility to provide sufficient and quality healthcare to South Africans.

Some may even argue that in fact, the public healthcare sector is collapsing altogether. Public hospitals in South Africa are highly strained due to the unmanageable workload, poor and incompetent management, and staff shortages (Von Holdt & Murphyi, 2006). Mismanagement,

neglect, and lack of funding for maintenance has left the public healthcare infrastructure run down and dysfunctional (Mayosi & Benatar, 2014). Strikes in the healthcare facilities over disputes relating to salaries, increases and bonusses are another concern for the South African public healthcare sector, as striking by healthcare professionals adversely impacts service delivery (Le Roux & Cohen, 2017). The loss of specialized medical personnel is a concerning factor for the state and future of the country's healthcare (Bhana, Petersen, Baillie, Flisher, & The Mhapp Research Programme, 2010). The rising migration of nursing staff to first world countries is a considerable threat, given their fundamental role in basic healthcare (Bhana et al., 2010).

Pressure on the healthcare system can directly be associated with the HIV and TB epidemics faced by the country. These epidemics are a great burden to the public healthcare sector who needs to provide consistent healthcare treatment and management for large portions of the population. The impact of these two diseases is so severe that local health facilities, such as clinics, day hospitals and hospitals, had to create dedicated services housing TB and HIV services. This means that a unit with dedicated staff members providing services to people living with TB and HIV, respectively, had to be established in every facility to meet the health needs of South Africans. Even though separate and dedicated HIV and TB services have been established, challenges such as long waiting times, inadequate staffing, administration challenges, medication supply and resource restrictions mean that the quality of all services is compromised. The sheer amount of people accessing services from the limited number of health facilities available is a major contribution to the pressure experienced by the system. Simply, the system does not have the capacity to deal with the country's health needs. The brunt of this pressure is felt on ground level, where high levels of stress and burnout has been recorded among healthcare workers working in the public sphere. The workload of nurses has been directly associated with burnout and stress (Spence Laschinger, Grau, Finegan, & Wilk, 2012). Healthcare workers in the HIV/AIDS field are at an even greater risk of suffering from psychological distress and decreased psycho-social well-being due to the increased demands of this specific sub-population of patients (Valjee & Van Dyk, 2014).

5.3.3. Task-Sharing

While there is a clear need for people living with HIV, and both HIV and TB, to have access to public mental healthcare in addition to their ARV treatment regimes, as highlighted by this study and corroborated by other research, options for mental health care services outside of the standard treatment are few and far between. Several studies have suggested task-sharing as a

resolution to address the mental health treatment gap within the South African public healthcare system (Nyatsanza, Schneider, Davies, & Lund, 2016; Selohilwe, Bhana, Garman, & Petersen, 2019), including in the context of HIV mental health care services (Petersen, Bhana, Baillie, & Mha, 2012) (Petersen, Hanass Hancock, Bhana, & Govender, 2014; Petersen, Hancock, Bhana, Govender, & Mental Health Care, 2013). This intervention sees-non-specialised healthcare workers address the mental health needs of the most vulnerable population groups through screening and counselling of at-risk patients in the primary healthcare setting. However, there is a significant burden of patient care and workload on professional healthcare workers (Roomaney, Steenkamp, & Kagee, 2017), which makes the utilization of healthcare support staff seem more appropriate.

Indeed, the literature has identified high levels of burnout and fatigue among professional healthcare workers. A systematic review of burnout among healthcare workers in Sub-Saharan Africa analysed 65 quantitative studies and found high levels of burnout amongst all healthcare provider but especially amongst the nursing population (Dubale et al., 2019). Burnout amongst healthcare providers in Sub-Saharan Africa has been associated with work environments, workload, professional conflict, and low levels of support (Dubale et al., 2019). South African literature echoes findings from Sub-Saharan Africa. Burnout and emotional exhaustion amongst HIV nurses, specifically, are exacerbated as a consequence of the challenging nature of their patient population, (Roomaney et al., 2017). Other healthcare workers from the HIV field are not spared, as research amongst HIV lay counsellors identifies high levels compassion fatigue, which includes secondary trauma and job burnout (Peltzer, Matseke, & Louw, 2013). Evidence has identified compromised psychosocial well-being even amongst non-nursing healthcare workers in the AIDS palliative care environment (Valjee & Van Dyk, 2014). This gives insight into the emotionally taxing and psychologically stressful environments of working in HIV/AIDS care. Not only does people living with HIV and comorbid HIV and TB experience exacerbated levels of distress, but their healthcare providers, especially their nurses, do as well. This phenomenon has surely been further exacerbated by the COVID-19 pandemic which took its grip in South Africa during 2020. Existing resources had to be used from an already limited pool to manage and treat the COVID-19 threat, hailing healthcare workers modern day heroes for their essential role. Pressure was felt by all healthcare professionals. Clinic TB and HIV units had to take over the management of COVID-19 screening and detection, surely amplifying any existing challenges and frustrations.

In view of the above, task-sharing for nurses in primary healthcare is not recommended to

address mental health needs, considering their existing occupation related strain. Certainly, task-sharing for HIV healthcare providers who are already at capacity will be an extra emotional and physical burden and will impact quality of services rendered. Both qualitative and quantitative feedback from professional nurses shows that while there is acknowledgement for the need, and support for the integration of depression care into public healthcare, they expressed concern over time constraints and the added burden to their workload (Kemp et al., 2021). Research has provided evidence for the association between health provider burnout and patient satisfaction, where the patient and healthcare worker relationship suffer as a result of the experience of emotional exhaustion among nurses (Garman, Corrigan, & Morris, 2002). Poor relationships between HIV nursing staff and their patients have been cited as a reason why patients cease to come for their clinic visits, affecting medication adherence and leading to poor health outcomes and even mortality (Kemp et al., 2021; Roomaney et al., 2017).

Besides, study assessing patient preference for mental health interventions in chronic care services found that patients prefer services rendered by lay-counsellors over existing nursing staff, provided that the lay-counsellor possess certain qualities characterised by good counsellors (Myers et al., 2018). This indicates that non-specialised healthcare workers delivering mental health services in the public healthcare system is acceptable to the community and that a combination of specialized care and trained, supported, and supervised non-specialist workers holds promise in addressing the mental health needs of South Africans.

5.3.4. Screening and Identification of Psychological Distress

An integral step in meeting the mental health needs of people living with HIV and comorbid HIV and TB can be through the routine screening and identification of high-risk primary care patients. Detecting patients in need of mental health intervention should be done timely and during the first stage of treatment. Screening tools can, for example, be administered by lay counsellors during the mandatory educational counselling sessions which form part of the existing treatment plan. There are brief, validated, and effective screening tools available that can be used in clinical settings to identify people with comorbid HIV and TB who require additional mental health services. These screening tools can easily be administered by nurses, lay counsellors or other healthcare workers, and should be routinely integrated into existing health management guidelines. Suitable, brief, screening tools that have been validated in the South African primary healthcare setting include the Kessler 10 (K-10) (Spies, Kader, et al., 2009; Spies, Stein, et al., 2009), the 20 Item Self-Reporting Questionnaire (SRQ-20) (van der Westhuizen, Wyatt, Williams, Stein, & Sorsdahl, 2016), the Patient Health Questionnaire 9 (PHQ9) (Cholera et al., 2014) (Bhana, Rathod, Selohilwe, Kathree, & Petersen, 2015) (Petersen et al., 2019) and the Center for Epidemiological Studies Depression Scale (Baron, Davies, & Lund, 2017; Myer et al., 2008).

Screening tools that measure specific mental disorders usually only indicate either the presence or absence thereof, while tools that measure non-specific mental distress often gives indication of the risk category associated with the score (Kessler et al., 2002). Knowledge about the severity of psychological distress is beneficial to the establishment of the level of intervention required and allocating resources accordingly (Patel et al., 2008). With basic training, these validated brief screening tools can be administered by any non-specialized healthcare providers (Kaaya et al., 2013) including lay counsellors, nurses or even community health workers.

Several studies have explored the feasibility and effectiveness of different mental health interventions in the primary healthcare setting. The successful integration of mental healthcare into the primary care setting is dependent on evidence-based approaches. Group Interpersonal therapy (IPT) has emerged as a promising approach to mental health intervention in LMIC, often adapted to incorporate cognitive behavioural therapy and problem-solving therapy (Petersen, Hanass Hancock, et al., 2014). One such South African study used an adapted IPT group-based therapy model on 60 primary healthcare users, which showed a significant reduction in depressive symptoms post completion of the intervention after 12 weeks, and at

24 weeks follow-up (Petersen et al., 2012). Moreover, qualitative analysis showed that participants also experienced improved coping skills, resilience, and self-agency from their participation in the intervention and authors could conclude the intervention as feasible and acceptable (Petersen et al., 2012). A smaller pilot randomized control trial used group IPT administered by trained and supervised lay counsellors as a mental health intervention among people with both HIV and depression (Petersen, Hanass Hancock, et al., 2014). The 34 participants who completed the 8-week IPT group program showed significant reduction in depressive symptoms as measured with the PHQ9 (Petersen, Hanass Hancock, et al., 2014). Qualitative feedback from participants show support in favour of using lay counsellor and community workers over nursing staff in delivering mental health interventions (Petersen et al., 2013), confirming that their intervention was feasible and acceptable.

In adopting a task-shifting approach, lay counsellors can be a valuable resource in addressing the mental health treatment gap threatening South Africa. Lay counsellors have the potential to fulfil both roles as interviewer during the screening process and counsellor during the delivery of the psychological intervention. This would be a more cost effective and practical strategy than using specialised service providers from a different field of healthcare work. A qualitative systematic review on utilizing lay counsellors for psychological intervention supports the potential of lay counsellors at primary healthcare level to effectively conduct behaviour change and common mental disorder counselling for depression, although various organizational issues would first need to be addressed (Petersen, Fairall, Egbe, & Bhana, 2014). However, noting the elevated levels of compassion fatigue and burnout amongst lay counsellors described earlier in the chapter, dedicated mental health lay counsellors may be required to fill the gap. Optimizing lay counsellors to provide group support to people living with HIV comorbid HIV and TB holds promise for effective mental healthcare integration into the public healthcare setting, provided they receive adequate training and supervision, a clear scope of practice and referral network.

5.4. Limitations

There are important methodological limitations to the present study which need to be highlighted. Firstly, the cross-sectional nature of this study limits interpretation and understanding of cause and effect. While associations between psychological distress and HIV/TB and socio-demographic factors can be established, it is not possible to know the direction of the relationship when data is cross-sectional. Secondly, the 70% sensitivity and 67% specificity of the K-10 screening tool was relatively low, possibly leading to an over estimation of the prevalence of psychological distress. Thirdly, the present study has a relatively small sample of people with comorbid HIV and TB, which increases the likelihood of a Type II error and decreases the statistical power of the study. This is a limitation to the conclusions that can be drawn from the results. Fourthly, the fact that only participants between the ages of 18 and 60 who also had available data for HIV, TB and psychological distress means that the study sample had important differences to the original nationally representative sample. The sub-sample selected for this analysis had fewer odds of being white or coloured and greater odds of having a secondary or tertiary education or of being a student. These criteria may have influenced the associations found between psychological distress and HIV and TB.

5.5. Recommendations for future research

Further research is recommended to understand the association between HIV/TB comorbidity and psychological distress among South African primary healthcare patients, given the paucity of available research. Research should include people living with HIV and people with comorbid TB and HIV, with a big enough sample size to yield adequate statistical power. Given the relatively low specificity and sensitivity of the K-10 screening tool, it is recommended that another brief screening instrument, such as the SRQ-20, is used and validated in the HIV and TB South African public healthcare patient population. The validation of screening tools for use among the HIV and TB infected populations in clinical settings are integral to address the screening and identification of mental health needs at primary care level.

Further research is also necessary to understand possible types of mental health interventions to address psychological distress among people living with HIV and those with comorbid TB and HIV. Specifically, research focusing on the efficacy, feasibility and acceptability of task-sharing mental health interventions conducted by trained and supervised primary healthcare

support staff is recommended. It is also recommended that further research includes adherence data, pre and post intervention, so that the relationship between psychological distress and adherence can be further investigated. A brief tool such as the Morisky Medication adherence Scale can be used, which has been validated in Sub-African patient populations (Tandon, Chew, Eklu-Gadegbeku, Shermock, & Morisky, 2015).

5.6. Conclusion

Given the burden of mental disorders and the epidemics of HIV and TB in South Africa, various research studies have been conducted to investigate this relationship. This study fills the gap in the understanding of the association between psychological distress and HIV and HIV/TB comorbidity among the general population of South African adults. This study found elevated levels of psychological distress among South African adults. It also found that living with HIV significantly increases psychological distress, and that an added diagnosis of TB disease further exacerbates the risk of psychological distress, even after controlling for key socio-demographic characteristics.

The study identified associations between psychological distress and several socio-demographic factors, such as age, sex, race, educational level, and employment. People living with HIV are at a greater likelihood of being psychologically distressed, which is concerning given the high prevalence of people living with HIV in South Africa. Moreover, when people living with HIV also develop TB disease, their likelihood of suffering from psychological distress further increases. Risk factors interact in various ways with the environment to impact an individual's experience of and response to psychological distress, with rippling effects to the wider eco-system. Poverty, low-socio-economic status, and disease play a key role in the prevalence and experience of psychological distress in South Africa.

Although people living with HIV or comorbid HIV and TB have special mental health needs, as highlighted in this study, and corroborated by other research, mental health care options are unjustifiably scarce. Current mental healthcare options for this patient sub-population are limited to a few mandatory, structured, psycho-educational sessions with lay counsellors, which certainly do not adequately cover their mental health needs. South Africa has many strides to make in addressing the mental health treatment gap, an endeavour complicated by a resource limited and struggling public healthcare system. The integration of mental healthcare into the public healthcare system is paramount in addressing the treatment gap and providing mental healthcare to vulnerable groups such as the HIV and/or TB population.

The screening and detection of people with HIV and/or TB in the primary healthcare setting is a vital step in addressing psychological distress, and a few brief screening tools have already been validated in the South African primary care environment that could be used to that effect. Specialist mental health workers providing training and support to generalist health workers to conduct mental health screening and counselling interventions in the public healthcare setting,

known as task-sharing, hold promise. Given elevated levels of burnout and stress among nursing professionals, task-sharing is recommended for lay counsellor or community workers, instead of nursing personnel. Adapted interpersonal group therapy has shown promising results among the HIV population but further investigation of specific interventions, including their effectiveness, feasibility, and acceptability, is warranted. Addressing psychological distress among people living with HIV and especially among those who have both HIV and TB, will positively affect disease progression, disease transmission and health outcomes.

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