The Relationship between Depression, HIV Stigma and Adherence to Antiretroviral Therapy (ART) among Adult Patients Living with HIV at a Tertiary Hospital in Durban, South Africa: The Mediating Roles of Self-Efficacy and Social Support

A dissertation submitted in fulfilment of the requirements for the degree of

Master of Social Sciences in Social Work

School of Applied Human Sciences

College of Humanities

By

MUZIWANDILE QINISO LUTHULI (215022449)

Supervisor: Professor Johannes John-Langba

March 2021

Compulsory declaration

This research dissertation has never been submitted before in part or in it entirety for the accolade of any degree. Thus, it is the product of my original effort, and every significant piece of material, or works of other persons used or cited in this dissertation has been acknowledged by means of proper citation and reference.

Signature…….. Date: ……..

Dedication

All honour and gratitude goes to the Creator of the universe for all that I have achieved and yet to achieve. I dedicate this dissertation particularly to my grandmother Bhekephi Mseleku, and my parents Mr Bonginkosi Luthuli, Ms Thokozani Mzobe and Mrs Lindiwe Hlophe. I also dedicate it to my son Bandile Luthuli, my sibling Mbalenhle Mthiyane and my partner Nomfanelo Mdlalose, to my grandfather Vusimuzi Mseleku, my uncle Mduduzi Mseleku, and to my youngest aunt Snakho Mseleku. All your love, encouragement and unending support made me to persevere even at times when I felt hopeless. I therefore, extend my profound appreciation to all of you and I will always dedicate myself into whatever I do and at every point of this trajectory because every tremendous achievement attained by myself is not just for me but for all of us to cherish as a supportive and united family. Lastly, I also dedicate this research dissertation to the whole family clan as this is going to be the first master's degree in my family.

Acknowledgements

My profound gratitude is genuinely extended to following people and organisations:

My Supervisor Professor Johannes John-Langba for his teachings, continuous support, and guidance throughout the course of this dissertation and for motivating me to work diligently and fastidiously as well as for being responsive when asked to provide letters of recommendation.

My undergraduate lecturer Dr Joseph Rudigi Rukema, for his encouragement and support by often being responsive when asked to furnish letters of recommendations.

My undergraduate Supervisor Ms Babalwa Dano, for demonstrating faith in me as an emerging researcher, and for her continuous encouragement and support given when asked to provide letters of recommendations.

My undergraduate social work field supervisors, Mr Sphesihle Msomi, Mrs Dolana Dlamini, and Mrs Zandile Ngidi for all their teachings, and ceaseless support as well as responding promptly when asked to furnish letters of recommendation.

Another thank you goes to Dr Kwanele Shishane for her guidance, and responsiveness when asked to bring light into difficult milestones of my research, without your ceaseless support this trajectory would have been lot more difficult.

A great thank you goes to ALL my friends who have had a direct and indirect support into the successful completion of this dissertation namely, Mr Zwelisha Mfishi, Ms Anele Gumede, and Ms Nosipho Funeka. I am genuinely grateful to all of you guys.

The financial assistance of National Research Foundation (NRF) in collaboration with Research and Innovation, Support and Advancement (RISA) towards this research is hereby acknowledged.

The financial assistance of Richard ad Turner towards this research project is hereby acknowledged.

I am also grateful about the support received from all staff members at Philani Family ARV Clinic, especially Sister T.E Goge and Mrs D. Ngcobo for their tremendous assistance in allowing me for the opportunity to successfully conduct my data collection within the Hospital Clinic.

The Department of Health, King Edward VIII Hospital, and Department of Social Work for granting the approvals for conducting my research with adult patients who are enrolled in ART program.

Lastly, my greatest gratitude also goes to the adult patients who participated in this research, and without you, this research would not have been a success.

Abstract

Although, numerous factors predicting adherence to antiretroviral therapy (ART) among people living with HIV/AIDS (PLWHA) have been broadly studied on both regional and global level, up-to-date adherence of patients to ART remains an overarching, dynamic and multifaceted problem that needs to be investigated overtime and across various contexts. There is a rarity of empirical data in the literature on interactive mechanisms by which psychosocial factors influence adherence to ART among PLWHA within the South African context. Therefore, this study was, designed to investigate the relationship between depression, HIV stigma and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban, South Africa and the mediating roles of self-efficacy and social support. The Health Locus of Control Theory and the Social Support Theory were the underlying theoretical frameworks for this study.

Using a cross-sectional research design, a total of 201 male and female adult patients aged between 18-75 years receiving ART at a tertiary hospital in Durban, KwaZulu-Natal were sampled, using time location sampling (TLS). A self-administered questionnaire was employed to collect the data in this study. Data were analysed through SPSS version 27. Several statistical analyses were conducted in this study, namely univariate statistical analysis, correlational analysis, Pearson's chi-square analysis, cross-tabulation analysis, binary logistic regression analysis, and mediational analysis.

Univariate analysis indicated that the sample mean age was 39.28 years (SD=12.115), while most participants were females 71.0% (n=142), never married 74.2% (n=147) and most were also secondary school educated 48.3% (n=97), as well as unemployed 65.7% (n=132). The prevalence rate of participants had high adherence to ART was 53.7% (n=108), and 46.3% (n=93) of participants had low adherence to ART. Chi-square analysis revealed that employment

status was the only statistically significant socio-demographic influence of adherence to ART in this study ($\chi 2$ (3) = 8.745; p < .033). Chi-square analysis showed that there was a statistically significant difference found between depression and adherence to ART ($\chi 2$ (4) = 16.140; p < .003), while between HIV stigma and adherence to ART no statistically significant difference was found ($\chi 2$ (1) = .323; p >.570).

Binary logistic regression indicated that depression was statistically associated with adherence to ART *(OR= .853; 95% CI, .789 ‑.922, P<001)*, while the association between self-efficacy and adherence to ART was statistically significant *(OR= 1.04; 95% CI, 1.001 ‑ 1.078, P<.045)* after controlling for the effect of depression. However, the findings showed that the effect of depression on adherence to ART was not significantly mediated by self-efficacy (Sobel test for indirect effect, Z= 1.01, *P*> 0.31). Binary logistic regression showed that, the effect of HIV stigma on adherence to ART was not statistically significant *(OR= .980; 95% CI, .937 ‑ 1.025, P>.374)*, but the effect of social support on adherence to ART was statistically significant, only after the effect of HIV stigma was controlled for (*OR= 1.017; 95% CI, 1.000– 1.035, P<.046).*

This study promotes behavioral and social change effected through evidence-based interventions by emphasizing the need for additional research that investigates the interactive mechanisms by which psychosocial factors influence adherence to ART. Depression is a significant predictor of adherence to ART. Thus, to alleviate the psychosocial impact of depression on adherence to ART, effective interventions must be devised, along with a special consideration of self-efficacy and social support. Therefore, this study is helpful in informing and effecting change in health policy, and healthcare services through its findings.

List of Tables

List of figures

Table of Contents

CHAPTER ONE: INTRODUCTION

This chapter introduces the study on the relationship between depression, HIV stigma, self-efficacy, social support, and adherence to ART among adult patients living with HIV in South Africa. The chapter is composed of five sections; thus, it begins by providing background and contextual understanding of the problem under study, then go on to state the research objectives and research questions. Following this will be the rationale and significance of the study. Then, provide definitions of all key terms used in this study, structure of the dissertation and summary of the chapter.

1.1 Background and context

The Human Immunodeficiency Virus (HIV) and Acquired Immune Syndrome (AIDS) have increasingly been recognised as a serious public health concern, which for several decades has constantly been epidemic across many countries in the entire world. The global statistics indicate a continuous rise in the figures of PLWHA globally from an estimated 35.3 million in 2012 to 37.9 million in 2018 and 38.0 million in 2019 (UNAIDS, 2013; UNAIDS, 2019; UNAIDS, 2020). The pandemic appears to have recurrently and extensively the most serious effect in Africa and South Africa is renowned of her most wide-ranging HIV prevalence in the world which poses a major burden in controlling the disease in the country (UNAIDS, 2019). According to the UNAIDS, (2012) South Africa made actual improvements in the reduction of new HIV infections by 41% between 2001 and 2011. Similarly, cases of new infections of HIV in 2017 were 270,000 which was indicative of 31% decline from 390 000 new HIV infections reported in 2010, thus the decline in new HIV infection continues as the incidents have decreased from 270 000 reported in 2017 to 200 000 incidents reported in 2019 (UNAIDS, 2018 & UNAIDS, 2020).

Furthermore, South African has made a great improvement in reducing AIDS-related deaths by 43% and new HIV infection by 31% between 2010 and 2018, and the recent statistical report indicates further drop in the cases of new infections of HIV(200 000) and figures of deaths related to AIDS (72 000) in South Africa (UNAIDS 2018; UNAIDS, 2020). Although, recent data reflect significant decline in the figures of new infections and that of deaths due to AIDS, more work still need to be done to further control the spread and health impact of HIV on large number of people in the country. This observation is corroborated by UNAIDS report that in 2016 there were 7.4 million of PLHIV in South Africa but only 3.9 million of whom were receiving treatment and in 2018, there were 7.7 million of PLWHA, yet again only 4.8 million people were on treatment (UNAIDS, 2019). Furthermore, according to the most recent report for 2019 there were 7.5 million of PLHIV, but only 5.3 million of whom were on HIV treatment (UNAIDS, 2020). The ART coverage continues to expand on year on year basis.

Over the past years, South Africa encountered her initial AIDS-related deaths in early 1980s (Simelela &Venter, 2014). Moreover, as from the year of 1998 up until 2008, the country shaped a sizable magnitude of serious health impact caused by HIV epidemic, which became obvious, under the presidency Thabo Mbeki that was largely manifested by denialism towards HIV endemic (Furman, 2011). Eventually, in April 2004 South Africa began public national rollout of free antiretroviral therapy that restored hope to approximately 5.3 million PLWHA at a time (Heyer & Ogunbanjo, 2006). Until recently, South Africa is known to have a world's biggest public ART programme. UNAIDS (2020) reported that, in 2019, 5.3 million PLWHA in South Africa were ART users and 71% of whom were adults.

Moreover, South Africa has made a considerable progress in escalating numbers of ART recipients from 616,337 in 2009 to 5.3 million of ART users in 2019 (UNAIDS, 2016 &

UNAIDS, 2020). Despite this considerable improvement to scale-up the number of people receiving ART services, the epidemic is inevitably continuing to grow gradually year after year. Thus, the latest epidemiological data by UNAIDS (2020) reports that, KwaZulu-Natal province remains the highest among other provinces with the rate of HIV prevalence which has risen from 12.2% in 2017 to 27% in 2019. There have been several key successes in the South African Public ART program, nevertheless, it is also inexorable to argue that some of the key challenges requires thorough and careful attention, thus, one of which is adherence to ART. This is evident in most studies that, PLWHA lack adherence to ART due to multifaceted factors that influence it (Heestermans, *et al*, 2016).

Predictors of adherence to ART among adult PLWHA have been broadly studied (Heestermans *et al.*, 2016; Moratioa, 2008; Mathebula, 2015, & Mulelu, 2016), but very little is known pertaining to the interactive mechanisms by which psychosocial factors impact adherence to ART among this population in South Africa. Furthermore, extensive research has been carried out which aims to investigate associations of depression with adherence to ART among adult PLWHA (Tao, Vermund & Qian, 2018) however, there is a paucity of research that has examined the intervening effect of self-efficacy and social support in the South Africa context.

Additionally, up to date there is dearth of empirical data on the interactive mechanism by which depression, HIV stigma, self-efficacy, social support influence adherence to ART. The psychosocial problems such as self-efficacy, mental health (depression and anxiety), HIV stigma, emotional strain, copying, and social support are thought to be the most prevalent predictors of adherence to ART (Dalmida *et al*., 2017). The decisions of PLHIV whether to adhere to ART or not, does not solely depend on thier medical characteristics, but on the psychosocial determinats of adherence to ART (Dalmida *et al*., 2017). Therefore, a comprehensive and advanced

understanding of the interactive mechanism by which the psychosocial factors influence adherence to ART is vital for viable and appropriate evidence-based interventions and for policies guiding public ART program in South Africa.

1.2 Statement of the research problem

For several years, South Africa has been marked as the country with most prevalent HIV epidemic in the world, provided that within a range of almost two decades as from 2004 there were approximately 5.3 million of PLWHA and the proportion has increased dramatically by 2.2 million people because in 2019 there were an estimated 7.5 million of PLWHA (Heyer & Ogunbanjo, 2006; UNAIDS, 2020). In 2019, South Africa made a noteworthy improvement towards achieving the UNAIDS triple (90-90-90) aims, as the proportion of PLHIV on antiretroviral treatment was 75% (3.6 million), while 92% of PLHIV knew their status and 92% (5.2 million) of PLWHA on treatment were virally suppressed (UNAIDS, 2020), however, adherence of patients to ART remains a major drawback in spite of this major improvement.

Despite the ART scale-up in South Africa, adherence remains an overarching challenge among PLHIV (Bedelu, Ford, Hilderbrand & Reuter, 2007), surprisingly there is limited data on the interactive mechanism by which psychosocial factors impact on adherence to ART in this context. Yet, adherence to ART for patient is difficult to achieve since it a life-long commitment, for that reason additional studies are required in South Africa to determine the extent to which psychosocial predictors impact adherence to ART to devise appropriate interventions. Furthermore, adult PLWHA are directly affected by the economic, political, cultural, and social conditions of the society. Thus, a major challenge with treatment adherence is to stop people from defaulting but in several studies, it has been shown that depressive symptoms jeopardize the health outcomes of PLWHA (Kitshoff & Naidoo, 2012). Also, unemployment has a

devastating impact on the healthy lives of many people in South Africa. Kitshoff and Naidoo (2012) hypothesizes that, there is a high likelihood that depressive symptoms be associated with other factors namely, the presence of side effect, unemployment, lack of social support, stress, anxiety, and stigma.

Optimum adherence to ART is essential to curb and avert drug resistance, treatment failure and alleviate the risks of the spread of HIV (DoH, 2016). However, high levels of HIV stigma are thought to impede disclosure of seropositive status which then inhibit PLWHA from receiving social support that may bolster their adherence to ART (George & McGrath, 2019). In addition, PLWHA who experience HIV stigma tend to internalise negative beliefs held in the society about the disease and develop self-detracting ideas about themselves which result in demoralization and diminished self-efficacy (Umar, Levy, Donenberg, Mackesy-Amtiti, Pujasari & Bailey, 2019). Sequentially, diminished self-efficacy impact negatively on adherence to ART (Umar *et al*., 2019).

In South Africa thus far, evidence indicate that, the expansion of ART programme across the country and among PLWHA has not proven to improve the patients' health outcomes either or in terms of mitigating the rate of AIDS-related deaths. Several studies have stressed other issues pertaining to the roll-out and utilisation of ART, especially about that men only engage in ART initiation predominantly at either an older age or later stage of HIV, and they demonstrate high mortality rate as compared to women (Heestermans *et al*., 2016; UNAIDS, 2019). UNAIDS (2019) reported that in 2018, majority of women (65%) were on ART as compared to men (56%). This also indicate the necessity of engaging men in HIV testing and encourage that they retain in HIV care. Thus, actions to minimize HIV stigma may be the most crucial step towards the improvement of adherence to ART and psychosocial well-being of PLWHA.

Moreover, HIV stigma and depression have mostly among other predictors been found as strong prognosticators of adherence to ART among adult PLWHA (Umar *et al*., 2019). Therefore, the central purpose of this research was to investigate the relationship of depression, and HIV stigma with adherence to ART among adult patients living with HIV in South Africa, and the mediating roles of self-efficacy and social support.

1.3 Aims and objectives of the study

This study aimed to investigate the relationship between depression, HIV stigma and adherence to ART among adult patients living with HIV/AIDS at a tertiary hospital in Durban, South Africa and the mediating roles of self-efficacy and social support.

The objectives of the study include to:

- Assess the extent of adherence to antiretroviral therapy among adult patients living with HIV at a tertiary hospital in Durban, South Africa;
- Examine the relationship between depression and adherence to antiretroviral therapy among adult patients living with HIV at a tertiary hospital in Durban, South Africa;
- Examine the relationship between HIV stigma and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban, South Africa
- Examine the mediating role of self-efficacy on the relationship between depression and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban, South Africa; and
- Examine the mediating role of social support on the relationship between HIV stigma and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban South Africa.

1.4 Research questions

The research questions that this study endeavored to answer were as follows:

1. What is the extent of adherence to antiretroviral therapy among adult patients living with HIV/AIDS at a tertiary hospital in Durban, South Africa?

2. What is the relationship between depression and adherence to antiretroviral therapy among adult patients living with HIV at a tertiary hospital in Durban, South Africa?

3. What is the relationship between HIV stigma and adherence to ART among adult patients living with HIV/AIDS at a tertiary hospital in Durban, South Africa?

4. What is the mediating role of self-efficacy on the relationship between depression and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban, South Africa?

5. What is the mediating role of social support on the relationship between HIV stigma and adherence to ART among adult patients living with HIV at a tertiary hospital in Durban, South Africa?

1.5 Rationale and significance of the study

There is a scarcity of impirical research carried out on the psychosocial predictors of adherence to ART among adult PLWHA in South Africa, as a result very little is known pertaining to the interplay of depression, HIV stigma, self-efficacy and social support in influencing adherence to ART among this population. This limits the broader understanding of the extent to which various factors including psychosocial determinants intersect to influence adherence to ART among adult PLWHA in South Africa. Thus, HIV stigma and depression, have been extensively studied

and associated independently with adherence to ART across diverse settings globally (Umar *et al.,* 2019), however, the influence of these psychosocial variables on adherence to ART may look different from country to country. Meanwhile, very few studies have investigated the interactive mechanism by which self-efficacy and social support intervene between the direct effects of these variables on adherence to ART in South Africa.

Hu-delson and Cluver (2015) states that, extensive number of studies on ART adherence in the African context, have mainly focused on the direct effect of alluded predictors on adherence to ART. Likewise, very limited research has been done that examines the intervening role of self-efficacy in the effect of depression on adherence to ART among this population in South Africa. Likewise, with also the mediation role of social support in the effect HIV stigma on adherence to ART. In addition, Hu-delson and Cluver (2015) further state that, there are few studies globally that have explored the interactive mixture of various predictors that influence adherence to ART. Therefore, understanding of the complex interactive mechanisms over which the myriad factors impact adherence to ART is vital for the effective development of, and implementation of evidence-based ART adherence interventions and policies targeted at PLWHA in South Africa.

As this investigation aimed to investigate whether depression, and HIV-stigma predicts adherence to ART in adult PLWHA and the mediating role of self-efficacy as well as social support on the predicted relationships. The Theory of Health Locus of Control (Rotter, 1966) and Social Support Theory (House, 1981; Gottlieb, 1985; Barrera, 1986; Thoits, 1995) mutually guided the theoretical basis of this study. Furthermore, several studies have confirmed an excellent link between self-efficacy, and locus of control, because these concepts incorporate closely related elements (Christensen, 2004; Kaplan & Atkins, 1984). Therefore, social support,

and self-efficacy have been mostly linked to high adherence to ART (Kekwaletswe, Jordaan, Nkosi, & Morojele, 2017), this highlight the significance of incorporating interventional variables that have a positive psychosocial effect on adherence to ART in this research.

Inquiry that involves PLWHA in South Africa should not disregard the impact of historical disparities, especially regarding the restricted access to education which is now evident through high rates of unemployment (Kitshoff & Naidoo, 2012). When analyzing this population, it is crucial to consider the indirect enablers that increase susceptibility to non-adherence to ART namely side effects of treatment, alcohol use, unemployment, lower levels of education and poverty (Simelela, & Venter, 2014). Current statistics have shown that, in 2019 there were approximately 70% (5.3 million) of all PLWHA on HIV treatment, but out of an estimated total of 5.3 million only 75% (4.0 million) of whom remained on treatment (UNAIDS, 2020). In this regard, this study would further contribute to informing health policy and the implementation of evidence-based interventions necessary to advance retention of PLWHA in HIV care as well as their adherence to ART.

The burden of HIV/AIDS in South Africa provides motivation for this investigation, considering the centrality of improving adherence of patients to ART by exploring the interactive mechanism over which different factor affect it. Thus, in order to better understand adherence to ART, a complete set of interrelated factors must be considered (Umar, *et al.,* (2019), because adherence to ART is of great concern in South Africa. The implication is that there is rarity of studies focuses on exploring factors that influence adherence to ART, precisely within the South African context. Therefore, to succeed at consistently attaining good adherence to ART, better understanding of the complex and interplay between predictors of adherence to ART is needed.

1.6 Significance of the study to social work practice

This research is aligned with social work practice, mainly because social workers are regarded as conscience of HIV/AIDS response (Ntshwarang & Tumani-Musamba, 2012). They normally operate at the margins and centre of communities, helping and linking people to services and making services beneficial for them (Ntshwarang & Tumani-Musamba, 2012). In addition, social work practice also involves helping PLWHA to access ART services and support them to continue with the treatment and protect their rights (Ntshwarang & Tumani-Musamba, 2012). The roles of social workers in the healthcare setting involve linking patients with community services and provide psychosocial support to both patients and their families (Ntshwarang & Tumani-Musamba, 2012). Therefore, the information gathered from this study relates to the vital roles assumed by clinical social workers deployed in the health settings.

Moreover, this study supports and provides social work practice with the framework for formulating and implementing effective hospital-based and community-based ART adherence interventions that are informed by research. Ntshwarang & Tumani-Musamba (2012), further states that “In hospitals, social workers convey their professional knowledge of the social and psychological components of illnesses and of the treatment process to manage the disease” (p. 287). This study is compatible with social work practice to a large extent as social workers in healthcare settings they deal with psychosocial cicumstances related to HIV and adherence of patients to ART.

The study provides social work practice and researchers from other related study areas with new empirical data on the interative mechanism by which psychosocial predictors influence adherence to ART among adult PLWHA in South Africa. The researcher considers that the findings of this investigation would also contribute substantially to social work research and

inform practice along with interventions that seek to improve adherence to ART among PLWHA in South Africa.

1.7 Definition of key terms

Human immunodeficiency virus (HIV). is an infectious disease that weakens immune system (CD4 cells) of a human being as a result the infected person become exposed to opportunistic infections (Thompson, *et al.*, 2012; WHO, 2003). Department of Labour (2003) also defines it as the "Virus that deteriorates the immune system and advance to Acquired Immune Deficiency Syndrome (AIDS)" (p.7).

Acquired immune deficiency syndrome (AIDS). Is the most progressive HIV infection stage that is characterised by severe HIV-related infections that may lead to death (WHO, 2003). Department of Labour (2003) defines AIDS as "a syndrome that results from serious infection with HIV" (p.7). Van Dyk (2008) cited in Mathebula (2015) clarifies that "AIDS is developed by a virus (HIV) which enters the body from outside" (p.15). This implies that AIDS cannot be genetically inherited but is acquired.

People living with HIV/AIDS (PLWHA). Is a subset of the general population which have been identified or diagnosed with a seropositive status (presence of antibodies against HIV) (UNAIDS, 2010). For this study PLWHA were adult patients living with HIV who were also enrolled in ART programme.

Antiretroviral Therapy (ART). The Antiretroviral Therapy is defined by WHO (2010) as HIV treatment associated with the use of a triple mixture of antiretrovirals (ARVs) designed to suppress the viral multiplification of HIV and to present AIDS.

Adherence. Adherence in accordance with WHO (2003) "is a patient's ability to follow a

treatment plan, take medications at prescribed times and frequencies, and follow restrictions regarding food and other medication" (p. 3). Antiretrovirals (ARVs) According to WHO (2003) are pills designed to supress the viral progression of HIV and to prevent AIDS. Thus, adherence to antiretroviral therapy is also defined as the degree to which a patient takes HIV treatment as advised and prescribed by health professional (Osterberg & Blaschke, 2005; WHO, 2003). In line with the WHO guidelines adherence to ART is determined by taking more than 95% of pill doses according to the orders given by the healthcare provider (Carter, 2005; WHO, 2013).

Non-adherence. as defined by Miller (1997) refers to when a patient is not taking treatment at all, taking incorrect doses without suggested dietary intake, missing doses and clinic appointments, not taking medication on time and stop taking treatment without consulting the health professional. Therefore, a non-adherent patient to ART is also defined as one that is taking less than 95% of the prescribed doses at a given time (Sumbi, 2011).

Depression. Is a psychological disorder that is characterised by a decreased energy, depressed mood, feeling of guilt, low self-worth, loss of interest, poor centration and disturbed sleep or appetite (WHO, 2010). In other words, depression will be considered as one of the major psychosocial factors included in this study.

HIV stigma. Godffman (1963) define stigma as a "significant discrediting attribute possessed by a person or group with an undesirable difference" (p. 4). Furthermore, UNAIDS (2008) define HIV stigma as undesirable beliefs, attitudes and stereotypes that are held to perceive PLWHA as disgracefully different from the social ideals. There are two types of stigma which are closely related to behavioral and mental health namely internalized and perceived HIV stigma. Perceived HIV stigma is defined as a consciousness of detrimental attitudes from the society towards PLWHA, whereas internalized stigma refer to internalizing negative ideas from

the people in the society that result in low self-esteem and non-disclosure of HIV infection (Lee, Kochman and Sikkema, 2002; Phillips, Moneyham, Tavakoli, 2011).

Social support. Is generally defined as a protection and assistance provided to or received from others (Shumaker & Brownell 1984). "Assistance may be tangible as financial aid or intangible as in emotional help" (Langford *et al*., 1997, p 95), but protection may be considered as shielding people from the adversarial effect of stressful life (Cassel, 1976). According to WHO (2004) is an "emotional, instrumental, and financial assistance obtained from an individual social network, social support provided by friends, family and neighbours is referred to as informal support whereas social support provided by formal service agencies is called formal support" (p. 52).

Self-efficacy. Are beliefs that people generally embrace about their ability to perform action in a manner which will influence events that impact their lives (Zimmerman & Bandura, 1994). Bandura (1994) modified the definition of self-efficacy as beliefs that influence how individuals think, feel, behave, and motivate themselves. This is exerted in a great deal of how much effort one will put in something and how long will he or she endure in the face of adversity.

Adult patient. The South African definition of an adult is any individual at the age of 18 years or older (Constitution of the Republic of South Africa, 1996). While the adult definition of UNAIDS and WHO refers to an individual at the age of 15 years or older (UNAIDS, 2012). Of interest to this study adult patient is defined as an individual at the age of 18 years or older, receiving treatment from any healthcare facility.

Clinic. According to KwaZulu-Natal Health Act (2000) "means a facility at and from which a range of primary healthcare services is provided and that is normally open eight or more

hours a day based on the needs of the community to be served" (p. 2). This study focuses specifically on ARV clinic that provide ART services to patients living with HIV.

Tertiary hospital. "Means a hospital which receives healthcare users from and provides sub-specialist support to a regional hospital and requires the expertise of clinicians working as sub-specialists" (KwaZulu-Natal Health Act, 2000, p. 5).

1.9. Structure of the dissertation

This dissertation consists of the following seven chapters:

Chapter one: Introduction. This chapter provides general introduction, background, and context of the problem under investigation. It also clearly states the research objectives, research questions, rationale, and significance of the study. It carries on with providing clear definitions of key terms used, structure of the dissertation and close with a brief overall synopsis of the chapter.

Chapter two: Literature review. This chapter offers a critical review of the literature that involves the extent of HIV/AIDS pandemic; brief history and development of the South African public national ART programme; challenges to the successful implementation of ART programme; policy and legislation guiding ART programmes and interventions; extent of adherence to ART among adult patients in South Africa; associations among depression and adherence to ART as well as between HIV stigma and adherence to ART; intervening effect of self-efficacy on depression and adherence to ART; intervening effect of social support on HIV stigma and adherence to ART.

Chapter three: Theoretical framework. This chapter provides applicable theoretical frameworks underlying this study, then carries on with reviewing critically the relevant theoretical models to justify a special relativity between them and their relevance in the context

of this study. The chapter closes with an overall summary of the relevant theoretical model.

Chapter four: Methodology. This chapter presents the methodology and the research process carried out in this study. The chapter describes the research design; hypotheses and hypothesised model; population and sampling frameworks; data collection approach and methods; measures (instruments); pre-test and pilot test; data management and analysis; the reliability of the measures; ethical considerations, limitations of the study and lastly the brief synopsis of the chapter.

Chapter five: Results. This chapter describes the results of the statistical analysis performed in relation to the specified objectives of the study as well as the hypotheses outlined in the previous chapters. The statistical results are appropriately presented, arranged, as well as clearly described and explained in accordance with the specified research objectives.

Chapter six: Discussion. This chapter provides discussion of the study findings obtained from applicable statistical procedures or tests carried out during data analysis phase. This chapter interprets and discusses the findings with references to previous scientific works pertinent to the study. The chapter closes with a brief synopsis of the findings.

Chapter seven: Conclusions. This chapter provides a detailed summary of findings and make inferences by explaining after each research objective whether it has been successfully achieved or not. Furthermore, it also includes in-depth personal analysis accompanied by recommendations for additional research. The chapter closes with the implications for practice and summary of conclusions as well as recommendations.

1.9 Summary

Non-adherence to ART is a creepily escalating problem in the global society which requires thorough attention and urgent response through appropriate interventions among PLHIV in order to fulfill their psychosocial needs associated with adherence to ART. Therefore, this research endeavors to bridge the gaps in the literature by investigating the relationships of psychosocial factors with adherence to ART for the purpose to inform interventions that aims to improve adherence of patients to ART. The subsequent chapter proceeds with a critical review of the literature pertaining to the topic of this study.

CHAPTER TWO: LITERATURE REVIEW

There is a paucity in the literature which investigates the interactive mechanisms by which various psychosocial factors impact adherence to ART among PLWHA in South Africa. The researcher has accessed a wide range of literature partinet to the study. This chapter presents extent of HIV/AIDS pandemic; brief history and development of the South African public national ART programme; challenges to the successful implementation of ART programme; literature on policy and legislation guiding ART programmes and interventions; extent of adherence to ART among adult patients in South Africa; associations in relation to depression and adherence to ART as well as HIV stigma and adherence to ART; intervening effect of self-efficacy on depression and adherence to ART; intervening effect of social support on HIV stigma and adherence to ART. The review and discussion of these facets emphasizes the necessity to know whether does the interactive mechanisms of psychosocial factors predict the odds of adherent behavior to ART in effort to improve adherence to antiretroviral treatment.

2.1 Extent of HIV and AIDS pandemic

The HIV/AIDS impact has continuously been felt on all levels of the society over the years. The AIDS epidemic has underscored largely upon many culpable lines in the society (UNAIDS, 2019). The extent of the epidemic is changing over the years with a range of everlasting and complex challenges that widening the journey in the AIDS response.

The global statistics reported that in 2001 there were an estimated 19.7 million PLWHA globally, whereas 1.4 million were for AIDS-related deaths (UNAIDS, 2008). The epidemic continued to go viral across the world by 50% (19.7 million) increase in the number of PLWHA globally between 2001 and 2005, however a significant decline was manifested only between 2005 (39.4 million) and 2008 (33.4 million) (UNAIDS, 2008). Furthermore, AIDS-related deaths

were on peak by 54% (1.7 million) between 2001 and 2005, but the rate declined slightly by 35% (1.1 million) between 2005 (3.1 million) and 2008 (2.0 million) (UNAIDS, 2008). Yet again, since 2008 there has been a dreadful upsurge in the number of PLWHA around the world, growing from an estimated 33.4 million in 2008 to 37.9 million of PLWHA reported in 2018 and the latest estimate of 38.0 million of PLHIV reported in 2019 (UNAIDS, 2008; UNAIDS, 2019; UNAIDS, 2020). Moreover, the progress in the reduction of AIDS-related deaths has been steady with a specific comparison between 2001 (1.4 million), 2012 (1.6 million), 2017 (940 000) and the latest 2019 (690 000) (UNAIDS, 2008, UNAIDS, 2018 & UNAIDS, 2020).

The global picture of the pandemic conceals a wide variety of trends among regions and countries. Improvements made in Sub-Saharan Africa (SSA) are key to the global progress because the region remains the highest among other regions in the world as it accounts for about 61% of the global estimates of PLWHA (UNAIDS, 2019). In previous years, back in the mid-2010, there were about 68% (22.9 million) of PLWHA in the Sub-Sahara Africa (UNAIDS, 2010). The total estimate of PLWHA in the region have further escalated from an estimated 22.9 million in 2010 to 25.8 million in 2018 (UNAIDS, 2010; UNAIDS, 2019). On the other hand, the estimate of people receiving ART have increased substantially across the region from 100, 000 in 2004 to 15 million at the end of 2019 (UNAIDS, 2020). Within the region of SSA the eastern and southern Africa remains the mostly affected part of the region by HIV epidemic as in 2019 there were an estimated 20.7 million of PLWHA (UNAIDS, 2020). Furthermore, although eastern and southern Africa has demonstrated good progress in the expansion of ART, major challenges remains pertaining largely to retaining PLWHA in HIV care and adherence to ART.

South Africa has been known for years as an epicenter of HIV epidemic among other countries in the sub-Saharan Africa and the entire world. The latest UNAIDS report showed that,

the country has an estimated 7.5 million PLWHA along with 200 000 cases of new infections of HIV and 72 000 of cases of dealths related to AIDS (UNAIDS, 2020). Over the previous years the South African government had given little attention to the HIV and AIDS epidemic. The HIV prevalence has increased tremendously from 0.8% in 1990 to 4.3% by 1994 and in 2015 it was estimated at 11.2% among the general HIV population (6.1 million people). (Simelela &Venter, 2014). Yet again in 2019 it has increased even higher with 20.4% among the general population (UNAIDS, 2020). From 1998 until 2008, the country had shaped a wide-ranging magnitude of serious health impact caused by HIV epidemic, which was notable predominatly in the era of denialism towards HIV endemic, as evident under the presidency of Thabo Mbeki (Furman, 2011).

During the early 1980s South Africa encountered the first AIDS-related deaths with a gradual increase over years (Simelela &Venter, 2014). South African has made a great improvement in reducing AIDS-related deaths by 43% and new HIV infection by 31% between 2010 and 2017 (UNAIDS 2018). Furthermore, there has been a gradual reduction in the cases of deaths related to AIDS from 293 166 in 2006 to 72 000 in 2019 (UNAIDS, 2019 & Stats SA, 2018). The improvement in the reduction of the cases of deaths may be due to the country's greatest progress in scaling up the number of PLWHA on ART program. However, a year-on-year rise in the total estimated amount of PLWHA in South Africa between 2002 (4.2 million) and 2019 (7.5 million) was indicative of a ceaseless burden of HIV/AIDS across the country, despite the intervention efforts have been put in action to curb the epidemic (Stats SA, 2018 & UNAIDS, 2020).

The HIV prevalence differs from region to region, country to country and province to province. Likewise, in 2019 South Africa's HIV prevalence was high at 20.4% but differed

across provinces, since the provincial prevalence rate raged from (12.6%) in Western Cape (WC) to (27%) in KwaZulu-Natal (KZN) (UNAIDS, 2020). The province of KwaZulu-Natal (KZN) has been on peak among other provinces between 2005 and 2018 with an estimated (16.5% in 2005) of HIV prevalence and (27% in 2019) (UNAIDS, 2020). Thus, South African National HIV Prevalence, Incidence and Behaviour Survey 2012 reported that, KZN was a leading province with HIV prevalence rate of (16.9%) in 2012 and Mpumalanga (14.1%) as well as Free-State (14.0%) were not far behind (HSRC, 2014).

UNAIDS (2019) reported that in 2016 there were 7.4 million of PLWHA in South Africa but only 3.9 million PLHIV were receiving ART and in 2019, there were 7.5 million of PLHIV, only 5.3 million of PLHIV were on treatment. KwaZulu-Natal province accounted for 27% (2.1 million) of PLHIV in 2019 (UNAIDS, 2020). According to eThekwini District AIDS Council Quarter 1 (2017/2018), The eThekwini District has an estimated 650 000 PLWHA, and out of 650 000, only about 59% (n = 383 869) of PLHIV were enrolled on ART program. Based on new trends in recent years many countries in the regions with hardest hit by epidemic especially in the east and southern African regions have experience a major decline in the cases of deaths related to AIDS and new infections of HIV. Major improvements made over the previous years have become trivial on year-on-year basis due to a steady progress towards achieving a 2020 target for the reduction of new HIV infections.

2.2 History and development of the South African national ART programme

Treatment response along with HIV/AIDS prevention began during the 1980s and 1990s where the knowledge about HIV transmission was limited in South Africa (Simelela & Venter, 2014). Simelela and Venter (2014) further state that, over the previous years the provision of “safe sex” education strategy and condom usage was subverted by the fear of stigma, and others social

factors. Therefore, HIV/AIDS epidemic took hold of many risky socio-structural factors including but not limited to violence, stigma, and discrimination and marginalisation. In 2002 the South African government began to take actions in AIDS response by proposing options for expanding the roll-out of ART program. According to Simelela and Venter (2014), "The clinicians in the joint task team quietly developed HIV treatment protocols that included ART for adults and children" (p. 250). Eventually, in April 2004 initiation for ART was implemented at various health facility points throughout South Africa.

Moreover, in 2005, all provinces started to provide ART, but the rolling out of ARVs was mainly through tertiary hospitals (Simelela & Venter, 2014). This implies that, the under-resource public primary health care facilities were unable to provide HIV treatment to PLWHA. The country also could not reach the targeted number of people who were supposed to receive ART then. The total number of 85 000 were recipients of ART from the public healthcare segment in 2005, but in 2008 the number of patients enrolled on ART increased rapidly into 678 550 (Simelela & Venter, 2014).

Thus, South Africa was on good track in increasing ART coverage rapidly among PLWHA on year-on-year basis. In 2010, the national department of health revised HIV treatment procedures for the purpose of expanding treatment to all pregnant women and children below one year (Simelela & Venter, 2014). From the adjustments made in ART eligibility policy, 1.79 million PLWHA were on ART in 2011 (UNAIDS, 2012). "By mid-2013, 6.4 million people were estimated to be living with HIV in SA, with an estimated 2.3 million on ART, and expanded access to 'third-line' drugs for patients experiencing resistance" (Simelela & Venter, 2014, p. 251). UNAIDS (2012) highlights that, South Africa have the greatest ART program in the entire world as well as high ART coverage across the country.

In 2009, President Jacob Zuma did not underestimate the degree to which HIV/AIDS has affected lives of millions of people in South Africa, he then necessitated an urgent AIDS response and focus largely on the expansion of the ART program (Simelela & Venter, 2014). Yet, the South African ART is the world's largest programme, however, the country struggles to adapt very well to the ever-changing guidelines of world health organisation.

Furthermore, in 2016, the country undergone 'test and treat', strategy whereby anyone diagnosed HIV positive were eligible to start treatment with an immediate effect regardless of how progressive the virus has been in their body (UNAIDS, 2019). The current data present that the number of PLWHA on treatment has increased tremendously by 88.3% between 2009 (616,337) and 2019 (5.3 million) (UNAIDS, 2019). This manifest that, in recent years South Africa's ART program has experienced dramatic expansion.

Although, this dramatic scale up of ART users is a huge progress, there are thousands if not millions of people who have not yet undergone HIV tests including new and existing cohorts, and others who eventually die due to AIDS related illnesses. Moreover, despite a huge ART coverage, retention in care for PLWHA is of great concern as in 2019, it was reported that 70% (5.3 million) were receiving ART in South Africa, and 75% (4.0 million) of whom remained on HIV treatment (UNAIDS, 2020). Thus, those who could not retain on HIV treatment accounted for 24.5% (1.3 million) (UNAIDS, 2020) which can be thought of as a worrying setback in the event of adherence of adult patients to ART. This is also evident in most studies that, PLWHA lack adherence to antiretroviral therapy due to multifaceted factors that influence it (Heestermans, *et al*. 2016). Similarily, these myriads of factors also contribute to the impede administration of the public ART programme in South Africa.

2.3 Key challenges to the successful implementation of ART programme

The provision of public ART services had a slow start in South Africa regardless of a vast spread of HIV/AIDS epidemic. The delay in swift start was largely due to political evasion at the core of AIDS denialism (Bekker *et al.*, 2014), however since 2009 there has been an unprecedented expansion in the South African ART programme. Despite a large expansion, any ART programme is considered successful when it has attained the subsequent key indicators namely adherence of patients to ART and retaining of patients in HIV care with a goal of reaching indiscernible viral stage.

In the entire world, South Africa now leading for having the biggest number of patients enrolled in ART program however, the country encounters many challenges as the public ART program continues to expand. These challenges include operational, retention in HIV care, fiscal and logistical support functions as well as linkage, and adherence to therapy (Bekker *et al*., 2014). The national test and treat policy strategy implemented since 2016 has increased the pool of both first time and repeating HIV-testers. Consequently, people who were diagnosed with HIV were linked to care but then their retention and adherence to therapy has proven to be an unending challenge (Bekker *et al*., 2014). The current statistical data presents that in 2018 there were an estimated 1.6 million (33%) of ART users who did not remain on treatment (UNAIDS, 2019). Furthermore, studies have shown that lack of retention in HIV care has a detrimental effect on health outcomes (Ameyan, Kamara, Sesay, Sheriff, Dumbuya, Timbo, Conteh & Guillard, 2017).

Moreover, it has been also shown that poor adherence to ART is a result of poor retention in HIV care which allows for viral progression that leads to drug resistance problem (Bekker *et al*., 2014). There are pervasive barriers to the retention in care that have been identified by

researchers but the most prevalent ones are traveling long distance to the public health facility and lack of transportation, especially in the resource-limited settings such as in rural areas (Ameyan *et al*., 2017). In addition, HIV stigma combined with unemployment, and stress impede retention of PLWHA in care in conjunction with their adherence to ART (Kitshoff & Naidoo, 2012; Ameyan *et al*., 2017).

The programme monitoring has been also an overarching challenge as Bekker *et al.*, (2014) highlighted that the introduction of ART services has complicated the problem of weak health information systems and in the late 2009 the reporting of public health sector statistics was changed from reporting statistics of patients initiated on ART cumulatively to numbers of patients currently on ART. This on the other hand, further complicate the problem of tracking patients who are on ART program and retaining them in care. Scarcity of regular patient identifier and electronic monitoring systems for tracking patients who has moved between healthcare sites result in health professionals to over-estimate loss to follow up (Bekker *et al*., 2014).

Continuous expansion of government's ART programme involves challenges surrounding healthcare staffing. Thus, the staff shortage at healthcare facilities is the most significant challenge that impede provision of quality of ART services (Vawda & Variawa, 2012). This also result in lengthy waiting times for patients at the healthcare facilities when collecting their treatment (Mulqueeny & Taylor, 2017). Furthermore, correct assessment of the quantity of antiretroviral (ARV) medication needed is necessary to avoid over-purchasing of HIV medication which may be costly to the government's financial budget. However, on the other hand, under-purchasing of drugs may result in out of stock especially in rural remote areas with a lack of reliable transportation for supply of ARVs (Vawda & Variawa, 2012). At present,

the South African public ART programme is deemed by many people as a success, while complex challenges are still prevailing, one of which is the adherence of patients to ART. Moreover, various key programmes and policies have been devised by government in response to the complex and everlasting challenges related to the successful implementation of ART programme in the context of South Africa.

2.4 Relevant South African legislation and policies guiding ART programmes

For many decades, most South African people had encountered violation or denial of fundamental human rights including but not limited to the right to access basic healthcare services. South Africa is renowed for having an advanced Constitution with robust human right protection including the rights of patients using the public healthcare services (Section 27, of the South African Constitution, Act No 108 of 1996).

In terms of legislation relevant to ART, the National Health Act (No. 61 of 2003) in section 25 (2) provide that the head of provincial health department must govern the operation of health care facilities and the quality of services within the context of the provincial and national health policy inside the borders of the relevant province. Chapter 4 of KwaZulu-Natal Provincial Health Act (No. 4 of 2000) set out the principles that the Provincial Health Minister must uphold in the planning and enactment of the provincial health policy to ensure that the fundamental human rights for all are realized.

According to (section 5) (a) the Minister must “uphold section 27 of the Constitution to achieve, within available resources, the progressive realisation of the right of everyone to have access to health services and section 24 of the Constitution to achieve the right to an environment that is not harmful to the health or well-being of the people in the Province”. The Act in (section 6) (1) further state that that the provincial health policy must give effect and regulate access of

people to public healthcare services by promoting equitable healthcare opportunities for all and replace past disparity existed in the provision of health services with an outstanding realisation of of fundamental human rights as guaranteed in terms of section 24 and 27 of the Constitution.

Government has shown a greatest effort in curbing HIV epidemic by adopting and implementing sound policies and legislations at the centre of the roll-out of public ART program. Thus far, some policies and programmatic interventions have yielded positive outcomes, despite such gains more work still need to be done in collective effort as burden of HIV increases on a year-on-year basis. Fight against HIV/AIDS and other-related opportunistic infections is the Millennium Development Goals (MDG) that involves a goal to achieve universal access to treatment for all PLWHA by 2010 (Chibango, 2013). South Africa demonstrated better progress towards this MDG goal number six as the proportion of PLWHA on ART program increased from 13.9% in 2005 to 41.6% in 2009 (Department of Health, 2010). Nonetheless, the country could have shaped far better outcomes but that was not attained due to the political evasion which hindered accelerated expansion of ART program in the era of HIV/AIDS denialism (Nattrass, 2008).

Moreover, the country is also on track towards accomplishing the UNAIDS triple ninety (90-90-90) aims, specifically regarding viral suppression and HIV testing. UNAIDS 90-90-90 target mandate each country to strive to achieve 90% of HIV diagnosis, another 90% of ART coverage for diagnosed individuals and the last 90% of virological suppression by 2020 (UNAIDS, 2014). In 2019, 92% of PLHIV knew their status of which 75% of whom was for those who were still on treatment and of those tested positive and on ART, 92% of who were virally suppressed (UNAIDS, 2020). However, this considerable progress is represented by the most recent data consolidating certain small parts of the high proportion of PLHIV which

thereby obscures the actual state and scope of the epidemic.

The earlier National Strategic Plan (NSP) for South Africa on HIV/AIDS and STDs from 2000 to 2005 was marked by many fault lines in the journey of AIDS response. Thus, President Thabo Mbheki in this era questioned the science of HIV and AIDS because he believed that HIV was not precarious therefore, AIDS symptoms were caused by HIV treatment itself and malnutrition (Nattrass, 2008). Nattrass, (2008) further state that, after president's withdrawal from the public debate in 2000, since then the former Minister of Health by the name of Dr Tshabalala-Msimang denied and delayed the introduction of ARVs until she was compelled to do so by the ruling of the Constitutional Court.

Despite the ruling of the Court the Minister of Health continued to underestimate and deny the provision of ART in the public health sector (Nattrass, 2008). This resulted in the national hardest hit by HIV epidemic as cases of deaths due to AIDS were high (Bekker *et al*., 2014). Thus, this period was then marked as Mbheki and Manto's HIV and AIDS denialism. The aims and objectives of the five year plan were moderately achieved due to the political prevarication as the HIV continuum of care was also hampered by that to the degree to which HIV-testing, connection to care, retention in HIV care and adherence to therapy were not implemented according to the government's planned (Department of Health, 2003).

The National Strategic Plan for South Africa on HIV/AIDS and STI from 2007 to 2011 was devised to rectify and bridged gabs of previous national strategic plan. This NSP aimed at providing continuous guidance to all health sectors and agencies by building on what was done in the previous plan. During this period the agencies from other government departments contributed to the development and expansion of the major program such as voluntary counselling and testing (VCT), health education, prevention of mother to child transmission

(PMTCT) and ART program (SANAC, 2007).

Moreover, the implementation of these program was hindered by an unacceptable level of discrimination and stigma towards PLWHA (UNAIDS, 2008), and men in South Africa are regarded as seldom testers of HIV than women. The recent research has shown that HIV testing has till recently been uneven between sexes due to that men frequently perceive healthcare facilities as women's place and regard HIV-testing as feminine (UNAIDS, 2008). Some people including both genders were reluctant to go for testing due to the fear of getting positive diagnosis (Nattrass, 2008). However, the PMTCT program accelerated access of pregnant women to HIV-testing facilities. The annual antenatal survey of the Department of Health for HIV and AIDS in 2009 indicated that 28% of the samples of 33, 488 women were able to attend antenatal clinic across the country and majority of them were dignosed with HIV (DoH, 2009).

In 2008 the department of health at the national level gazetted the policy document which served as the blueprint for the implementation of national PMTCT programme (Chibango, 2013), however, the new policy was declared in 2009 by former President Zuma on the World AIDS Day. This represented the effort of government and determination towards controlling and the prevention of mother-to-child transmission of HIV. The old policy was reviewed and eligibility to access HIV treatment was adjusted to qualify every pregnant woman with seropositive status to start enrolling in ART programme (Chibango, 2013).

The National PMTCT policy has four priority areas aligned with the international standards for a sound strategy in the implementation of PMTCT programmes namely: "Primary prevention of HIV especially among women of childbearing age; preventing unintended pregnancies among women living with HIV; preventing HIV transmission from a woman living with HIV to her infant; providing appropriate treatment, care and support to women living with

HIV and their children and families" (NDoH, 2010, p. 8). Over the previous years the country has made a remarkable improvement in the reduction of MTCT, especially due to the widespread availability and accessibility of PMTCT programmes. The MTCT rate declined from 3.6% in 2011 to 1.3% in 2017 and such improvements were also due to an unrestricted access to ART to alleviate the risk of MTCT (UNAIDS, 2019).

The South African NSP on STIs, HIV, and TB from 2012 to 2016 built up on the successes and shortfalls of the previous plan. This NSP aimed at Sustain Health and Wellness (Department of Health, 2013). It set out five key objectives that were to be achieved by the end of 2016 namely to: reduce by half the rate of new HIV infections, to make certain that at least 80% of PLWHA who qualified for antiretroviral treatment received it and 70% should at least still be on ART and alive after five years, and to reduce the stigma and ensure that the rights of PLHIV are realised (SANAC, 2011).

The epidemic was acknowledged to have a negative social and health impact on individuals living with the virus and their families and communities. The government had taken the responsibility to address structural and social factors related with HIV with a specific reference to social, economic, cultural, political, and environmental factors (SANAC, 2011). Despite the effort made by the government during that period, until recently there is poor understanding of such factors due to their complexity in affecting lives of PLWHA.

The South African National Strategic Plan on HIV, TB and STIs from 2017to 2022 addresses the gabs acknowledged during the past five years and strives to decline the rate of deaths due to AIDS and new infections of HIV (SANAC, 2017). This NSP adopts "focus for impact" approach which denotes a new strategic way to attain low numbers on new HIV infections and AIDS-related deaths (SANAC, 2017). Moreover, "This NSP aims to reduce new

HIV infections by more than 60% from an estimated 270 000 in 2016 to below 100 000 by 2022, including elimination of mother-to-child HIV transmission and a reduction in new infections among adolescent girls and young women from 2000 a week to less than 800" (SANAC 2017, p. 14). South Africa has shown a moderate improvement in the reduction of new HIV infections as in 2018 new HIV infections were 240 000 down from 270 000 in 2016 which accounts for 11% (UNAIDS, 2019). In the whole southern African region, the country accounts for a third in terms of new infections of HIV and 71 000 South Africans died in 2018 due to of AIDS (UNAIDS, 2019).

In summary of policies and legislation that have been devised and implemented in South Africa to prevent the pread and curb the impact of HIV endemic. The evidence in recent years in terms of the policy implementation appears to be a worrying setback in the country's HIV/AIDS response (Vawda & Variawa, 2012). In the previous years the progress has proven to be steady in the reduction of cases of new infections and deaths linked to AIDS (UNAIDS, 2020).The unprecedented expansion of the ART program in recent years is also placing considerable burden on health services which presents a difficulty in the provision of quality of health services (DoH, 2016). Therefore, it is in the collective power of government and civil society to conquer the barriers to better health outcomes in the manner to which the rights of all PLWHA are upheld and ensure patients' retention in care as well as adherence to ART.

2.5 Extent of adherence to ART among adult patients in South Africa

Adherence to ART is influenced by diverse factors. The challenge of adherence to ART is complex and varies across populations with patients encountering barriers such as affective factors (e.g. depression); behavioural factors (e.g. missed clinic visits); lack of support (social support), and socio-economic factors (HIV stigma, transport) (WHO, 2003; DoH, 2016). Thus,

increasing evidence demonstrates that these multifaceted factors are common among adult patients receiving ART in South Africa (Van Dyk, 2010).

Heyer and Ogunbanjo (2006) highlight that adherence to ART is a life-long commitment which requires a patient to attain an optimal adherence threshold of 95% without a fail every day. A research conducted by Maskew, MacPhail, and Rubel (2007) at Themba Lethu Clinic, in Gauteng province, explored the reasons for lack of adherence to ART as a resuts of loss to follow up. The study identified a set of 182 adult patients who lost follow-up visits at Themba Lethu Clinic. Patients' files were examined and reasons for clinic non-attendance were solicited telephonically, however death explained for 27% of the total group of patients who have ever missed follow-up visits in the clinic. The findings of the study revealed financial difficulty as a key obstacle to adherence to the clinic appointments. Kitshoff and Naidoo (2012) posits that the financial constrain is a major barrier to adherence to ART in South Africa as a result of the lack of employment opportunities.

A qualitative study conducted by Moratioa (2008) aimed to understand psychosocial factors that impact on adherence to ART among adult patients in Kalafong Hospital. A sample of 15 patients between the ages of 20 and 40 partaken in the study. The study found support from, healthcare workers, friends, and the family as an important psychosocial determinant in enhancing adherence of patients to ART. However, George and MacGrath, (2019) state that high prevalence of HIV stigma can impede HIV disclosure which could then avert patients from receiving social support.

Dalal *et al.*, (2008) did a retrospective analysis study with adult patients accessing ART at the urban primary healthcare clinic in Gauteng province. The results of the analyses revealed that participants who lost to follow-up for a minimum of 42 days accounted for 16.4 % (n=267)

of 1631adult patients participated in the study. Moreover, 64.8% (n=173) of those missed follow up were tracked successfully, but 48% (n=83) of traced patients deceased. The rates of retention in care of ART users are declining in South Africa followed by the increasing evidence of low levels of adherence to ART among adult PLHIV (Department of Health, 2016).

Van Dyk (2010) did a study with the aim to investigate adherence to ART among adult South African PLHIV across the country and to gain insight into the challenges they face regarding adherence. The results from this study indicated that 60% (n=263) of 439 participants from countrywide were not able to achieve a minimum rate of 95% optimum adherence. The study findings showed that there were many reasons for non-adherence to ART program. Amongst these reasons were: the lack of general knowledge about adherence to ART, no HIV treatment support, no money for food and transportation, battled with depression, abuse alcohol and missed ARV dosages due to fear of stigma and discrimination. Additionally, Azia, Mukumbang and Van Wyk (2016) state that transport costs, unemployment, food insecurity, stigma, absence of social support and disclosure have constantly been implicated in poor adherence to ART among adult PLWHA.

Kitshoff and Naidoo (2012) conducted a cross-sectional analytical study that aimed at exploring the relationship of depression with adherence to ART among a total of 146 patients aged 18 years and above. The study was undertaken at a semi-urban public healthcare facility in the municipal district of eThekwini in KwaZulu-Natal province with patients receiving ART. The study findings revealed that 62% (n=90) respondents of the total sample of 146 had high scores on depressive symptoms while 32% (n=46) were below 95% adherent to ART. From the study results no significant relationship was found between adherence to ART and depression but adherence to ART was linked to lower level of education and unemployment. However, data

on the link between depressive symptoms and adherence to ART varies across different populations (Ngum, Fon, Ngu, Verla & Luma, 2017), and evidence for this relationship in the South African context is inconclusive due to limited quantitative analysis between these variables.

A cross-sectional study by Adefolalu, Nkosi, Olorunju and Masemola (2014) was carried out to determine the predictive relationship of medication beliefs and self-efficacy with adherence to ART at a healthcare clinic in Pretoria. A total of 232 adult patients accessing ART partaken in the study. The findings from this study indicated that the participants' mean age was 40 years, 70% were females, 87% of the sample had been on ART for more than three years and 81,5% (n=189) were able to achieve at least 95% of adherence to ART. The findings further presented that among non-adherent group, 63% displayed the highest non-adherence especially among those enrolled in ART for more than three years. A robust association between adherence self-efficacy and adherence to ART was found ($p<0.001$) in the non-adherent respondents.

Mathebula (2014) did a qualitative study on reasons for patients to default ART. The study was undertaken at Thekganang ARV Clinic in Limpopo province. The study had a sample of 15 patients aged 18 and above. The findings of the study were that patients did face challenges including fear of stigmatisation and disclosure of HIV status. Furthermore, participants' reasons for defaulting ART were categorised as patient-related, psychological-related, socio-economic-related and medication-related. Patient related reasons involved lost appointment cards, substance abuse and transfer to a different area of residence and medication related reasons was confusion voiced around drug regimen. Socio-economic reasons were financial constrains for food and transportation to attend clinic visits while psychological factors were denial and depression.

A descriptive qualitative study conducted by Azia *et al.* (2016) described challenges encountered by adult patients at Vredenburg regional hospital in Western Cape, South Africa. The interviews were undertaken qualittively with a sample of 18 non-adherent patients. Findings from the study indicated that disclosure, lack of transport, insufficient food, stigma and unemployment were major barriers to adherence to ART. Another qualitative study done by Kheswa (2017) at Victoria Hospital in the Eastern Cape Province, with a sample of 23 adult patients.

The study aimed to determine how the health of PLWHA is influenced by socio-structural determinants contributing to poor adherence to ART. The study identified food insecurity, lack of quality service from healthcare professionals, financial constraints, unfair dismissal, rejection by church members, and fear of the consequences of HIV disclosure to be conducive to poor adherence to ART. The interventions to these multifaceted factors should be integrated with group and community-based ART adherence models in order to curb extent of poor adherence to ART in various communities (Azia *et al.* 2016; Kheswa, 2017).

George and MacGrath (2019) did a study that aimed at examining how disclosure, social support and HIV stigma are link to poor adherence to ART in the period of 24 weeks after ART initiation among adults PLWHA in the rural region of KwaZulu-Natal province. The study further explored association of other factors with poor adherence to ART with the total sample of 385 adult patients who were accessing ART in the local primary healthcare clinics. The study findings indicate that in the previous 24 weeks, non-adherence to ART accounted for 25% while in the last four weeks earlier to the 21st week follow-up, non-adherence was 9%. Furthermore, no relationship was found between social support, HIV stigma, adherence to ART and HIV disclosure.

In summary, as the number of patients receiving ART is ever growing, adherence become a major challenge for the country to address. Studies undertaken in South Africa have indicated that low rates of adherence to ART and poor retention in care are major challenges threatening the huge achievements made by the national public ART program over the years (National Department of Health, 2016). In addition, based on the available evidence there is a paucity of quantitative studies that provides quantitative analysis in quantifying the extent to which various factors influence adherence to ART among adult PLWHA in South Africa.

2.6 Associations between depression and adherence to ART

The empirical relationship concerning depression and adherence to ART has been studied extensively in African and Western countries, however there is limited research done to explore this relationship in the South African context.

Depression is a pervasive mental disorder common among PLWHA and it has been consistently linked to poor adherence to ART (L'akoa, Noubiap, Fang, Ntone, & Kuaban, 2013; WHO, 2013). Depression presents with the following symptoms namely feeling of guilt or low self-worth, general feeling of sadness, hopelessness, sleep disturbance, poor concentration, decreased energy and loss of interest or pleasure (WHO, 2013). Further, Depression at the present time affects over 350 million people around the world (WHO, 2013) and it has been anticipated to be one of the global leading cause of disability by 2020 (Moraes & Casseb, 2017). Thus, burden of depression is on peak among other mental health conditions globally nowadays.

Research has shown that PLWHA are more likely to develop and get affected by depression than the general population (Ngum, Fon, Ngu, Verla & Luma, 2017). In addition, the literature has also revealed that depression affect individual's quality of life as well as adherence to ART (Sin & DiMatteo, 2014; Ngum *et al*., 2017). Over the previous years, studies have

confirmed the link of depression with poor adherence to ART across various settings worldwide.

Nakimuli-Mpungu *et al.* (2012) did a systematic review on adherence to ART across African regions. The review assessed the predominance of depressive symptoms among PLWHA and their likelihood to attain good adherence to ART. Over a pool of 23 studies and 9 countries the depressive symptoms accounted for 32% rate of prevalence and the probability of attaining optimum adherence to ART was 55% lesser among depressed PLWHA than those who were not depressed. Moreover, a pool of 20 of 23studies on depression were cross-sectional and most comprised of patients with advanced stages of HIV who also had access to healthcare services.

Another systematic review on 111 studies was carried out by Uthman, Magidson, Safren and Nachega (2014) on depression and adherence to ART in partly developed and highly developed countries. This review investigated the link between depression and adherence to ART among PLWHA across diverse countries. Of 42 366 PLWHA, the rate of PLWHA who were able to achieve good adherence of (80% and above) ranged from 20 to 98% whereas, the rate of those with depressive symptoms extended from 12.8 through to 78% (Uthman *et al.*, 2014). Moreover, no substantial difference was found in the rate of depressive symptoms among PLWHA by income group of the country (Uthman *et al.*, 2014). However, a significantly higher magnitude of PLWHA who attained good adherence was found in underdeveloped countries (pooled rate of 86%) than in higher-income countries (pooled rate of 67%). This systematic review revealed that the probability of attaining optimal adherence to ART was 42% lower among PLWHA with depressive symptoms than those who did not have any depressive symptoms. Uthman *et al.*, (2014) state that that the degree of association between these variables deteriorates significantly with more recent publications. Therefore, among those with depressive symptoms the possibility of attaining good adherence was lesser than those without.

Kitshoff and Naidoo (2012) conducted a study in KwaZulu-Natal, South Africa to test whether the depressive symptoms predicts poor adherence to ART among adult PLWHA. Thus, no significant association found between depressive symptoms and low adherence to ART in the study. In addition, likelihood was higher among participants with depressive symptoms to have lower levels of education and to be unemployed than those without (Kitshoff & Naidoo, 2012). Beyene-Gebrezgiabher, Abraha, Hailu, Siyum, Mebrahtu, Gidey, Abay. Hintsa and Angesom (2019) posit that depression among PLWHA could be mainly caused by other difficult life events coupled with the effect of HIV and AIDS.

Belenky, Cole, Pence, Itemba, Maro and Whetten (2014) did a prospective, observational study to examine the prospective association between clinical outcomes of HIV, depressive symptoms, and adherence to ART among PLHIV in Tanzania. The study found positive relationship among depressive symptoms and low adherence to ART. Belenky *et al.* (2014) state that concentration on psychosocial factors such as depression in underdeveloped countries is seldom, in spite of its high pervasiveness and limited accessibility to mental healthcare services. Abas, Ali, Nakimuli-Mpungu and Chibanda (2014) posits that depression affect adherence to ART due to the event of repetitive negative thinking, difficulty in concentration and depressed mood in PLWHA.

Moraes and Casseb (2017) conducted a study in Sao Paulo, Brazil on whether depression predict adherence to ART among male patients. The study consisted of two groups of men namely homosexual and heterosexual men. The results of the study revealed a positive association among depression and low adherence to ART between these groups regardless of sexual orientation and age. Therefore, depressed men displayed less adherence rates to ART in this context (Moraes & Casseb (2017). A cross-sectional study Carried out by Ngum *et al.*

(2017) on the determinants and prevalence of depressive symptoms and their relationship with adherence to ART in the regional hospital of Cameroon.

Moreover, based on findings the study presented high prevalence of depression and depression was significantly correlated with worse adherence to ART. Thus, Ngum *et al.* (2017) posit that depressive symptoms such as lack of energy, loss of interest, poor concentration and hopelessness are more likely to contribute significantly to poor adherence to ART among depressed patients. Coutinho, Dwyer and Frossard (2018) conducted a mixed methods study in Rio de Janairo in Brazil on the relationship between depression and adherence to ART. The relationship among depression and non-adherence to ART was not found despite the 22.2% rate of prevalence for depression.

Additionally, Coutinho *et al. (*2018) further stated that the adverse drug side effects and fear of stigma were additional factors assumed by patients to be interfering with their adherence to ART. A recent cross-sectional study undertaken by Beyene-Gebrezgiabher *et al*. (2019) at Aksum in Ethiopia investigated whether depression was significantly related with adherence to ART among adult patients enrolled in ART programme. Thus, according to the study findings, the frequency of depression accounted for 14.6% in 411 adult patients on ART and the link was revealed among depression and poor adherence to ART.

From the existing evidence the prevalence of depressive episodes has proven to have a direct association with low adherence to ART. However, the extent of the link among depression and adherence to ART varies across different populations and settings which calls for further studies to be carried out to provide a very recent empirical data on the relationship concerning these variables. Thus, depression is a neglected mental health problem among PLWHA on ART in South Africa (Kitshoff & Naidoo, 2012). Due to the rarity of empirical data on depression and

adherence to ART in South Africa, therefore the relationship between these variables was examined in the present study.

2.7 Associations between HIV-stigma and adherence to ART

Likewise, extensive research has been undertaken that investigates the correlation with reference to HIV stigma and adherence to ART in the African and Western countries. However, in South Africa there are limited studies designed to test the associations between HIV stigma and adherence to ART in PLWHA.

Goffman (1963) defines stigma as "significantly discrediting attributes possessed by a person with an undesired difference" (p. 4). In literature underscores on HIV/AIDS, HIV stigma is thought of as undesirable beliefs, policies and attitudes towards individuals or group of people seem to have or live with HIV as well as towards their families and communities (Martinez, Harper, Russell, Carleton, Hosek, Bojan, Glum & Ellen, 2012). Other scholars have found it very vital to differentiate between enacted and felt stigma. Link and Phelan (2001) defined felt stigma as a mental state that people often be subjected to through their situations and typically due to the reactions of other persons. Enacted stigma is deemed as the real experiences of being stigmatized and discriminated against by the society (Jacoby, 1994).

Moreover, felt stigma is more pervasive and often occur prior to an enacted stigma (Jacoby, 1994). For instance, some PLWHA are aware of how badly an indivual with HIV is or has been treated by others in the society thereby conceal his or her HIV status. Martinez *et al.* (2012) posit that HIV/AIDS stigma may negatively impact the psychosocial well-being of PLHIV and it can prevent them from using the health care services. Mostly, stigmatization triggers the so-called "social death" where people no longer feel as integral part of the society, as a result they become unable to receive the support and services they need (Daniel & Parker,

1990).

Thus, HIV stigma is predominant factors that influences adherence to ART among PLHIV (Mbonye, Nakamanya, Birungi, King, Seeley & Jaffar, 2013). Additionally, a plethora of studies around the world have shown a strong association among HIV stigma and low adherence to ART in PLWHA (Katz, Annemarie, Ryu, Onuegbu, Psaros, Weiser, Bangsberg & Tsai, 2013). Therefore, Katz *et al.*, (2013) did a meta-synthesis and systematic review of 75 studies to assess systematically the relationship of HIV stigma with adherence to ART.

Moreover, seventy-five studies included were conducted among 26, 715 PLHIV in 32 countries globally, with few representations of studies from Central Asia and Eastern Europe (Katz *et al.*, 2013). The positive association between HIV stigma and low adherence to ART was found in 24 of 33 cross-sectional studies (71%) and HIV stigma in 34 qualitative studies undermined adherence to ART by compromising social support, adaptive coping and other psychosocial factors in PLWHA (Katz *et al.*, 2013). Evidence from studies has revealed that identifying the link among HIV stigma and poor adherence to ART has proven to be crucial with a clear focus on addressing HIV stigma while automatically addressing other mechanically correlated barriers of adherence at once.

Katz *et al.*, (2013) state that the effect of HIV stigma functions across different levels specifically from intrapersonal level to interpersonal and then to the structural level therefore, interventions to mitigate HIV stigma have to underscore on the alluded levels of influence to bolster adherence and health outcomes of PLWHA. Martinez *et al.* (2012) did a longitudinal mixed methods study to explore whether HIV stigma predicts adherence to ART among youth females in the United State of America (USA). The study found HIV stigma as non-significant predictor of adherence to ART at 12 months among youth females enrolled in the study from

2003 up until 2005 (Martinez *et al.*, 2012). However, HIV stigma was revealed to be correlated with poor adherence to ART in the same cohort overtime (Martinez *et al.*, 2012).

Across sectional study by Mao, Li, Qiao, Zhou and Zhao (2017) examined the impact of HIV stigma and ethnicity on adherence to ART among a total of 2 146 PLWHA enrolled in ART in Guangxi province, China. The study findings indicated that patients who had experienced enacted stigma reported poor adherence to ART while ethnicity was a moderator on internalized stigma and adherence to ART (Mao *et al.*, 2017). Based on the study findings intervention programmes should be implemented which targets ethnic minority groups in order to eliminate prevalence of internalised HIV stigma among PLWHA (Mao *et al.*, 2017).

A cross-sectional study by Nurfalah, Yona and Waluyo (2019) tested whether HIV stigma significantly predicted adherence to ART in the sample of 120 adult female participants at Abdul Moeloek Hospital in Lampung, Indonesia. The findings indicated that HIV stigma was a significant predictor of low adherence to ART and women exhibited low levels of HIV stigma reported better levels of ART adherence. It was concluded in the study that HIV stigma can be reduced by reinforcing the sense of self-esteen among adult Indonesian women (Nurfalah *et al.*, 2019).

Most people across the sub-Saharan African region still lack basic knowledge of HIV/AIDS. Levels of stigma towards PLWHA are still high, the survey conducted in Ethiopia indicated that nearly the second third of people said that they wont buy food from a seller with HIV and 42% thought that children with HIV should be disallowed to go to school together with children without HIV (UNAIDS, 2019). Furthermore, other countries in the region were reported with such stigmatizing attitudes by between 6 and 31% of participants in the survey, thus South Africa accounted for 15% of people who said they would never purchase vegetables from

vendors with HIV (UNAIDS, 2019).

From the available evidence the HIV stigma remains a major barrier to adherence to ART in many countries across various regions globally. Despite the prevalence of stigma towards PLWHA in South Africa, there is a dearth of research done to document specifically the empirical relationship between HIV stigma and adherence to ART among PLWHA. This demonstrate the need for more studies to investigate the said relationship in South Africa therefore the relationship was examined in the current study.

2.8 Intervening effect of self-efficacy on depression and adherence to ART

Prior studies in the sub-Saharan African have shown a strong empirical relationship between depression and non-adherence to ART among adult PLWHA (Nakimuli-Mpungu *et al.*, 2012) while self-efficacy has been independently associated with optimum adherence to ART (Kekwaletswe, Jordaan, Nkosi, & Morojele, 2017). Therefore, until recently, there is very little evidence that have documented the interavtive mechanisms by which self-efficacy intervene the effect of depression on adherence to ART in South Africa and elsewhere.

Among other factors, self-efficacy is a known prognosticator of adherence to ART and a central factor of health behaviour among people living with chronic illnesses (Karademas, 2006). Generally, self-efficacy is confidence or belief that a person has in his or her ability to complete a specific task (s) or attain a certain outcome (Bandura, 1994). Thus, in the literature on treatment adherence and HIV/AIDS, self-efficacy is thought of as patient's confidence or beliefs about their aptitude to practice personal control by following their treatment recommendations including adherence to ART (Johnson, Neilands, Dilworth, Morin, Remien & Chesney, 2007). Virous studies have shown that low self-efficacy interfere with adherence to ART in PLWHA (Johnson *et al.*, 2007), but there are very few studies that have tested and documented the

mediating role of this variable as it was done in this study.

Li, Huang, Wang, Fennie, He, & Williams (2011) did a cross-sectional study in China to test whether HIV stigma intervene the predictive effects among self-efficacy, quality of life and adherence to ART. The results shown that HIV stigma partly intervened the effect of self-efficacy on adherence to ART. While on the other hand, HIV stigma totally intervened the effect of self-efficacy on quality of life (Li *et al.*, 2011). Li *et al.*, (2011) suggested that although self-efficacy was a significant predictor of quality of life as well as ART adherence, HIV stigma as a significant mediator should be given special consideration.

A cross-sectional research carried out by Adefolalu *et al.* (2014) aimed to determine whether adherence to ART was predicted by the self-efficacy and medication beliefs at the healthcare facility in Pretoria, South Africa. The study presented a strong link of self-efficacy with ART adherence and the participants demonstrated an average score of 4.05 out of 5, representing their strong belief in the utilizing ART. Adefolalu *et al.* (2014) reported that patients' self-efficacy explicated for a substantial magnitude of variation in low adherence to ART, which places low self-efficacy as a robust prognosticator of low adherence to ART.

Wagner *et al*., (2018) did a study in Uganda on the effect of depression alleviation on HIV clinic attendance and adherence to ART and the mediating role of motivation and self-efficacy. A sample of 1028 depressed patients with HIV were surveyed over 12 months. The results indicated that among participants exhibited major depression, association was found among depression alleviation, clinic attendance and better adherence to ART at month 12. Furthermore, self-efficacy totally mediated these relationships at month 12, while the predictive effect of depression alleviation on adherence to ART was partially intervened by adherence motivation. Wagner *et al.* (2018) posts that depression alleviation is crucial in improving both

adherence to ART and clinic attendance, essentially through greater adherence self-efficacy and motivation in order to perfom health behaviours.

A mixed methods study conducted by Oluwabusayo, Aregbesola and Adeoye (2018) examined wherther adherence to ART was predicted by self-efficacy among pregnant adult women with HIV in South-West Nigeria. The results of the study revealed that low self-efficacy was significantly related with poor adherence to ART. The study also found from participants that protecting unborn babies and looking healthier were major motives of adherence while undesirable spousal influences and HIV stigma were barriers to adherence to ART. Additionally, it is therefore imperative to address issues of HIV stigma, misconceptions and adherence self-efficacy in ART scale-up effort (Oluwabusayo *et al*., 2018). Khotimah, Hargono, and Fatah (2018) did an observational analytic study with case of control design on the association between adherences to ART among PLWHA in Dr. Iskak Tulungagung Hospital, Indonesia.

Moreover, the study findings indicated that self-efficacy influenced adherence to ART and those reported low self-efficacy were 7.6 times more likely to report low adherence to ART than those who had high self-efficacy. Self-efficacy is an essential aspect for patients to adopt positive thinking in their effort to generate more optimistic opportunities to act to achieve positive health outcomes (Khotimah *et al.,* 2018). A recent cross-sectional study by Andini, Yona and Waluyo (2019) investigated the relationship of depression, self-efficacy with adherence to ART among adult Indonesian women living with HIV. From the study findings the self-efficacy was shown as a significant predictor of adherence to ART. Participants with high self-efficacy were 2.33 times more likely to achieve optimal adherence to ART than those with low self-efficacy while depressed women with HIV were adherent to ART by 3.64 times less than those without depression.

Andini *et al.* (2019) concluded that better levels of adherence to ART can be achieved in a large part by alleviating depression and improving self-efficacy. Another recent cross-sectional study Umar *et al.* (2019) investigated the interplay between HIV stigma, self-efficacy and depression with adherence to ART among youth PLWHA in Malawi. The results of the study indicated that the effects of HIV stigma and depression on adherence was interceded by self-efficacy. The study findings further revealed that both direct and indirect effects of HIV stigma and that of depression on adherence to ART was moderated by gender. Additionally, the association among HIV stigma and adherence to ART was at the same time moderated and mediated by self-efficacy.

Umar *et al.* (2019) assert that understanding the intersection of diverse factors that influence adherence to ART is vital to devise and implement viable evidence-based interventions. Thus, in order to alleviate the impact of HIV stigma and depression on adherence to ART, interventional efforts should take place that bolster self-efficacy while not disregarding gender in youth (Umar *et al.*, 2019).

2.9 Intervening effect of social support on HIV stigma and adherence to ART

The psychosocial factors have been consistently linked with poor adherence to ART where there is limited social support and high level of HIV stigma (Naar-King, Templin, Wright, Frey, Parsons & Lam, 2006). Conversely, social support has independently and at once with other factors been linked with better adherence to ART and quality of life among PLWHA in many settings (Kelly, Hartman, Graham, Kallen & Giordano, 2014). However, very little is known regarding the interactive mechanism by which social support intervene the effect of HIV stigma on adherence to ART among PLWHA in South Africa and elsewhere.

Social support is thought of as the assistance and protection provided to others or

received from others (Shumaker & Brownell 1984). Thus, assistance may be imperceptible as in emotional help or perceptible as financial aid (Langford *et al.,* 1997), but protection may be considered as shielding people from the adversarial effects of stressful life (Cassel, 197). Social support can be sent and received in diverse forms namely informational, appraisal, instrumental, and emotional support (Cassel 1976; Cobb 1976; Sarason & Sarason 1985). The emotional support, for instance, enables one to have a positive state of mind which subsequently bolster his or her adherence self-efficacy (Simoni, Frick & Huang, 2006).

Atukunda, Musiimenta, Musinguzi, Wyatt, Ashaba1, Ware, Haberer (2017) also states that, instrumental support, becomes very crucial after ART initiation where many other barriers to adherence surfaces and it helps patients to consistently overcome them. This support, for example, pertains to the provision of activities that generate income to overcome challenges related to transportation, food security and further structural barriers to adherence to ART (Atukunda *et al.,* 2017). However, social support is not frequently favorable. The relationships, socio-cultural and socioeconomic forces affect the levels, types as well as patterns of support furnished for better levels of adherence to ART in various contexts (Kelly *et al.,* 2014).

Moreover, lack of resources in many social relationships undermines the active provision of support thereby affect one's psychosocial well-being as well as adaptive coping capacity (George & McGrath, 2018). A multi-level and holistic intra-inter and structural supports are necessary for the alleviation of HIV stigma that subverts adherence to ART among PLWHA rapidly after treatment initiation (Tsai & Bangsberg, 2011). Naar-King *et al*. (2006) did a study that examined whether self-efficacy, psychosocial distress and social support predict adherence to ART in the total sample of 124 youth PLWHA on ART. From the study findings social support was not a significant prognosticator of adherence, but psychological distress and self-

efficacy significantly predicted adherence to ART. Thus, both psychological distress and self-efficacy together explained for 47% of variation (Naar-King *et al*., 2006). Another study conducted by George and MacGrath (2018) examined how HIV stigma, non-disclosure and social support are associated with low adherence to ART in 24 weeks after ART initiation among a group of adults PLWHA in rural region of KwaZulu-Natal.

A sample of 385 adult patients enrolled in the study and study findings indicate that low adherence in the last 24 weeks accounted for 25% of the sample and non-adherence in the last 4 weeks before the 21st week of follow-up was 9% (George & MacGrath, 2018). Furthermore, no association was found between non-disclosure of HIV, social support, HIV stigma, and non-adherence to ART. However, Azia's *et al.* (2016) findings from the descriptive qualitative study, identified stigma, unemployment, food insecurity and non-disclosure as major barriers to adherence to ART.

Moreover, some patients reported that they discontinued their treatment due to stigma and discrimination against by some family members and friends. Further, several patients articulated that they withdrew from attending ARV clinic due to fear of unintended disclosure of their HIV status when they were seen queuing at the ARV clinic more often (Azia *et al.*, 2016). The George and McGrath (2018) posts that, HIV stigma undermines HIV disclosure thereby avert PLWHA from getting social support.

In closing of this section, Naar-King *et al*. (2006) maintain that it is therefore imperative to develop advanced comprehension of the mechanisms by which psychosocial factors impact adherence to ART in order to devise interventions which are embedded in empirical evidence. Thus, the evidence from prior studies suggest that there is a wide gab in the literature that specifically investigates the intervening effect of social support between HIV stigma and

adherence to ART. Similarly, very little is known about the intervening effect of self-effficacy on depression and adherence to ART in South Africa and elsewhere.

2.10 Summary

In conclusion of this chapter, South Africa has made a huge progress in devising a well-documented policy that informs the operations of national ART program and the country is renowned of its progressive ART program and constitutional rights worldwide. The policy and legislation relevant to the study advocates for the promotion and protection of human right to a large extent, especially the rights of vulnerable population (PLWHA), however, there is still some evidence that their implementation needs more improvement in other settings in terms of the provision of quality ART services. The existing literature relevant to the topic has facilitated a good synthesis of robust findings that fuelled a critical argument for the topic of this study. However, most of the prior studies reviewed were not undertaken in South Africa, thus considerable amount of literature emerges from other African and Western countries. Moreover, this indicate that the relevance of their findings for understanding the influence of psychosocial factors on adherence to ART is still notional in the context of South Africa. Additionally, most of the previous studies have not tested the mechanisms by which social support and self-efficacy mediates the interaction of other predictor variables with adherence to ART.

CHAPTER THREE: THEORETICAL FRAMEWORK

This chapter provides pertinent theoretical models that serves as a lens through which the research problem and research questions are evaluated. Thus, the application of models from Health Locus of Control Theory (HLOC) and Social Support Theory (SS) are presented in this chapter, allowing for a better prediction and conclusions drawn from findings concerning the interactive mechanism over which psychosocial factors influence patients' adherence to ART. Therefore, the Health Locus of Control Theory was considered as a micro theory (personality) while Social Support Theory serves as macro theoretical perspective (broader social influences).

3.1 Health locus of control

Julian Rotter developed health locus of control theory which was derived from his theory of social learning (Rotter, 1966). The locus of control is a central construct of social learning theory (Rotter, Chance & Phares, 1972). Thus, the theory was extended by Wallston, Wallston and de Vellis (1978) to integrate the multidimensional facet of health-related behaviour. According to Rotter (1966) the "locus of control" concept refers to a generalised cognitive expectancy that determines the extent to which individuals perceive the control they have over their life events. Rotter (1966) states that, health locus of control consists of two basic forms of locus control namely internal and external.

Moreover, the internal locus of control relate to individuals who believe that future outcomes are a direct result of their personal actions, whereas individuals who have external locus of control believe that future outcomes are a result of factors beyond their control such as circumstances, chance or luck (Rotter, 1966). In other words, people with an internal locus of control believe that their achievements as well as failures are a result of their own actions.

Whereas people with external locus of control hold the belief that what happens in their lives is totally independent of their personal actions, but it can be ascribed to luck, circumstances, or fate. The researcher is cognisant of that this theory has been applied over decades and has been revised as well as transformed into an upgraded version. Therefore, this version has been preferred because it has been widely used to predict health-related behaviours and outcomes.

The most prevalent application of the Health Locus of Control has been in the field of health psychology. This theory was first made popular in the 1970s by Wallston, Wallston, Kaplan and Maides (1976), where it examined the extent to which people believed that their health was regulated by internal or external factors. Therefore, this stimulated an interest in researchers to adopt locus of control to health situations. The health locus of control theory has been applied in some studies to measure adherence behaviour to diabetes regimen with patients on diabetic treatment. In other studies, the health locus of control theory has been used to assess adherence to therapeutic regimen.

Moreover, a study conducted by Morowatisharifabad *et al.* (2009) utilised health locus of control theory in a sample of male and female diabetic patients in Iran and the study investigated the relationship of the theory to adherence to diabetic therapeutic regimen. Results of the study indicated that men had high internal locus of control than women while on the other hand, women exhibited high external locus of control than men. In addition, "A positive association between internal locus of control and adherence to diabetes regimen was found and there was a negative association between chance locus control and adherence to diabetes regimen" (Morowatisharifabad *et al.,* 2009 p. 37). Other studies were able to show the same results of positive association between optimal medication adherence and internal locus of control (Habib & Durrani, 2016) others were unable to display this association (Habboushe, 2001).

A descriptive correlational study by Zaky (2016) tested whether the health locus of control, and knowledge were significant predictors of adherence to antihypertensive therapy among a total sample of 150 female patients with preeclampsia at Alexandria Maternity University Hospital in Egypt. The results showed that external powerful health locus of control accounted for 39.2% and 27.3% of internal health locus of control demonstrated high scores on knowledge pertaining preeclampsia and its therapeutic regimen. In addition, women with external health locus of control demonstrated the highest percentage (40.4%) of adherence to the antihypertensive regimen than those with internal (29.4%) with a statistically significant variance of $p<0.002$.

Thus, strength of the health locus of control theory to the problem area of this empirical investigation is based on its ability to predict health-related behaviours and outcomes in a scientific manner. Various studies have shown how locus of control is closely related to health behaviours such as birth control utilization (Biondo & Mac Donald, 1970), smoking (James, Woodruff, & Werner, 1965), self-esteem and loss of weight (Balch & Ross, 1975). This micro theoretical construct has been linked to self-efficacy (Emir, 2016), which has been considered as a mediator variable in the context of this investigation.

Furthermore, for the purpose of this study, the health locus of control theory was utilised as a lens through which HIV and AIDS adult patients perceive their health conditions as controlled by internal or external forces. The theory maintains that patient's degree of health-promoting behaviour is determined by the degree of control that the patients believe they hold over monitoring his or her chronic disease (HIV) on long-term basis (Rotter, 1966). Therefore, patients fall within the borderlines of internal locus of control hold the belief of that their behaviour either passive or active directly influence their personal health outcome relating to

adherence to antiretroviral therapy.

For example, the adherent patients may believe that following ARV drug regimen, taking medication regularly, managing diverse side effects, keeping healthy lifestyle and clinic appointments for drug refills can subsequently yield good therapeutic results. While patients who never took an initiative in fighting the disease, are more likely to blame, themselves for not taking responsibility for their health and they will be more inclined to adopt lifestyle changes to improve their medication adherence behaviour.

On the other hand, patients within the borderline of external locus of control hold the belief of that their wellbeing is determined by factors beyond their control. Thus, these patients may believe that their poor adherence outcomes to ART may be due to psychosocial circumstances and actions by powerful others such as Doctors, Nurses, Social Workers, Pharmacist and Dieticians (blaming the healthcare system). The theory further helps to explain that, these patients perceive their good therapeutic outcomes as a result of luck but not their effort therefore they are less motivated to take action over their wellbeing. Thus, the health locus of control theory is helpful in explaining the degree of control over patients' behaviours that influence their therapeutic outcomes.

3.1.1 A critique of the health locus of control theory

Regardless of being the most frequently used theory, health locus of control has received a significant number of criticisms which can be classified into two clusters namely theoretical and methodological. Levenson (1981) stated the methodological flaws emerge on the scales used to measure this theoretical construct. According to Levenson (1981) the definition of the construct relates perhaps to other factors not even locus of control and scales used does not denote content-specificity which makes it difficult to draw useful conclusions across studies.

Although Rotter (1975) claims that I-E locus of control-scale should be regarded as undimensional, some authors namely Marsh and Richards, (1986), posit that the I-E scale consist of more than one element. The study by Collins and Cox (1976) presented 46 statements of the I-E scale in a Likert-type of scale and four elements were established namely belief in difficult world, belief in a predictable world, belief in a politically responsible world and belief in a just world. Marsh and Richards (1986) further contended that the I-E scale consist of five elements which may be considered as political control, success through initiative, interpersonal control, academic situations, and general luck.

Another substantial challenge, theorised by Rotter entail the internality and externality as contrary poles of the same dimension, which suggest that these opposite poles involve only a tiny part of the rationales that people often utilise to explain behaviours and events (Rotter, 1966; Malle, 2004). In addition, the theory is closely related to some other most frequently used personality variables namely self-esteem, generalised self-efficacy, and neuroticism which were examined in 75 studies through a meta-analytical study by (Judge & Ilies, 2002). The researchers have reported that I-E scale is highly correlated with a just world scale which posits that attitudes and behaviours might be beliefs in a just world rather than locus of control (Zuckerman & Gerbasi, 1977; Stromwall, Alfredsson & Landstrom, 2013).

3.2 Social support theory

The social support theory was developed by several scholars (House, 1981; Gottlieb, 1985; Cohen & Wills, 1985; Barrera, 1986; Thoits, 1995; Uchino, 2006; Sarason & Sarason, 2009; Taylor, 2011; Ditzen & Heinrichs, 2014). The term “social support” was coined in the late 20th century and it has been written about for several decades (William, 2005). Hupcey (1998)

describe social support as multi-dimensional construct that has been consistently studied because of its definitional complexity within the academic literature.

In the literature social support has been broadly defined as a protection and assistance either provided to or received from others (Shumaker & Brownell 1984). Thus, "Assistance may be tangible as financial aid or intangible as in emotional help" (Langford *et al*., 1997, p 95) while protection may be displayed through caring for people and shield them from the adverse effect of life stress (Cassel, 1976; Cobb, 1976; Sarason & Sarason, 1985). Moreover, the concept had been further hypothesised to be reciprocal (House, 1981) rather than a mere provision of protection and assistance. In addition, Shumaker, and Brownell (1984) extended the social support definition as an "exchange of resources between at least two individuals" (p. 11).

On the other hand, Will (1991) defines social support more precisely as the perception that a person is important and loved by others, where one feels much valued and integral part of the community of reciprocal assistance. Thus, the mid-1970s onwards was marked by the emergency of social support theory and research (Cassel 1976, Cobb, 1976, Sarason & Sarason, 1985). The theory integrates micro and macro level effects implicated in one's life. The social support theory rests on the propositions that informational, instrumental, and emotional support lessen adversarial effects of stressful life events (Cassel 1976, Cobb 1976, Sarason & Sarason 1985).

The theory has four defining elements that will be described below. These elements of social supports theory are instrumental, emotional, informational, and appraisal support (House, 1981; Barrera, 1986). (a) *Emotional support:* According to House (1981) as cited in Langford *et al.* (1997) "Emotional support involves the provision of caring, empathy, nurturance and trust between two persons or more" (p. 96). While House (1981) highlights emotional support as the

most crucial attribute through which the perception of support is expressed to others. Thus, emotional support could also refer to what Norbeck *et al.* (1981) called "affective assistance". (B) *Instrumental support*: Tilden and Weinert (1987) define instrumental support as when one is providing tangible assistance to others. Tangible assistance is described by Langford *et al.* (1997) as physical or solid assistance. For example, this could involve providing financial assistance or carrying out assigned task or work for other people. (c) *Informational support:* according to House (1981) "is information provided to another during time of stress" (p. 32).

Tilden and Weinert (1987) corroborated the utility of informational support during the process of solving the problem. This type of support ascertains resources and coping mechanisms which are necessary to address a stressful situation in one's life. (d) *Appraisal support:* is an articulation of information that is associated with the evaluation of self as oppose to informational support which seeks to solve the problem (House (1981). Furthermore, appraisal support refers to what Kahn, Baltes, Brim and Antonucci (1980) call "affirmational support". The affirmational support involves communication that affirms the pertinence of acts or accounts completed by other people (Kahn *et al.,* 1980). For example, a close relative reminds one of all his or her strategies or qualities that helped him or her to beat diabetes. This type of support rests on the notion that giving feedback and affirmation to someone is crucial in encouraging one to continuously use available resources and coping strategies to best manage stressful life events.

Initially social support had received great research consideration merely as a buffer in the relation between stressors and health outcomes (Cobb, 1976). Cassel (1976) posits that the undesirable health effects of stressful life events are moderated by the process of social support. The researcher is aware of that over the previous decades, various models linking social support with health have been established. Most of these theoretical modelling efforts endeavours to

explain the crucial health operation of social support in the framework of distress. At the core of social support theory there are three diverse theoretical perspectives that uniquely expain the link of social support with health namely the tress and coping perspective, the relationship perspective and social constructionist perspective (Ensel and Lin, 1991; Barrera, 1986; Berkman, Lin, 1986b; Cohen *et al.*, 2000; Dohrenwend and Dohrenwend, 1981; Wheaton, 1985). Thus, *stress and coping* is the most dominant theoretical perspective on social support which theorises that support mitigates the effects of a stressor on health through either the credence that support is available or the supportive actions of others which are thought to enhance coping (McKay, 1984; Cutrona & Russell, 1990). This perspective emphasises that actual assistance given by others is effective in enhancing coping and moderating the effect of a stressor by matching the demands of it.

Alternatively, this perspective also predict that social support protects people against the effects of stressful life events by allowing them to construe difficult situations in a less negative way. Furthermore, this perspective consists of two types of appraisals namely *primary* and *secondary*. The primary appraisal involves evaluations of whether the event is a threat or not, while secondary appraisal assesses the availability of personal and social resources necessary to cope with the event (Cohen & Hoberman, 1983). The *social constructionist perspective* on social support posits that self and social world are inseparably linked (Mead, 1934). Some authors have used social cognition to comprehensively understand social support (Sarason *et al.*, 1990; Lakey & Drew, 1997; Mankowski & Wyer, 1997; Lakey & Cassady, 1990; Pierce *et al.*, 1997). A primary concern of social-cognitive views is with the perception of support. This perspective emphasises on generalised beliefs about the supportiveness of others which does not rely on the level of stress.

The symbolic interactionalism is another aspect of social constructionist perspective on social support. According to Mead (1934), people learn to control themselves by employing the principles of the group to their own conduct: "Self-criticism is essentially social criticism, and behaviour that is controlled by self-criticism is essentially behaviour controlled socially" (p. 255). This aspect theorises that various social roles protect people from adverse effect of tress through building and maintaining self-esteem and identity (Thoits, 1999). The *relationship perspective* conceptualises support as part of general relationship process. The major premise of this perspective is that positive, secure, and stable relationships may enhance one's well-being. Therefore, this perspective predicts that people with little social support are more likely to have poor health outcomes (Lakey & Cohen, 2000).

Social support theory has been applied and studied across different academic disciplines with a specific reference to sociology, nursing, public health, psychology, medicine, and criminology. The social support construct was first applied in the mental health literature by Caplan (1974) and was also linked to physical health by physician-epistemologists (Cassel, 1976 & Cobb, 1976) as means of enhancing health outcomes. Cassel (1976) highlighted that social relationships play a pivotal role in protecting people from potentially harmful health effects of psychosocial stress. Cohen and Wills (1985) in their research introduced two key hypotheses that were centred on how social support may impact people's health. Therefore, House *et al.* (1988) utilised applicable literature to form a causative link in relation to health and social support.

Moreover, several studies have explored the received support using data derived from cross-sectional surveys and most of which have reported inconsistent empirical evidence. Nonetheless, the health influence of perceived social support has received considerable attention and majority of studies have employe data from surveys conducted in communities. The study

conducted by Ross and Mirowsky (1989), revealed that perceived support interacts mutually with the level of control. Another study by Roxburgh (2006) investigated perceived support from partners and co-workers, but the results indicated that partner support does not have moderating effects for both gender groups.The support received by men from co-workers was deemed to convey a significant negative impact on depression.

Francis Cullen was first to articulate social support theory in the study of crime and delinquency (Kort-Butler, 2017). Cullen (1994) cited in Kort-Butler (2017) emphasised on how supportive societies and social relationships can respectively reduce crime rate. Therefore, Kort-Butler (2017) posited that social support is also involved in the processes of criminal justice and social control, thus, effective rehabilitation and social control are through social support. A longitudinal study by Simoni *et al.* (2006) evaluated cognitive-affective model of treatment adherence which was grounded in social support theory among male and female patients on ART. The findings indicated that social support enhances adherence to ART among this group.

Therefore, this empirical investigation has applied conceptual models from social support theory to understand and predict diverse effects of social support on the phenomenon of adherence to ART in adult PLWHA. The theory allowed for an explicit evaluation of the interaction among the central study variables within different theoretical models used to understand the complex effect of support on health outcomes. In addition, the theory helped to explain relational factors related to adherence to ART by drawing from different theoretical perspectives on support applicable within this heterogeneous population. Moreover, the theory also provided for better understanding of how social support mediate health effects of other factors and social dynamics by which social support changes or maintains adherence behaviours of patients.

3.2.1 A critique of social support theory

The difference in the conceptualisation of social support reflect an ambiguous construction of the concept (Song, Son & Lin, 2011). Cassel (1976) and Henderson (1977) both highlighted that inconsistent and functionalist framing of social support mixes the concept with its consequences and ignore the reality of that support do not often operate in a positive way to intervene between health and stressors.

The construct can be categorized in various ways, however most conceptualisation effort simply converges on multidimensional forms of social support (Song *et al.*, 2011). The distinction between social support and other related factors such as social capital, social networks, social cohesion, and social integration tend to be indistinct in the current health literature. These factors are set under the notion of social support (Roxburgh, 2004; Turner, 1999). Therefore, such tangled conceptualisation of social support threatens the unique empirical utility of the construct. Thus, further efforts are required to advance and clarify the recent conceptualisation of social support because this social concept is unique. The issues of valid and reliable social support scale were identified in the past decades (Dean and Lin, 1977), as social support research had suffered from a range of methodological flaws over the past years. A precise nature of social support definition is needed to overcome inconsistencies in empirical results and operational measurements of the concept in order to achieve robustness of the results (Song *et al.,* 2011). The concept is a multifaceted factor, but less theoretical attention has been paid to reciprocal support, actual support and instrumental support as well as other forms of support (Song *et al.*, 2011).

Moreover, its firm definition is essential for a comprehensive and coherent understanding of the literature drawing from various perspectives based on the construct. Song *et al.,* (2011)

state that area of health research has not examined how the various forms of social support mediate the effect of different network-based precursors. In addition, social support is a dynamic factor that may moderate and mediate health effect of other factors, therefore longitudinal designs are needed for thorough conceptualisations of dynamics through which social support influence health.

3.3 Justification and relevance of health locus of control and social support theories to ART adherence in the South African context.

In line with health locus of control theory, the study underscored on examining the interactive mechanism through which depression, and self-efficacy predict odds of adherence behaviour to ART. The severe human and socio-economic impact of HIV has been considered as one of the remarkable major developments of the unique South Africa's post-apartheid era. As from the year of 1998 to 2008, the country had shaped a large extent of serious health impact caused by HIV epidemic, which surfaced under the presidency of Thabo Mbeki that was largely marked by his denialism towards HIV endemic (Furman, 2011).

South Africa has for several years been considered as an epicenter of HIV epidemic among other countries in the sub-Saharan Africa and the entire world. The socio-economic impact of HIV is likely to continue, and the public health system endure a year-on-year increasing burden of HIV epidemic. The national roll-out of ART through the public health system posed a major administrative challenge due to the serious economic consequences yielded by the pandemic in South Africa. The dramatic spread of HIV has reflected socioeconomic and behavioral conditions in South Africa.

Furthermore, its prevalence rates are strongly correlated with key socio-demographic influences namely gender, poverty, race, education as well as employment (UNAIDS, 2010).

Consistent with health locus of control theory in this study, PLWHA who fall within the external theoretical borderline would be more likely to rationalize their health conditions or outcomes as controlled by the above-mentioned circumstances. The patients with external locus of control would be more likely to direct their blame to the health system for health outcomes related to adherence to ART. Therefore, they might hold the belief of that the degree of their adherence behavior to ART may be accounted for by external forces (e.g socioeconomic circumstances) rather than internal forces (their actions).

Moreover, health locus of control does not independently provide a sufficient theoretical explanation for a complex adherence behavior to ART, therefore social support theory offers a broader theoretical perspective on the phenomenon of adherence to ART. Although the provision of ART is critically important in the lives of PLHIV, it is also essential to understand the myriad of psychosocial factors that hinders positive health outcomes of users of the public ART programme. Social support is one of key social factors that should be bolstered to enhance adherence outcomes among PLHIV.

Consistent with social support theory stress and coping perspective is one of the most prevalent theoretical models of social support (McKay, 1984; Cutrona & Russell, 1990), thus some of the patients have strained relationships, which eventually affect their adherence behaviours. Despite the widespread of HIV in South Africa, studies have documented high prevalence of HIV stigma against PLHIV, which then inhibit disclosure of HIV status to family members and partners.The relationship perspective of the theory speaks to engaging the family members or significant others in the treatment plan to ensure that different forms of support are received. Depression, HIV stigma, stress and other negative psychosocial factors are likely to be associated with problems of social support along with worse ART adherence outcomes. Positive

social support promote adherence to ART, which reflect positive prospect for long life in PLWHA.

The relationship perspective conceptualises support as part of general relationship process for instance family members may be essential sources of social support and the stronger the support the better psychosocial outcomes for PLWHA. The major premise of this perspective is that positive, secure, and stable relationships may enhance an individual's well-being. In South Africa family and community support have been proved to reduce non-disclosure of HIV status and HIVstigma, therefore this theory is relevant in the context of explaining adherence behaviour to ART because social support protects PLWHA from detrimental health effects of psychosocial stress (Cassel, 1976 & Cobb, 1976).

3.4 Summary

The synthesis of health locus of control theory and social support theory in this study provides a robust theoretical explanation of the phenomenon of adherence to ART that spans from the micro to the macro context within which a myriad of factors influence it. The eclectic approach to several theoretical perspectives of health locus of control and social support theories have proven to be strong, useful and relevant despite the inadequacies of some other theoretical models which are not suitable in explaining adherence to ART within the historical and socioeconomic context of South Africa.

CHAPTER FOUR: METHODOLOGY

This chapter describes the methodology that was used in this study and explicates how the research process was conducted. This pertains to the research design; hypotheses and hypothesised model; population and sampling framework; data collection approach and methods; measures (instruments); pre-test and pilot test; data management and analysis; the reliability of the measures; ethical considerations and lastly limitations of the study.

4.1 Research design

Creswell (2014) define research design as a systematic framework of the research procedures that span the researcher's operational decision from general assumptions to specific methods of data collection, measurements, and analysis. A quantitative research approach was employed utilising cross-sectional design to investigate the interactive influence of psychosocial factors on adherence to ART among adult PLWHA, in South Africa. The researcher's research design was informed by the research paradigm through which the researcher thinks when planning and conducting research process (Krauss, 2005).

Leavy (2017), define research paradigm as "the philosophical worldview that carries a set of assumptions that guide the research process" (p. 13). The researcher recognises that reality (i.e. truth) differs between paradigms. Guba and Lincoln (2001) assert that truth is regarded as either value-laden (criticalism), or subjectively biased (constructivism), or strictly objective (positivism), or partly objective (post-positivism). Thus, the researcher falls within the philosophical borderland of post-positivistic paradigm that largely underpin this study. The post-positivistic paradigm operates under the principle of objectivity that is fundamentally subjective in nature (Carter & Hurtado, 2007).

This study was largely embedded in post-positivist paradigm that carries a philosophical

assumption of that truth cannot be simply obtained by aggregating scientific data but it can only be approximated (ontology), and pure objectivity cannot be attainable due to inevitable presence of subjectivity in the research process (epistemology) (Chilisa & Kawulich, 2012). Chilisa and Kawulich, (2012) further maintain that this paradigm also posits that there is no absolute reality and truths are always interpretations which may be largely engrained in values and assumptions. Therefore, this show that the research process can never be completely value-free.

In addition, quantitative research is often associated with post-positivistic paradigm that carefully take the utility of objectivity and subjectivity into consideration within research (Carter & Hurtado, 2007). Thus, the paradigmatic assumptions adopted in the study determines the research design (Krauss (2005), therefore this study utilised cross-sectional research design. A quantitative research underpinned by post-positivistic paradigm does not buffer research against subjectivity (Carter & Hurtado, 2007), a good example of this is the selection of variables of interest in quantitative study. In many quantitative studies the selection of variables is often subjectively biased and is based on the researcher's perceptions and experiences of the social world (Carter & Hurtado, 2007).

The main goal of quantitative research is to test theories (hypotheses) and determine the relationships between variables namely independent and dependent variables which vary from one person to another in a population (Leavy, 2017). Quantitative researchers before research begins, they try to recognise, isolate, and define variables of interest within the study and then tests to find the relationships, correlation, and causality between them (Babbie, 2007). Thus, employing quantitative research approach in this study, it well-suited the nature of the topic for research, therefore, the researcher was able to use hypotheses, measurement methods, computational and statistical procedures that are central to best achieve the overall purpose of the

study. Furthermore, this research design, also enabled the researcher to reach a large sample size which subsequently led to useful conclusions and to focus on specific facts that could be generalizable to the target population (Babbie, 2007). It also allowed for a better objectivity through highly reliable measurement instruments of data collection that were used to replicate the study and generalise the results to a broader population. Quantitative studies are valuable for narrowing the problem affecting the target population and measuring the aspects of the problem to recognise the link between factors (variables) established by qualitative studies.

4.1.1 Hypotheses

This study hypothesises that among PLWHA accessing antiretroviral treatment at a tertiary hospital:

H_0: Depression does not predict adherence to ART

H_1: Depression predicts adherence to ART

H_0: HIV stigma does not predict adherence to ART

H_2: HIV stigma predicts adherence to ART

H_0: Self-efficacy does not mediate the relationship between depression and adherence to ART

H_3: Self-efficacy mediates the relationship between depression and adherence to ART

H_0: Social support does not mediate the relationship between HIV stigma and adherence to ART

H_4: Social support mediates the relationship between HIV stigma and adherence to ART

The hypothesized relationships among the central study variables is presented in Figure 1.

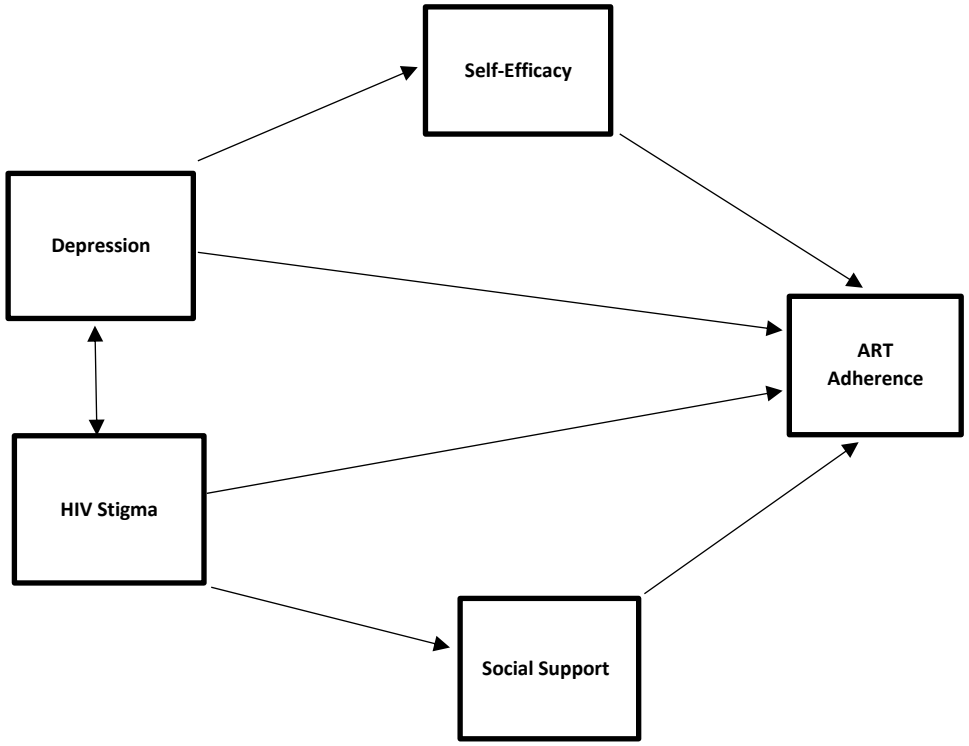

Figure 1. Hypothesized model of the central study variables.

4.1.2. Variables

The types of the central study variables include independent variables, mediating variables, and dependent variable. These variables are shown below:

Depression (Independent variable). This variable was characterised by feeling of guilt, low self-worth, decreased energy, loss of interest or pleasure, poor centration and disturbed sleep or appetite as measured by patient health questionnaire (PHQ-9) (Kroenke *et al.*, 2001). It comprised of severity of depressive symptoms assessed over the past two weeks and scores on PHQ range from 0 to 24. Participants with higher score points were indicative of severe

depression. This variable was hypothesised as predictor of adherence to ART.

HIV stigma (Independent variable). UNAIDS (2008) define HIV stigma as undesirable beliefs, attitudes and stereotypes that are used to perceive people living with HIV as disgracefully different from the social ideals. There are two types of stigma which are closely related to behavioral and mental health namely internalized and perceived HIV stigma. Perceived HIV stigma is considered as a consciousness of unfavorable attitudes from the society. This variable was considered specifically as a, *negative self-image, internalised stigma, concerns with public attitudes towards PLWHA, and disclosure concerns* as measured by Berger *et al.* (Berger *et al.,* 2001). This variable was hypothesised as predictor of adherence to ART.

Adherence to ART (Independent variable). A simplified medication adherence questionnaire was used to assess the extent to which, whether patients were able to adhere to ART or not. Participants were asked whether they not took any of their medication over the last weekend and asked if at times they feel worse, do they stop taking their HIV treatment.

Self-efficacy (Mediator variable). This was defined as beliefs that participants hold about their ability to perform actions that influence events which impact on their lives (Zimmerman & Bandura, 1994). This variable was measured using HIV adherence self-efficacy scale (HIV-ASES) to assess confidence of participants to perform health-related behaviours and durability that leads to improved adherence to ART (Johnson *at al.,* 2007). This variable was hypothesised as the mediator on depression and adherence to ART

Social Support (Mediator variable). This variable was broadly defined by Shumaker and Brownell (1984) as the assistance and protection provided to others or received from others. This variable comprised of participants' perception of social support received from three diverse sources namely *family, friends and significant others* as measured by Zimet's *et al.,* (1988)

multidimensional scale of perceived social support (MSPSS-12). This variable was hypothesised as mediatior on HIV syigma and adherence to ART.

4.2 Population and sampling

A proper understanding of the relationship between general, target and study (sample) population is critical in avoiding sampling bias and poor population specification (Asiamah, Mensah & Oteng-Abayie, 2017). The general population is the largest group of potential participants who share a single attribute of interest (Asiamah *et al*., 2017), thus for this study the general population were PLWHA. The refinement of the general population is essential considering that the involvement of all individuals in the study may controvert the research scope, goal and context. Thus, the remaining proportion after the refinement of general population is called target population (Asiamah *et al*., 2017).

Moreover, the specification of target population and study population is also essential especially, when the study population is too large and can be executed using selection criteria on members who met it. The target population is the semi-final group of potential participants from which the sample is drawn and to which the results from selected study participants are generalised (Neuman, 2014). The target population for this study were adult HIV and AIDS patients enrolled in national public ART program. A sample is a group of participants drawn from the target population who willingly give consent before being part of the study (Neuman, 2014). Sampling as defined by Leavy (2017) is a process through which a researcher selects a representative group from the target population to provide data that is necessary for the purpose of the study.

A time location probability sampling was used as a sampling procedure for this study to recruit adult patients enrolled in the public ART program aged 18 years and older at Philani

Family Clinic in King Edward VIII tertiary Hospital, Durban, South Africa. Time location sampling (TLS) is typically used to collect data from hard to reach populations and the aim is to reach potential study participant at times and places where they congregate (Leon, Jauffret-Roustide & Strat, 2015). This sampling procedure was very suitable for this study, taking into consideration that PLWHA are vulnerable and hard to reach population. The participants were recruited when they came for clinic visits to collect their regular ARV treatment at King Edward VIII Hospital's Philani Family ARV Clinic in Durban, KwaZulu-Natal. Patients were recruited while waiting to be seen by the doctors at the hospital clinic.

This is a second largest public hospital in the Southern part of the earth (hemisphere), providing tertiary and regional health care services to the entire of KwaZulu-Natal and part of Eastern Cape Province. The Philani Family Clinic is used as an ARV clinic that aims to provide comprehensive care and ensure the rollout of ART to all South African and foreign PLWHA. The clinic provides its service mainly to patients from different areas in eThekwini Municipal District and from elsewhere. Therefore, the researcher went to the hospital from Monday to Thursday and participants were recruited between 08:00 am to 12:00 am only on the mentioned days and times.

Sample size determination. Singh and Masuku (2014) define sample size determination as a technique of selecting an appropriate number of research subjects to include in a statistical sample. The sample size is the essential feature of any empirical investigation in which the aim is to draw inference from the sample data to the larger population (Barlett, Kotrlik & Higgins, 2001). The sample size determination is one of the critically important parts of quantitative research design for this reason studies with small sample size may not yield desirable statistical power, whereas studies with large sample size may lead to unnecessary waste of money,

resources and time (Vishwakarma, 2017).

The sample sizes may be based on three different ways namely variance base, cost base and statistical power base (Singh & Masuku, 2014). Thus, the sample size reached in this study was determined based on the cost of collection of data and adequate statistical power needed from the study to minimize the risk of committing type two (II) error (Vishwakarma, 2017; Singh & Masuku, 2014). The power of a study refers to the probability that the study accurately rejects the null hypothesis when it is false and 80% (.8) or more is an accepted power for many studies (Vishwakarma, 2017).

A researcher typically needs to estimate the proportion in a population for a proper sample size determination (Barlett *et al.,* 2001). As part of the procedure, before the calculation of adequate minimum sample size for this study, the estimated prevalence rate of all patients enrolled in ART programme in the hospital was established from the results of the pilot study. The estimated prevalence of adult patients on ART program was 14.4 % according to the preliminary findings of the pilot study. Therefore, the acceptable 5% margin of error was used (5 percent points of the true population value) with a desired confidence level of 95% (Barlett *et al.,* 2001).

The minimum sample size was determined using the following formula of (Lemeshow, Hosmer, Klar & Lwanga, 1990, p.1).

$$\boldsymbol{S = \frac{Z^2\left(1 - \frac{a}{2}\right)p(1-p)}{d^2} = \frac{(1.96)^2\ 0.144 \times 0.856}{0.05^2} = 189.41 = 189}$$

Where, d^2 = is a margin of error (precision) of ±5% that was used, this implies that the sample mean will vary from the true population mean with plus or minus five percent of error in the sample statistics. Where, $1 - \frac{a}{2}$ = is the desired confidence level of 95% that was used along with

an associated z-value (critical value) of 1.96 which means that the researcher is 95% certain that the whole population responses would be within the accepted precision. Where, p = is the estimated population proportion of 14.4% that was used to calculate proper minimum sample size. Where $\boldsymbol{S}$=is a sample size. Therefore, based on the sample size calculations, the study had to arrive at the estimated minimum sample size of 189 patients, but this study had a total of 230 adult patients who participated in the study. However, over the course of data cleaning process some cases had to be discarded as a result of incongruent responses, and high magnitude of incomplete data on the study questionnaire, which left the study with a valid cases of 201 adult patients.

4.3. Data collection approach

Creswell (2014) defines data collection as "a series of interrelated activities aimed at gathering good information to answer emerging research questions" (p.146). The most critically important objective of data collection is to make certain that reliable and good data is collected for proper statistical analysis. A cross-sectional survey design was employed as a data collection approach for this study, since the aim was to gain reliable data at one point in time that would make it possible to produce robust conclusions and establish swift directions for future research (Leavy, 2017). The study also employed a primary type of data which refers to the data collected for the first time, right from the main source (Creswell, 2014). The researcher collaborated with the clinic healthcare professional to recruit adequate number of participants necessary for good quality research that minimises bias of any form. Thus, the data collection process took place at Philani Family ARV Clinic in King Edward VIII tertiary Hospital situated in the South of Durban, uMbilo. Many participants were recruited at the waiting area while waiting for their out-patient files and to be

seen by the clinic doctors. In addition, some were referred by the healthcare professionals (Clinic Nurses) after they met with the doctors.

The researcher clearly explained the nature, scope, and purpose of the study in the recruitment process. Leavy (2017) states that the informed consent is a crucial element for undertaking ethical research that includes and protect human subjects. The participants were informed of the rights, benefits and risks when participating in the study then the researcher obtained a written informed consent from the participants who clearly understood the information and willing to partake in the study. Moreover, no monetary compensation or incentives were offered to stimulate patients' participation in the study, therefore the choice to participate was purely autonomous and voluntary in nature.

The personal (face-to-face) interviews were conducted utilising structured self-administered questionnaire technique. The study questionnaire was prepared into two language versions namely IsiZulu and English because IsiZulu is a widely spoken language in KwaZulu-Natal province. This questionnaire method does not require the interviewer (researcher) to complete it, however exception was made to save time for participants who were encountering a difficulty with reading the survey instrument by themselves.

Gaining entry and recruitment of participants. Patients were recruited using time location probability sampling at a waiting area in the clinic while waiting to be seen by the clinic doctors. The researcher collaborated with the clinic healthcare professionals in terms of referring patients who wished to participate in the pilot study. The study was explained, and the informed consent process was completed to inform the participants of the rights, potential risks, and benefits when participating in the study. Those patients who were willing to participate they displayed their

consent by providing signature on the consent form given. The researcher went to the health facility from only Monday to Thursday and only between 07:30am to 11:30am

4.4 Instrumentation

The questionnaire consists of six sections as follows, *Part I* include socio-demographic information that roughly asked research participants about their background; *Part II* of the questionnaire was a measure of adherence to antiretroviral therapy; *Part III* was a measure of depression; *Part IV* was the measure of HIV stigma; *Part V* of the questionnaire was the measure of self-efficacy and *Part VI* was a measure of social support. This questionnaire took approximately 25-35 minutes to complete, however the amount of time spent on the instrument was dependent upon participants' ability to read through and understand questions.

4.4.1 Measures

Five measures were used in this study namely, simplified medication adherence questionnaire, patient health questionnaire, HIV adherence self-efficacy scale, short version of HIV stigma scale and the multidimensional scale of perceived social support.

Simplified Medication Adherence Questionnaire (SMAQ). Simplified medication adherence questionnaire (SMAQ) was used to measure this variable. The SMAQ was firstly formed by Knobel *et al.* (2002), based on the scale created by Morisky to measure adherence levels among patients living with HIV. The SMAQ has 6-items of which four are dichotomous (*yes/no*), whereas one is open (*less/more than two days*), and one is Likert-type (*from never to more than 10 times*). These items were: (1) "Do you ever forget to take your medicine?" (2) "are you careless at times about taking your medicine?" (3) "if at times you feel worse, do you stop taking your medicine?" (4) "Thinking about the last week, how often have you not taken your

medicine?" (5) "Did you not take any of your medicine over the last weekend?" (6) "over the past three months, how many days have you not taken any medicine at all?". These six items (questions) measured three components of adherence to ART namely, unintentional (question 1 and 2), intentional (question 3) and frequency (question 4, 5, and 6). Patients were identified as non-adherent when they reported a positive response to question 1, 2, 3, and 5, as well as more than two times missed doses for question 4 and more than two days for question 6 (Knobel *et al.,* 2002). In the original study the internal consistency reliability of SMAQ was found to be good in a sample of 1797 adults HIV and AIDS male patients in Spain.

The SMAQ exhibited 91% specificity and sensitivity of 72% with Cronbach's alpha internal coefficient of .75 (Knobel *et al.,* 2002). The tool has been used in 12 countries including South Africa (Agala, *et al.,* 2020), which justifies it applicability in this study. However, the researcher delved into the original measure and identified two key dimensions that were missing which were predominantly featured in previous studies on adherence to ART in South Africans. These aspects are lack of food and disclosure of HIV status (Van Dyk, 2010; Mathebula, 2014; Azia *et al.,* 2016; George & MacGrath, 2019). Thus, two additional items with dichotomous response options (yes/no) were included in this standardised scale and both were evaluated by an expert for construct validity: (7) "have you ever gone hungry in the past two weeks?" and (8) "have you ever disclosed your HIV status to anyone?". During the piloting of this study the reliability of this measure was .345 lower than other measures. Even after having collected actual data for the study the reliability of this questionnaire was lower, all 8 items were recoded from (Yes=1 No=2) into (Yes=1 No=0) and the reliability increased to. 464 (Cronbach's alpha).

The Patient Health Questionnaire (PHQ; Kroenke, Spitzer, & Williams, 2001). The PHQ-9 is a self-administered measure for assessing depression severity (Kroenke *et al.,* 2001).

This tool was used to measure this variable. The PHQ-9 has exhibited good psychometric properties with adequate internal reliability. The diagnostic validity of the tool was established in studies involving 6000 patients in seven obstetrical and eight primary healthcare clinics and the score of 10 and above had a specificity of 88% and a sensitivity of 88% for major depressive disorder (Kroenke *et al.,* 2001). A Cronbach alpha of .89 and .86 were established in a study that involved two different patient population (Kroenke *et al.,* 2001). Furthermore, criterion validity was established in the sample of 580 patients through structured interviews conducted by mental health professional (Kroenke *et al.,* 2001).

The instrument has 9-items that assesses severity of depression in the past two weeks with scoring options of a four-point Likert type scale ranging from *not at all* response weighted with (0) to *nearly every day* response with a weight of (3), with other responses weighted orderly. These items were "Little interest or pleasure in doing things 0 *not at all* to 3 *nearly every day"*; "Feeling down, depressed or hopeless 0 *not at all* to 3 *nearly every day*", "Trouble falling asleep, staying asleep, or sleeping too much, 0 *not at all* to 3 *nearly every day*", "Feeling tired or having little energy, 0 not at all to 3 nearly every day", "Poor appetite or overeating, 0 *not at all* to 3 *nearly every day*", "Trouble concentrating on things, such as reading the newspaper or watching television, *0 not at all to 3 nearly every day"*, "Thoughts that you would be better off dead or of hurting yourself in some way, 0 *not at all* to 3 *nearly every day"*. The scores for this instrument ranges from 0 to 24, the highest scores reflect severe depression. During the piloting of this study the reliability of this measure was also low by .413 but after having collected actual data for the study the reliability increased significantly to .768 (Cronbach's alpha).

Short Version of HIV Stigma Scale (HSS; Berger, Ferrans & Lashley, 2001). Berger et al.'s short version was used to measure HIV stigma in this study (Berger *et al.,* 2001). This

shortened version of HSS derived from a commonly used Berger et al.'s (2001) 40-item HIV stigma scale. An original 40-item HSS was evaluated in a Swedish context among PLHIV, however one of items was removed due to low factor loadings and after excluding the item the instrument demonstrated good reliability and validity (Berger *et al.,* 2001). Data derived from a psychometric tests of Swedish 39-item HSS were re-evaluated to construct a short version HSS of 12-items and Cronbach's alpha for all 39-items was .96 while for subscales ranged from .87 to .96 (Berger *et al.,* 2001).

This short version of the tool was psychometrically tested in the study conducted by Reinius *et al.,* (2017), using similar data emanated from the same sample of 1096 Swedish PLHIV partaken in nation-wide across-section survey. This instrument exhibited loss of sensitivity than a full scale in sample of 880 adult (aged 18-82 years) Swedish PLWHA originating from a total of 1096 and Cronbach's alpha for all 12-items was .6 while .7 was for the sub-scales (Reinius *et al.,* 2017). The short version comprises of four subscales intended to measure *concerns with public attitudes, disclosure concerns, negative self-image, and personalised stigma* (Berger *et al.,* 2001).

Similar response format from the full scale was used, thus the scoring options were a four-point Likert type scale ranging from *strongly disagree* response with a weight of (1) to *strongly agree* response with a weight of (4), with other responses weighted chronologically. For each subscale one corresponding item was chosen as an example: *For internalised stigma* "People I care about stopped calling after learning I have HIV". *For disclosure concerns* "I work hard to keep my HIV a secret". *For concerns about public attitudes* "People with HIV are treated like outcasts". *For negative self-image* "feel I'm not as good a person as others because I have HIV". Subscale scores were calculated with a possible range of 3 to 12 after summing up

responses and higher score was indicative of a higher level of perceived HIV stigma and the established internal consistency of this study was .873 (Chronbach's alpha).

HIV Adherence Self-Efficacy Scale (HIV-ASES; Johnson *et al. 2007).* ART adherence self-efficacy was assessed using the HIV-ASES, which has 12-items with 3-point Likert type scale ranging from *not at all confident* response weighted with (0) to *totally confident* response weighted with (3). (Johnson *at al.*, 2007). The instrument was used to measure patients' confidence in performing behaviours related to treatment adherence and durability (Johnson *at al.*, 2007). The examples of the scale items were based on the next main question, *how confident have you been in the past month that you can*: "Stick to your treatment plan even when side effects begin to interfere with daily activities?" 0 *not at all confident* to 3 *totally confident.*"Stick to your treatment schedule even when your daily routine is disrupted" 0 *not at all confident* to 3 *totally confident*. The item scores were summed for each respondent and those with high scores reflected higher ART adherence self-efficacy. In the original study by Johnson *at al.*, (2007) all 12-items were psychometrically assessed for the validation of the intrument with two sample HIV adults enrolled in ART programme. This scale exhibited a robust internal consistency of (ps > .90) and 15 months (rs>.40) and 3 months (sr> .70) test retest reliability (Johnson *at al.*, 2007), justifying it applicability in the current study. On this study the established internal consistency was .888 (Chronbach's alpha).

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet and Farley, 1988). This self-report scale was used to measure perceived social support in the current study (Zimet *et al*., 1988). Originally, the MSPSS was created with 24-items assessing relationships of respondents with family, friends and significant others in the subsequent domains respect (i.e. "people look up to me"), social popularity (i.e. "I receive invitations to be

with others") and items which directly associated with perceived social support (i.e. "I get the help and support I need from my") (Zimet *et al*., 1988). The 5-point Likert type of scale was utilized on this measure for scores on each item extending from *strongly disagree* response (1) to *strongly agree* response (5). Thus, several pilot studies results led to the revision of earlier instrument and to the viability of the present version of MSPSS (Zimet *et al*., 1988).

The current MSPSS has only 12 items intended to measure perceived social support and these items were distributed into factors group pertaining to the source of support namely family, friends, and significant others. Each of these subscales included four items that were rated on a 7-point Likert type scale in a current version ranging from *very strongly disagree* weighted with (1) to *very strongly agree* weighted with (7) because the aim was to reduce the ceiling effect and increase variability (Zimet *et al*., 1988). The sample items were, "I get the emotional help and support I need from my family, *Very strongly disagree (1)* to *very strongly agree (7)"*, "I have a special person who is a real source of comfort to me, *Very strongly disagree* very *(1)* to *strongly agree" (7).*

Zimet *et al*. (1988) assessed the psychometric properties of the current scale and found internal reliability of .88 for all items and .91, .87 and .85 for Friends, Significant Other and Family subscales. The reliability coefficient was also calculated in a sample of 390 Turkish students by using test-retest methods and Cronbach's alpha for three subscale and the whole scale (Duru, 2007). The results confirmed a robust internal consistency coefficient of .87 and the subscales demonstrated high internal reliability respectively as follows, Significant Other .90, Family .85 and Friends support .88 (Duru, 2007). Therefore, the test-retest reliability for the whole scale was .88 and for subscales namely Friends, Significant Other and Family was (.78, .88 and .78) respectively (Duru, 2007). This justifies the applicability of the scale in the current

study. On this study the established reliability score was .852 (Chronbach's alpha).

Reliability of the central study measures. Reliability is "the extent to which results are consistent overtime and accurate representation of the total population under study and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable" (Joppe as cited in Golafshani, 2003, p.597). Bartlett and Frost (2008) posits that, the reliability of a measurement process is also determined by the heterogeneity of the population in which measurements are done. There are three different types of reliability in measurements, for example a good measure should generate highly consistent results across time under similar conditions (test-retest reliability), while on the other hand, it should produce similar results when used by different researchers at also different times (inter-rater reliability) (Bartlett & Frost, 2008).

Moreover, the degree of consistency in participant's responses across individual items (internal consistency) on the scales was tested using Cronbach's alpha procedure with acceptable alpha coefficient threshold of .70 for reliability (Cronbach, 1951; Cortina, 1993). Majority of the central study measures have proved to have been reliable. The HIV adherence self-efficacy scale has 12 items and has a reliability of .888, the patient health questionnaire has 9 items with the reliability of .768, the short version of HIV-stigma scale has 12 items and has a reliability of .873, the simplified medication adherence questionnaire has 8 items and has a reliability of .464 and finally the multidimensional scale of perceived social support has 12 items with the reliability of .852. The reliability statistics of the central study measures are shown on Table 1 below.

Table 1. Reliability coefficients of the central study measures

Name of the scale	Number of items	Cronbach's Alpha α
HIV Adherence Self-Efficacy Scale	12	.888
Patient Health Questionnaire	9	.768
Short Version of HIV Stigma Scale	12	.873
Simplified Medication Adherence Questionnaire	8	.464
Multidimensional Scale of Perceived Social Support	12	.852

4.4.2 Pre-test of survey instrument

Survey questionnaire pretesting is crucial components of survey research process because it gives researcher an invaluable opportunity to reflect and revise a research instrument before many errors begin to magnify at a later stage. Rothgeb (2008) defined pretesting as a method of validating a survey questionnaire (set of questions) on a very small subgroup of the general population.

Survey questionnaire pre-test. The decision of not pretesting the survey instrument poses a potentially serious risk of measurement errors and inaccurate data (Rothgeb, 2008). A complete draft of survey instrument was pretested on three experienced respondents (colleagues) who were able to thoroughly do cross-checking of all questions and improve style of the instrument. The pretesting process was conducted in the same administration procedure that was used in the full-scale study. The researcher used experienced respondents in the pre-test because they were more likely to pinpoint problems and notice errors on the survey questionnaire.

Both pretesting methods were use namely declared and undeclared pre-tests (Babonea &

Voicu, 2008), thus two respondents were part of a declared pre-test and they were asked to provide their viewpoints on the overall format, order and wording of questions. The post pre-test interview was conducted in connection with each question particularly about part one of the instrument (socio-demographic information) with one respondent participated in undeclared pre-test. Few issues were identified by pre-testers related to overly sensitive questions which may cause respondents to skip items, response option in few questions, logical order in items numbering, lengthy time to complete and instructions for each section. Therefore, all these issues were revised and given due consideration prior to the process of translating the instrument due to cross-cultural reasons.

Forward and back translation. The quality of translation is a very critical requirement of the cross-cultural research (Tyupa, 2011). Forward translation is a procedure of converting a text of the survey instrument directly from the source into the target language version, while back translation is a process whereby a translator retranslates a translated text back into the original language version (Tyupa, 2011). The researcher approached two bilingual translators who were proficient in both source and target language versions, one did a forward translation from English (original) into IsiZulu (target) language version while another translator translated IsiZulu version back into English version. The guidelines of back translation were adhered to as the translator who did back translation did not have access to the original text version. Thus, the back translated text was reviewed and compared with the original text to pinpoint inconsistencies and errors which may threatens equivalence of meaning. Therefore, errors and discrepancies detected were revised before conducting pilot study test.

4.4.3 Pilot-test of survey instrument

Pilot test is also known as a feasibility study conducted to test the whole process of the research project (Rothgeb, 2008). A pilot study test is defined as a process of testing the viability of data collection instruments, participant's recruitment strategies, research protocols and other research procedures on a subsample of the target population in preparation for a full study (Zailinawati, Schattner & Mazza, 2006). The pilot study helps identify and address potential issues that would impede the success of the study. Although, the pilot study results might not be meaningful, the preliminary analysis should be carried out merely to test the efficacy and feasibility of the research process through to the last stage (Rothgeb, 2008).

Feasibility of the study protocol. A pilot study was conducted at Philani Family ARV clinic in King Edward VIII Hospital in March 2019. The researcher enrolled a total of 23 adult patients accessing ART, aged 18 and older in the pilot study test. The time taken by the researcher to explain the study and get consent from the participants was approximately 3 to 5 minutes. Data collection procedures encountered some issues with the participants who had a difficulty with reading questions, but this issue was overcame by assisting subjects. To avoid including the same participants partaken in the pilot study to the central study, the researcher asked the potential participants during the recruitment process of the actual study whether had they ever been part of the pilot study instrument test before.

Data management and analysis Data management is an act of dealing with the data by collecting, checking, cleaning, coding, preserving, backing up and entering it into the computer software (Neuman, 2014). Data collected from 23 participants were entered by the researcher directly into the Statistical Package for Social Sciences (SPSS) program. Thus, data entry was

carried out using specific codes for each item on the questionnaire. Data were cleaned and imputed for missing values by using univariate statistics on SPSS version 25.

Testing the measurement instrument. The pilot study respondents took on average approximately 25-35 minutes to complete the survey questionnaire. Some items/questions were missed by some respondents when they all attempted to complete all questions. This was deemed to be due to that questions were closely separated, and some respondents were in hurry to head back home after they had met with the doctors. Respondents faced no difficulty in understanding questions because items were pretested and translated into the widely spoken language prior to the pilot study test. However, slight discrepancy was observed with item number 11 on the scale measuring adherence to ART in part two of survey instrument.

Reliability of measurement scales. Leavy (2017) defines reliability as a magnitude of consistency shown when study measures are repeated under the same condition. The internal consistency of individual items on the survey instrument was measured utilizing Cronbach's alpha coefficient technique (Cronbach, 1951). Majority of scales used in the pilot study test demonstrated an acceptable reliability. The short version of HIV stigma scale has 12 items and has showed reliability of .841, HIV adherence self-efficacy scale has 12 items and has established reliability of .940, the multidimensional scale of perceived social support has 12 items with the reliability of .793, the patient health questionnaire has 9 items with the reliability of .413 and lastly the simplified medication adherence questionnaire has 8 items and has established reliability of .345.

4.5 Data management and analysis

Data analysis is a process of scrutinising, structuring, cleansing, modeling and transforming data with the aim of finding invaluable information and draw inferences after using several

approaches, comprising of various techniques (Neuman, 2014). Thus, this study used statistical analysis which focused mainly on the use of statistical modelling of data for predictive purposes rather than only descriptive purposes. The model of the study consisted of two predictor variables (HIV stigma and depression), and two mediator variables (self-efficacy and social support), and one outcome variable (adherence to ART). The data collected was entered using specific assigned codes for an individual item on the instrument, as well as cleaned and analysed using Statistical Package for Social Sciences (SPSS) software program (Muijs, 2010). This software package was suitable for this study as it enabled for the researcher to manage and perform complex statistical analyses by using statistical techniques such as descriptive statistics, bivariate analysis, regression analysis and mediation analysis utilising Sobel test for indirect effect.

Before continuing with the analysis, a quality check on dataset was carried out to ensure that the data is clean through handling properly the missing data. Random and non-random missing data was checked as one of the first steps in cleaning the dataset. Thus, the random missing data is unavoidable because it usually happen for a participant to miss or choose not to answer the questions, whereas non-random missing data can substantially subvert the validity of the results of the analysis (Tabachnick & Fidell, 2013). For all variables, the percentage and frequency distribution were done to observe if there were random or non-random missing data that needed to be handled properly in variable cases. Therefore, only few cases were subject to elimination due to the issue of incongruent and missing data in this study.

The preliminary analysis of the cleaned dataset was done to detect if the continuous predictor and mediator variables were normally distributed. Univariate statistics were used to assess the percentage difference in participants' socio-demographic characteristics. Further, since

the outcome variable was coded dichotomously Pearson's Chi-Square test was used to test independence between categorical variables and logistic regression procedure was used to assess whether the mediator variables added to the significance of predicting the odds of the outcome variable.

4.6 Ethical considerations

Ethical principles are crucial basis for conducting ethical research (Ahmad, 2018). Babbie (2007) defines ethics as a set of principles that offer behavioural rules and expectations suggested by an individual or a group about good practice or conduct towards human research subjects, employers, fellow researchers, students and other population groups. Thus, this research demonstrated special protection and maximum care for subjects by ensuring compliance with different ethical standards notable in every research process involving human subjects.

Human subject's protection. The researcher was cognisant of the potential psychological harm may be triggered by the disclosure of personal and sensitive information related to HIV and AIDS as this sub-segment of the general public is deemed as vulnerable population. To mitigate such harms, this research underwent full ethical approval process of the University of KwaZulu-Natal and Health Research Committee of KwaZulu-Natal Department of Health. Moreover, confirmation and permission letter (gatekeeper) from King Edward VIII tertiary Hospital where participants were recruited was received before the commencement of research fieldwork. (See appendix C & D).

Risks and benefits of participating in the study. The essential ethical rule of every research is that it must bring no harm to the participants (Babbie, 2007). The research participants can encounter either emotional or physical harm. Babbie (2007) posit that emotional harm encountered by research participants is commonly difficult to determine and to predict than

physical harm. The participants in this study were informed and assured by the researcher that there would be no social and physical risks that the study may possibly pose, however due to the nature and sensitivity of the topic psychological and emotional risks may occur. Participants were also informed that there would be psychosocial mechanisms in place to address any emotional and psychological distress that may take place as appropriate referrals could have been made because there were medical social workers and psychologists within the hospital setting. This therefore afforded the participants an opportunity to have a choice of whether to retain or withdraw from the research study if they at any stage felt uncomfortable. No emotional harm surfaced or reported in this research study and the data collection process took place at King Edward VIII Hospital where participants normally come to receive ART services. Another benefit is that the study findings would be made available to the hospital and thus inform policies and support improvement of adherence to ART among patients receiving ART.

Informed consent. The process of informed consent is essential in attaining fundamental ethical principles to protect human participants these principles include justice, beneficence, and respect for participants (Ahmad, 2018). The informed consent contains information in a comprehensible language to the research participants, the aim of the research, as well as anticipated length of the study, the procedures that will be carried out during the study, possible disadvantages, benefits and risks to which the research subjects may be prone and veracity of the researcher (Babbie, 2007). Ahmad (2018) further state that the informed consent should include the purpose of the research, understanding of voluntary participation, ratio of benefits and risks, confidentiality of participants' information and procedures necessary throughout the research.

Moreover, prior to the recruitment of participants, the informed consent form and study questionnaire were both sent to the relevant managers in the Hospital and Philani Family ARV

clinic for screening and approval. Therefore, as per managers' feedback they screened and approved both. The informed consent forms were distributed to all potential participants and it informed the participants mainly about the duration of involvement, purpose of the research, their rights, benefits and dangers when participating in the study, who was eligible to access to the information provided by them and for what purpose, the opportunity to ask questions mainly before and maybe after participating, (See appendix A). Thus, choice to participate in the study was purely voluntary and all participants who decided to be part of the study demonstrated their consent through their signature on informed consent forms. All participants signed the informed consent forms before participating in the study.

Voluntary participation and privacy. De Vos, Strydome, Fouche and Delport (2011) post that participation of research subjects should always and at any stage be voluntary and that no one should be influenced or coerced in partaking in the study. In effort to ensure and facilitate voluntary participation in this study the participants were informed about their rights, purpose of the study, potential risks, benefits, and research procedures prior to participation. Furthermore, signed informed consent forms were obtained from all participants who were willingly desired to be part of the study. In addition, during the interviews, participants were allowed the decision to not answer the question (s) which made them feel uncomfortable. This process allowed for voluntary participation as participants had a chance to make an informed decision on whether to participate in the study or not.

On the other hand, De Vos *et al.* (2011) define privacy as anything that is not often intended for other people to see and analyse. In this study the issue of privacy was important, but all patients who were at the facility were there for the same reason, which did not pose much threat to participant's privacy as for instance, the sitting arrangement at the clinic was dispersed,

thus, no one else could see what was written on the questionnaire administered by research participants.

Deception of respondents/subjects. De Vos *et al.* (2011) define deception as deliberate concealment of correct information or providing falsified information in a manner of encouraging participants' participation when they would have probably refused to participate. In this study the deception of the study subjects was avoided, and transparency was ensured about the overall information outlined regarding the research study.

Anonymity and confidentiality. Anonymity is defined as the way of ensuring that the identity of research respondents is unidentifiable while confidentiality refers to the handling of one's information in private manner through agreement made that restrict others from accessing confidential information (De Vos *et al.*, 2011). There participants were informed that information obtained from them will be only accessed by the research supervisor, and the researcher. The codes were used instead of names on the survey questionnaires as participant's identification for the purposes of protecting the exposure of their identity. Furthermore, due to the special protection and maximum care required by this vulnerable population, confidentiality and anonymity were ensured through electronic storage and coding of dataset, which satisfied the highest standards of data encryption. In addition, concerns of confidentiality were addressed by using all completed questionnaires for only research purposes and questionnaires were all kept confidential.

Dissemination and publication of findings. The researcher has ensured that the final report contains genuine and accurate information as well as non-misleading findings. The electronic and hard copy of the final report was sent to King Edward VIII Hospital and to the head office of KwaZulu-Natal Department of Health. The researcher also ensured that the final

report was clear and entails all relevant as well as useful information for publication (De Vos *et al.*, 2011).

Actions and competence of researchers. Researchers have an ethical obligation to ensure that they are honest, competent, and sufficiently skilled to conduct research (De Vos *et al.*, 2011). The utilisation of survey questionnaires and research scales constructed by reputable researchers had improved the researcher's competence as well as the collection of reliable and valid data for this research. The researcher demonstrated his competence by designing, conducting, analysing, and producing a good quality of research that was scientifically and ethically grounded. This research effort acknowledged a cross-cultural difference in the target population by translating a pretested research instrument into a culturally appropriate language in order to gather an accurate and rich data.

4.7 Limitations of the study

Limitations exist in every research, even though the study is carefully planned (De Vos *et al.*, 2011), as a result they need to be clearly specified. Study limitations are potential weakness which are largely out of researcher's control and are closely related to the preferred research design, funding constraints, statistical model constraints and other factors which may affect the results and conclusions of the study (Dimitrios & Antigoni, 2019). Therefore, strengths and limitations of this research are clearly acknowledged and further discussed below.

There are notable strengths of this research. The study utilized a revolutionary tool that has a set of software programs incorporated into one package (SPSS). This statistical software program allowed for analysis of scientific data related to social sciences through application of several statistical techniques clustered in this single statistical software package. The software handled and operated data easily and allowed for analysis of the relationships between different

variables central to this study in a single model for predictive purposes. The sample size of this study was sufficient in assuring adequate power for the detection of statistical significance which therefore assured accuracy of the results and conclusions.

It is therefore imperative to explicitly acknowledge rather than ignore the limitations of this study when interpreting the findings. Polit and Beck (2010) state that a deeper understanding of the limits of generalisability in the study is essential in cases where political, cultural, and geographical difference exist. In addition, study findings which are based on random samples are thought to be generalisable to the larger population (Polit & Beck, 2010). Thus, the response rate was laudable in this study however the sample of the study may not have been adequately representative of the larger population as participants were not selected using random sampling method. Therefore, this suggest for further research to be carried out in a larger scale to extend the scope of the study to include sample population from different areas.

Joppe (2000) stated that using pre-validated scales with a known reliability does not guaranteed that the research would be free from potential pitfalls. The validity and reliability of the scale may be known however the instrument may have limitations in terms of measuring what it aims to measure (Validity). This study also was limited in its ability to establish causal effect between variables central to the study and provide causal inference (external validity) outside the study location to all adult PLWHA in South African.

Furthermore, this study utilised self-report questionnaires with sensitive nature of items that relied on truthful responses to draw the meaningful conclusions. Johnson and Fendrich (2005) state that social desirability response bias is the tendency for research participants to display the desirable image of themselves which later affect the validity of the instrument. The socially desirable responding is most likely to take place when participants are responding to

items that are socially sensitive. Thus, there was a possibility that the self-report measures used were subject to socially desirable responses as participants may have believed that the information, they provide should achieve socially acceptable values.

Another limitation of this study design involves cross-sectional research approach employed to obtain information from data collected for a specific point in time. The cross-sectional data cannot be used to determine the causal effect between variables and to analyse behaviours (i.e., adherence to ART) over time (Leavy, 2017). Furthermore, the respondents were required to provide information on the past behaviours (adherence to ART) thus, the concern with this was the recall bias that threatened the provision of genuine responses (Neff, 2012).

The time-locations sampling technique used in this study was considered as an additional limitation of this study due to the problem of biased estimates in terms of proportions of participants covered by the study, the length of the sampling time and the representativeness of the selected sample to the larger population (Leon *et al*, 2015). Individuals of target population visit the location at certain time units, and the probability of the healthcare centre was proportional and unique to an available daily average number of patients attended the healthcare facility. Thus, this technique did not allow for the random selection of the unit in order to reduce selection biases and the variance was thus underrated.

A conceptual inaccuracy does take place during the process of translating the survey questionnaire. It could possibly occur that when the translation was performed the translator did not only translate the literal meaning of the words but also how words fits well conceptually in the context (Tyupa, 2011). The conceptually incorrect meaning of the words may occur when the translation of the questionnaire is poorly done. Erroneous translation subject the study to

generate biased results which thereby subvert the trustworthiness of the study. The issues of translation and back-translation have been acknowledged as inherent limitations of this study.

4.8 Summary

The literature has shown that, adherence to ART advances over time while the influence of psychosocial factors may persist. Therefore, there is a need for additional research to be conducted on a large-scale to confirm whether or not the interactive mechanisms of psychosocial factors do predict the odds of adherence to ART in South Africa. The next chapter presents the results of a statistical analysis in line with the objectives of the study.

CHAPTER FIVE: RESULTS

A quantitative research approach was used to investigate the relationship between depression, HIV stigma, self-efficacy, social support, and adherence to ART. This chapter presents the results of the statistical analysis performed in relation to the objectives of the study and the hypotheses tested. The analysis of data was carried out at two stages, the first stage was the presentation of demographic data and the second stage was the analysis of the research questions. The first stage of analysis presents descriptive data entailing socio-demographic influences/factors such as age, sex, highest level of education, and employment status. The second stage of the analysis yields the results of bivariate analysis which includes cross-tabulations with chi-square test of independence, as well as correlational analysis. Thus, the chapter ends by presenting the results of binary logistic regression analysis. All findings that were equals to or fell below the established alpha level of 0.05 were considered statistically significant.

5.1 Univariate statistical analysis

Univariate statistics are type of information displayed in few words to describe basic feature of the data in the study namely frequencies, mean, median, mode, variance, standard error, range, percentiles and standard deviations (Grey & Kinnear, 2012). The univariate procedure is a simple form to analyze and present data for only one variable in a single table or graphical representation.

5.1.1 Socio-demographic characteristics of the participants

A total of 201 participants completed the questionnaires were both males and females, Figure 2 presents age distribution of participants. The mean age as shown in the graph was 39.28

[(standard deviation (SD) 12.115] with a range of 18 to 75 years, the mode age was 43 and median age was 41. Age groups by percentage was 18-24 years 14.9% (n= 30), 25-35 years 18.4% (n=37), 36-45 years 30.3% (n=61), 46-55 years 19.9% (n=40), 56-65 years 8.0% (n=16) and 66+ years 8.5% (n=17). Majority of participants were between the ages of 36-45 years (30.3%).

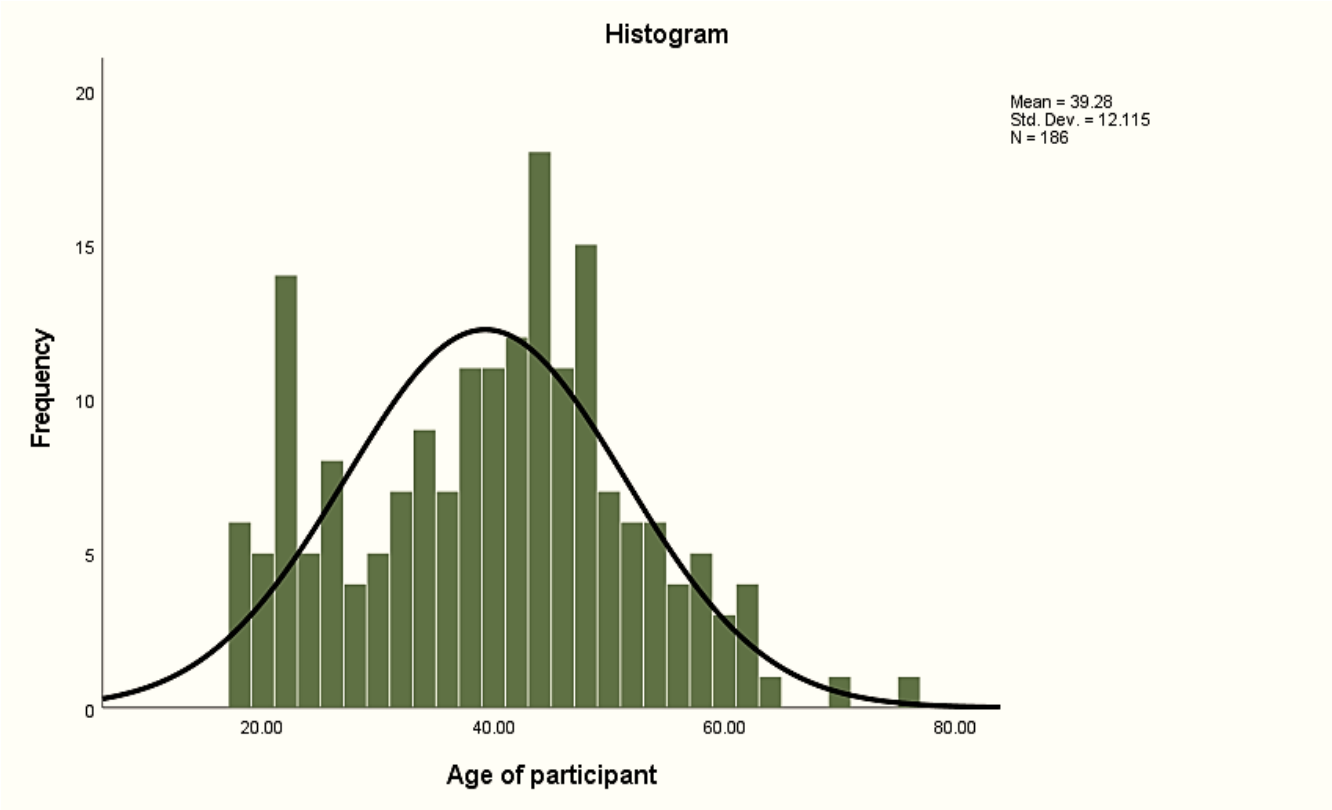

Figure 2. *Age distribution of participants (N=186)*

As shown in Table 2, majority of the participants were females 71.0% (n=142), while males were 29.0% (n=58). The participants from the study comprised of African population group only 100% (n=201). Regarding the marital status of the participants it is shown below in

table 3 that never married participants were 74.2% (n=147), married participants were 18.2% (n=36), divorced participants were 3.0% (n=6), widowed participants were 2.5% (n=5), and separated participants were 2.0% (n=4).

Table 2. Participants' sex, population group, and marital status

Demographics	Frequency	%
Sex		
Female	142	71.0
Male	58	29.0
Population Group		
African	201	100.0
White	0	0.0
Indian/Asian	0	0.0
Coloured	0	0.0
Other	0	0.0
Marital Status		
Never married	147	74.2
Married	36	18.2
Divorced	6	3.0
Widowed	5	2.5
Separated	4	2.0

As shown in Figure 3 the highest levels of education of participants were as follows, 8.0% (n=16) participants reported to have never had education, whilst 17.9% (n=36) of participants had primary education, 48.3% (n=97) of participants had secondary education, and 23.4% (n=47) participants had tertiary education. Almost half of the participants were secondary shool educated which may possibly be suggestive of adequate ability of participants to understand the benefits, jeopardies, and potential consequences of not adhering to ART. (See figure 3).

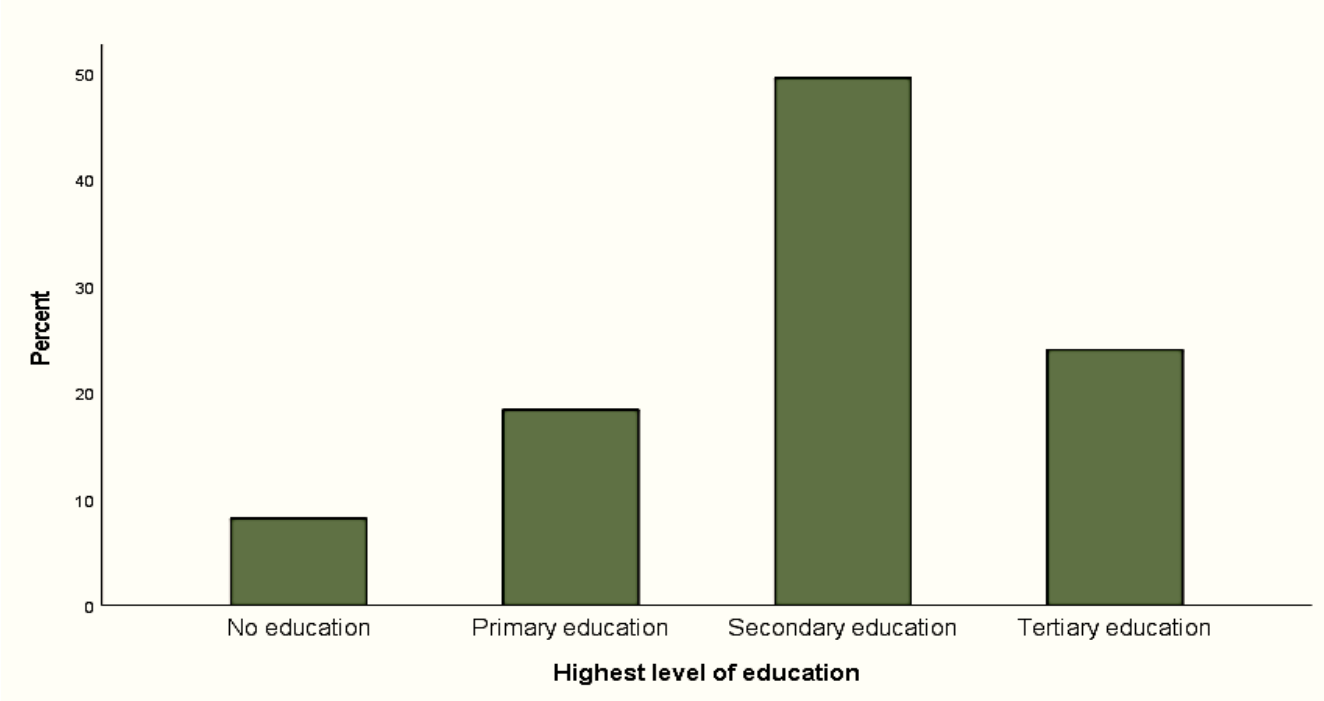

Figure 3. *Highest level of education of participants (N=196)*

Figure 4 depictcts employemt status of the participant. As shown, unemployed participants were 65.7% (n=132), while formally employed participants were 20.4% (n=41), self-employed participants were 11.9% (n=24), and retired participants were 1.0% (n=2). Majority of participants were unemployed, and this is very likely to impact on adherence to ART pertaining to regular clinic attendance and adequate food to take with the treatment (Kitshoff & Naidoo, 2012).

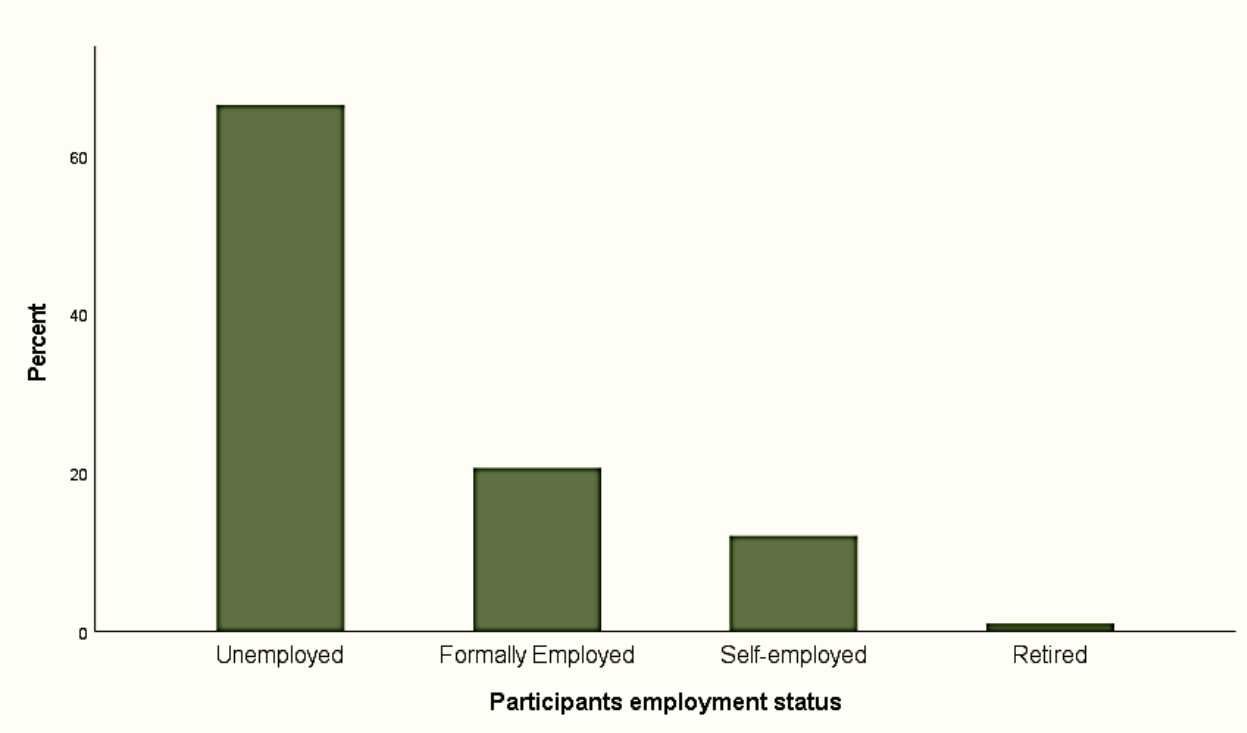

Figure 4. Employment status of participants (N=199)

Figure 5 presents participants' areas of residence and all participants resided predominantly in Durban areas that were close to the hospital where they received ART from. Majority of whom were from North Durban 28.6% (n=44), followed by West of Central Durban 18.8% (n=29), South of Central Durban 16.2% (n=25), Durban Central 14.3% (n=22), South Durban 13.6% (n=21), Inner West of Durban 5.8% (n=9) and Outer West of Durban 2.6% (n=4).

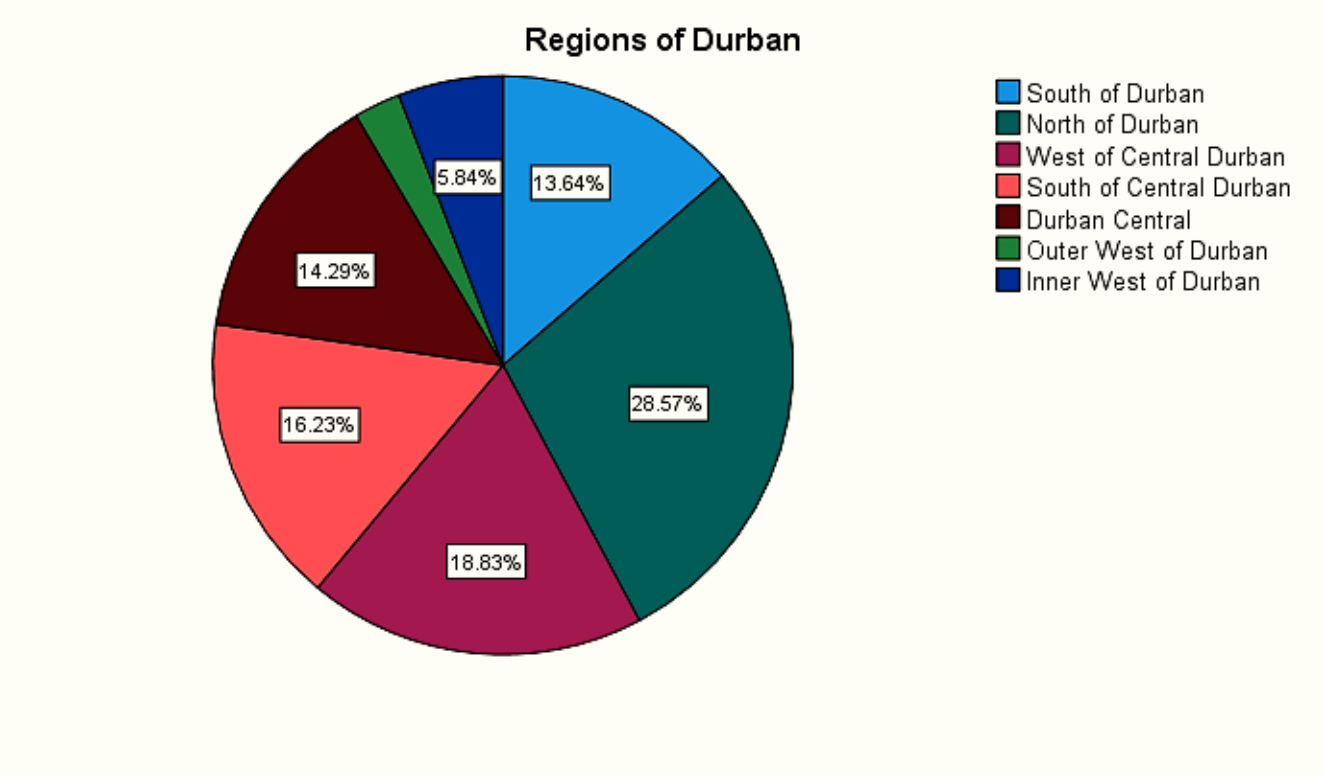

Figure 5. Area of residence of participants (N=154)

Figure 6 shows the religious groups of participants, and majority of them identified with Christianity 80.9% (n=161), followed by participants with no religion 10.1% (n=20), participants reported other were 8.0% (n=16), only one participant 0.5% (n=1) identified with religion of Hinduism as well as one partcipants 0.5% (n=1) reported Muslim region.

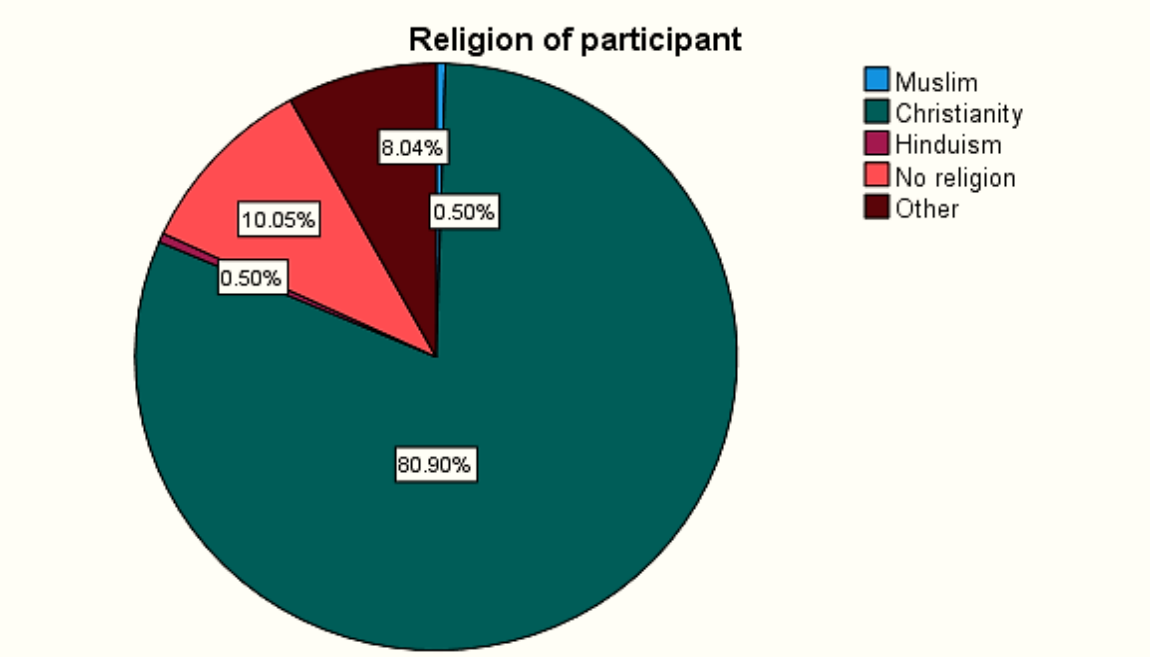

Figure 6. Religion of participants (N=199)

Figure 7 depicts estimated monthly income of participants, majority of participants were receiving monthly income below R3000, 78.0% (n=135), followed by participants received monthly income rages from R3000-R6000, 18.5% (n=32), R6001-R10 000 were 1.7% (n=3), and more than R10 000 were 1.7% (n=3).

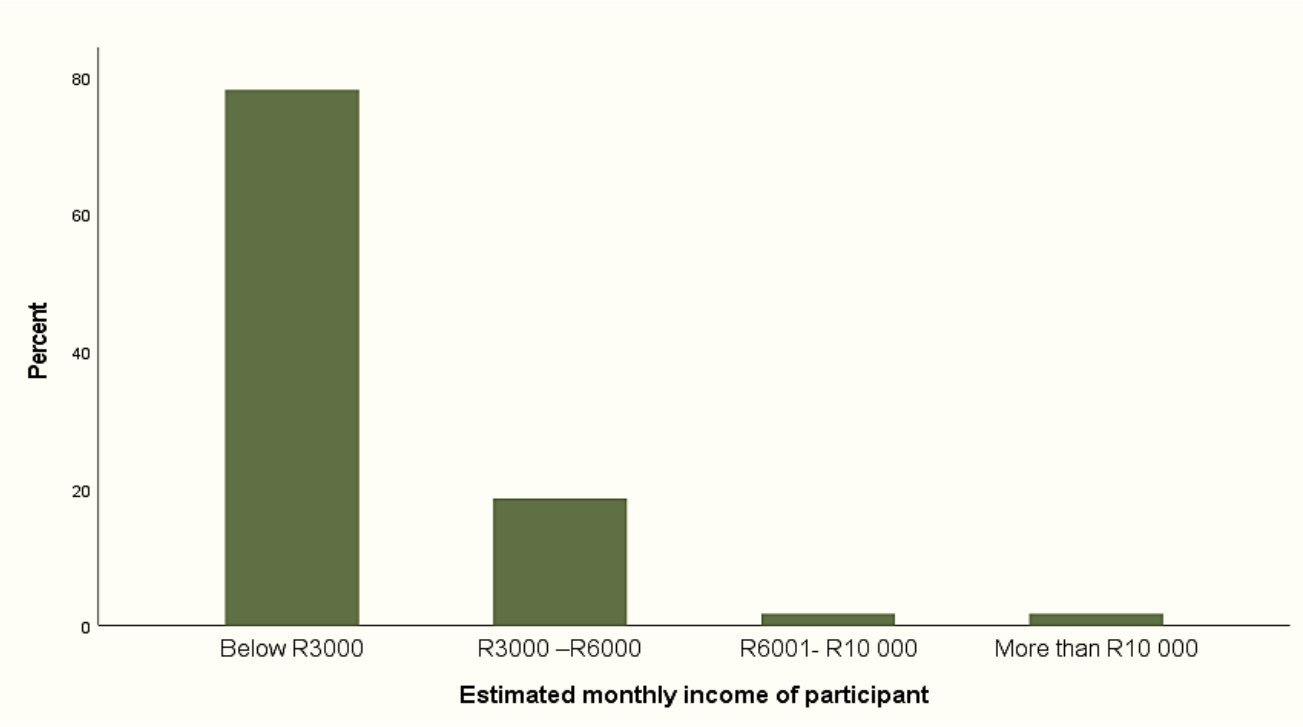

Figure 7. Estimated monthly income of participant (N=173)

5.1.2. Extent of adherence to antiretroviral therapy

As shown in Table 3, the mean value of participant's adherence to ART was 6.23, with a standard deviation of 1.33 which indicated that the approximate average deviation between individual value and average value was 1.33. Similarly, the variance was 1.76 which showed that the average squire deviation between individual values and mean was very trivial. Median of participant's adherence was 6.0 indicated that 50% of observations of the data were either equal to or less than 6.0 of adherence to ART and the rest of 50% of observations were either more than or equal to 6.0 of adherence to ART. Out of 201 participants, the frequency of high adherence to ART was 53.7% (n=108) and low adherence was 46.3% (n=93). Therefore, the

difference in frequency between these two groups of adherences was not substantial because the high adherence group was slightly greater than low by only 7.4%.

Table 3. Measures of central tendency for Adherence to ART (N=201)

Variable			Adherence			
			High Adherence		Low Adherence	
Mean	**SD**	**Median**	N	%	N	%
6.2289	1.32942	6.000	108	53.7	93	46.3

Table 4. Frequency distribution of adherence to ART

Items	Frequency	Valid Percent
1. Do you ever forget to take your medicine?		
No	82	41.0%
Yes	118	59.0%
2. Are you careless at times about taking your medicine?		
No	157	82.6%
Yes	33	17.4%
3. If at times you feel worse, do you stop taking your medicine?		
No	183	92.0%
Yes	16	8.0%
4. Thinking about the last week. How often have you taken your medicine?		
Never	8	4.0%
1-2 times	20	10.5%
3-5 times	20	10.5%
6-10 times	102	53.4%
More than 10 times	14	21.5%
5. Did you not take any of your medicine over the last weekend?		
No	153	80.5%

Yes	37	19.5%
6. Over the past 3 months, how many days have you not taken any medicine at all?		
More than 2 days	36	21.8%
Less than 2 days	129	78.2%
7. Have you ever gone to bed hungry in the past 2 weeks?		
No	146	72.6%
Yes	55	27.4%
8. Have you ever disclosed your HIV status to anyone?		
No	27	13.4%
Yes	174	86.6%

5.1.2 Means, standard deviations, modes, and medians for all predictor variables

Table 5 presents results of descriptive statistics of all continuous predictor and mediator variables based predominantly on measures of dispersion and that of central tendency. Mishra, Pandey, Singh, Gupta, Sahu and Keshri (2019) defines mean as arithmetic average value of dataset which can be calculated through by diving the sum of observations by their total number. Whereas standard deviation is a measure of variance around the mean (Mishra *et al.*, 2019). According to Table 4 the mean and standard deviation values across those completed the scales were as follows, for depression the mean was 7.05 (SD=5.36), for HIV stigma was 23.16 (SD=7.06), for self-efficacy was 29.24 (SD=9.39), and for social support was 64.20 (SD=19.67). The mean and standard deviation values for self-efficacy, HIV stigma and social support were greater than that of depression indicating that the participants reported relatively good social support, self-efficacy, and high levels of perceived HIV stigma. The mode for social support was 84.00, for HIV stigma was 25.00, for self-efficacy was 36.00 and for depression was 3.00.

Table 5. Means, standard deviations, modes, and medians for all predictor variables (N=191)

Scale	Mean	Standard Deviation	Mode	Median
Depression	7.0524	5.35551	3.00	6.0000
HIV-Stigma	23.1623	7.06272	25.00	23.0000
Self-Efficacy	29.2408	9.38614	36.00	33.0000
Social Support	64.2042	19.66924	84.00	69.0000

5.1.3 Normality tests of the central study variables

The normality of data was assessed since it a precondition for several statistical procedures, and as a fundamental assumption all parametric tests requires that the data be normally distributed. The values of skewness and kurtosis were employed to assess the normality of data along with other two broadly used methods of normality test namely Kolmogorov-Smirnov test and Shapiro-Wilk test. Skewness is a measure of asymmetry of a normal distribution of dataset, while kurtosis is a measure of the degree to which observations knot around the central point (peakedness) (Grey & Kinnear, 2012; Mishra *et al.*, 2019). Shapiro-Wilk test was the most appropriate method since it can handle medium sized samples of at least 50 or less than 2000, and for both test methods null hypothesis was rejected when the *p*- value was greater than 0.05 (Mishra *et al.*, 2019). Furthermore, a z-test was also applied for confirmatory purposes, and to obtain the Z-scores for each variable the starndard error values were divided by using the values of skewness and kurtosis, respectively. The sufficient normality of distribution was established

within the z value of -1.96 and + 1.96 (Mishra *et al.*, 2019).

Table 6 describes the test of normality for adherence, and the Shapiro-Wilk test p-value was .000. Thus, the results indicate that the data for adherence were not normally distributed, and the critical ratio (Z-value) for skewness (-3.272) was not within the predetermined critical value of ±1.96. The null hypothesis was not rejected, and non-parametric tests were appropriate to analysing data.

Table 6 Test of normality: Adherence

Tests of Normality						
	Kolmogorov-Smirnov[a]			**Shapiro-Wilk**		
	Statistic	df	Sig.	Statistic	df	Sig.
Adherence Sum Score	.178	191	.000	.915	191	.000
	Skewness			**Kurtosis**		
	Value	SE	Z	Value	SE	Z
	-.576	.176	-3.272	-.031	.350	-0.088

a. Lilliefors Significance Correction, SE: Standard Error, Z: Critical value

Table 7 describes the test of normality for depression, and the Shapiro-Wilk test p-value was .000. Therefore, the results indicate that the data for depression were not normally distributed, and the critical ratio (Z-value) for skewness (4.846) was not within the predetermined critical value of ±1.96. The null hypothesis was retained.

Table 7. Test of normality: Depression

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Depression Sum Score	.111	191	.000	.936	191	.000
	Skewness			Kurtosis		
	Value	SE	Z	Value	SE	Z
	.853	.176	4.846	.449	.350	1.282

a. Lilliefors Significance Correction, SE: Standard Error, Z: Critical value

Table 8 describes the test of normality for HIV stigma, and the Shapiro-Wilk test p-value was .002. Thus, the results suggest that the normality was not assumed for this data, and the critical ratio (Z-value) for kurtosis (3.017) was not within the predetermined critical value of ± 1.96. The null hypothesis was not rejected.

Table 8. Test of normality: HIV-stigma

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
HIV-Stigma Sum Score	.088	191	.001	.975	191	.002
	Skewness			Kurtosis		
	Value	SE	Z	Value	SE	Z
	.287	.176	1.630	1.056	.350	3.017

a. Lilliefors Significance Correction, SE: Standard Error, Z: Critical value

Table 9 describes the test of normality for self-efficacy, and the Shapiro-Wilk test p-value was .000. Therefore, these results suggest that the normality was also not assumed for this data, and the critical ratio (Z-value) for skewness (-5.676), and kurtosis (6.688) were not within the predetermined critical value of ±1.96. As a result, the null hypothesis was not rejected.

Table 9. Test of normality: Self-efficacy

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Self-Efficacy Sum Score	.225	191	.000	.812	191	.000
	Skewness			Kurtosis		
	Value	SE	Z	Value	SE	Z
	-.999	.176	-5.676	2.341	.350	6.688

a. Lilliefors Significance Correction, SE: Standard Error, Z: Critical value

Table 10 describes the test of normality for social support, and the Shapiro-Wilk test p-value was .000. Therefore, these results indicate that the normality was not assumed for this data, and the critical ratio (Z-value) for skewness (-3.94), and kurtosis (5.537) were not within the predetermined critical value of ±1.96. As a result, the null hypothesis was not rejected.

Table 10. Test of normality: Social support

Tests of Normality						
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Social Support Sum Score	.152	191	.000	.897	191	.000
	Skewness			Kurtosis		
	Value	SE	Z	Value	SE	Z
	-.695	.176	-3.94	1.938	.350	5.537

a. Lilliefors Significance Correction, SE: Standard Error, Z: Critical value

5.2 Bivariate analyses

Bivariate analysis is a type of quantitative procedure which involves analysis of only two variables typically denoted as independent and dependent variables for the reason to determine empirical relationship between them (Grey & Kinnear, 2012).

5.2.1 Correlations among central study variables

The hypothesized model of the central study variables explored the relationship among depression, HIV stigma and adherence, as well as the mediating effect of self-efficacy on depression and adherence and the mediating effect of social support on HIV stigma and adherence. These hypothesized relationships were displayed in the model (See figure 1, in the previous chapter).

Table 11. Correlation matrix among central study variables

	Adherence	Depression	HIV-stigma	Self-Efficacy	Social Support
Adherence	---	-.314**	-.119	.140	.136
Depression	-.314**	---	.360**	.045	-.009
HIV-stigma	-.119	.360**	---	.084	-.048
Self-Efficacy	.140	.045	.084	---	.424**
Social Support	.136	-.009	-.048	.424**	---

**. Correlation is significant at the 0.01 level (2-tailed).

Correlation among the central study variables

Since all measures of central study variables were outside of the limits of normality (see Table 6 up to 10), a nonparametric tests were an appropritate procedures to use as such the Spearman's rank order correlation coefficient was performed to examine the association among central study variables. According to Table 13 the Spearman's rho indicated that there was a significant inverse association between depression and adherence (r_s = -.314, p < .001). Depression is generally thought to influence the degree of adherence to ART (Sin & DiMatteo, 2014; Ngum *et al*., 2017), this is in support of the results of this study, indicating a significant correlation between these two variables. Similarly, in the study conducted by Umar *et al.* (2019) depression was found to be significantly and negatively correlated with adherence to ART.

Conversely, there was a non-significant inverse correlation between HIV stigma and adherence to ART (r_s = -.119, p > .095), indicating minimal relationship between these variables. However, several studies have confirmed a significant correlation between HIV stigma and

adherence to ART (Martinez *et al.,* 2012; Mao *et al.,* 2017; Nurfalah *et al.,* 2019; Umar *et al.* 2019). Thus, findings shown herein were not supportive of a consistent relationship between HIV stigma and adherence to ART, therefore null hypothesis was retained. Self-efficacy was significantly and positively correlated with adherence to ART ($r_s = .140$, $p < .051$), while social support fell short of statistically significance, but was positively correlated with adherence to ART ($r_s = .136$, $p > .057$).

In summary, the strength of the relationships (effect size) across all the scales was not sufficiently large (Cohen, 1988), however, this was supportive of the subsequent stage of analysis namely logistic regression because it assumes that independent variables should not be highly correlated with each other (little or absence of multicollinearity).

5.2.2 Test of independence of demographic and predictor variables with adherence to ART

The cross-table 12 presents, the percentage distributions on the observed data among variables age and adherence. As shown in the contingency table below the age group 36-45 years had most participants, 55.7% (n=34), with low adherence than participants, 44.3% (n=27), with high adherence. Most participants with high adherence were observed than those with low adherence on the following age groups, for age 18-24 years, 73.3% (n=22), for 25-35 years, 56.8% (n=21), for 46-55 years, 60.0% (n=24), and for 66 and above, 52.9% (n=9). The Pearson's chi-squire test result indicated that there was no statistically significant difference between age and adherence to ART ($\chi 2$ (5) = 10.86; p > .054).

Table 12. Crosstabulations of age category with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
Age Group	18-24	Count	22	8	30
		Expected Count	16.1	13.9	30.0
		% within Age Group	73.3%	26.7%	100.0%
		% within Adherence	20.4%	8.6%	14.9%
		% of Total	10.9%	4.0%	14.9%
	25-35	Count	21	16	37
		Expected Count	19.9	17.1	37.0
		% within Age Group	56.8%	43.2%	100.0%
		% within Adherence	19.4%	17.2%	18.4%
		% of Total	10.4%	8.0%	18.4%
	36-45	Count	27	34	61
		Expected Count	32.8	28.2	61.0
		% within Age Group	44.3%	55.7%	100.0%
		% within Adherence	25.0%	36.6%	30.3%
		% of Total	13.4%	16.9%	30.3%
	46-55	Count	24	16	40
		Expected Count	21.5	18.5	40.0
		% within Age Group	60.0%	40.0%	100.0%
		% within Adherence	22.2%	17.2%	19.9%
		% of Total	11.9%	8.0%	19.9%
	56-65	Count	5	11	16
		Expected Count	8.6	7.4	16.0
		% within Age Group	31.3%	68.8%	100.0%
		% within Adherence	4.6%	11.8%	8.0%
		% of Total	2.5%	5.5%	8.0%
	66+	Count	9	8	17
		Expected Count	9.1	7.9	17.0
		% within Age Group	52.9%	47.1%	100.0%
		% within Adherence	8.3%	8.6%	8.5%
		% of Total	4.5%	4.0%	8.5%

The cross table 13 shows, the results of adherence by sex of participants, as shown in the table, 55.6% (n=79), of females and 50.0% (n=29), of males reported high adherence while 44.4% (n=63), of females and 50.0% (n=29), of males reported low adherence to ART. Therefore, majority of participants were females than males in both groups high and low adherence. Furthermore, the Pearson's chi-squire test results show that these two variables were independent indicating no significant statistical difference between sex and adherence ($\chi 2$ (1) = .526; p > .468).

Table 13. Crosstabulations of sex of participants with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
Sex of participant	Female	Count	79	63	142
		Expected Count	76.7	65.3	142.0
		% within Sex of participant	55.6%	44.4%	100.0%
		% within Adherence	73.1%	68.5%	71.0%
		% of Total	39.5%	31.5%	71.0%
	Male	Count	29	29	58
		Expected Count	31.3	26.7	58.0
		% within Sex of participant	50.0%	50.0%	100.0%
		% within Adherence	26.9%	31.5%	29.0%
		% of Total	14.5%	14.5%	29.0%

The cross table 14 presents the results of adherence by participants' highest level of education. As depicted in the contingency table, 52.6% (n=51), of participants with low adherence were more than those with high adherence 47.4% (n=46) at secondary level of education. However, based on the cross table majority of participants with high adherence were

observed than those with low adherence on the following educational levels, for primary education, 63.9% (n=23), and tertiary education, 53.2% (n=25), respectively. Furthermore, 62.5% (n=10), of participants with no education had high adherence and were more than those with low adherence 37.5% (n=6). The Pearson's chi-squire test results indicate that there was no significant statistical difference between participants' highest level of education and adherence ($\chi 2$ (3) = 3.505; p > .320).

Table 14. Crosstabulations of highest level of education of participants with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
Highest level of education	No education	Count	10	6	16
		Expected Count	8.5	7.5	16.0
		% within Participants' level of education	62.5%	37.5%	100.0%
		% within Adherence	9.6%	6.5%	8.2%
		% of Total	5.1%	3.1%	8.2%
	Primary education	Count	23	13	36
		Expected Count	19.1	16.9	36.0
		% within Participants' level of education	63.9%	36.1%	100.0%
		% within Adherence	22.1%	14.1%	18.4%
		% of Total	11.7%	6.6%	18.4%
	Secondary education	Count	46	51	97
		Expected Count	51.5	45.5	97.0
		% within Participants' level of education	47.4%	52.6%	100.0%
		% within Adherence	44.2%	55.4%	49.5%
		% of Total	23.5%	26.0%	49.5%
	Tertiary education	Count	25	22	47
		Expected Count	24.9	22.1	47.0

	% within Participants' level of education	53.2%	46.8%	100.0%
	% within Adherence	24.0%	23.9%	24.0%
	% of Total	12.8%	11.2%	24.0%

As shown in 15, majority of unemployed participants 60.6% (n=80), reported high adherence and were more than those with low adherence n=52 (39.4%). On the other hand, participants reported low adherence were more than those with high adherence on the following employment statuses, for formally employed, 63.4% (n=26), and self-employed, 58.3% (n=14). The Pearson's chi-squire test results indicate that there was a significant statistical difference between the employment status of participants and adherence ($\chi 2$ (3) = 8.745; p < .033).

Table 15. Crosstabulations of employment status of participants with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
Employment status of participant	Unemployed	Count	80	52	132
		Expected Count	70.3	61.7	132.0
		% within Employment status of participant	60.6%	39.4%	100.0%
		% within Adherence	75.5%	55.9%	66.3%
		% of Total	40.2%	26.1%	66.3%
	Formally Employed	Count	15	26	41
		Expected Count	21.8	19.2	41.0
		% within Employment status of participant	36.6%	63.4%	100.0%
		% within Adherence	14.2%	28.0%	20.6%
		% of Total	7.5%	13.1%	20.6%
	Self-employed	Count	10	14	24

		Expected Count	12.8	11.2	24.0
		% within Employment status of participant	41.7%	58.3%	100.0%
		% within Adherence	9.4%	15.1%	12.1%
		% of Total	5.0%	7.0%	12.1%
	Retired	Count	1	1	2
		Expected Count	1.1	.9	2.0
		% within Employment status of participant	50.0%	50.0%	100.0%
		% within Adherence	0.9%	1.1%	1.0%
		% of Total	0.5%	0.5%	1.0%

The cross table 16 shows the results of adherence by depression. The majority of participants with high adherence were observed as compared to those with low adherence on the following depression score levels, for mild depression, 56.9% (n=37), moderate, 71.4% (n=25), moderately severe, 61.1% (n=11), and severe, 100.0% (n=5). The table also show that 61.0% (n=47), of participants with minimal depression reported low adherence and this rate was greater than that of participants 39.0% (n=30), with high adherence under this category. For these variables, the Pearson's chi-squire test results indicate that there was a significant difference between depression and adherence ($\chi 2$ (4) = 16.140; p < .003).

Table 16. Crosstabulations of depression with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
Depression	Minimal Depression	Count	30	47	77
		Expected Count	41.6	35.4	77.0

	% within Depression	39.0%	61.0%	100.0 %
	% within Adherence	27.8%	51.1%	38.5%
	% of Total	15.0%	23.5%	38.5%
Mild Depression	Count	37	28	65
	Expected Count	35.1	29.9	65.0
	% within Depression	56.9%	43.1%	100.0 %
	% within Adherence	34.3%	30.4%	32.5%
	% of Total	18.5%	14.0%	32.5%
Moderate Depression	Count	25	10	35
	Expected Count	18.9	16.1	35.0
	% within Depression	71.4%	28.6%	100.0 %
	% within Adherence	23.1%	10.9%	17.5%
	% of Total	12.5%	5.0%	17.5%
Moderately Severe Depression	Count	11	7	18
	Expected Count	9.7	8.3	18.0
	% within Depression	61.1%	38.9%	100.0 %
	% within Adherence	10.2%	7.6%	9.0%
	% of Total	5.5%	3.5%	9.0%
Severe Depression	Count	5	0	5
	Expected Count	2.7	2.3	5.0
	% within Depression	100.0%	0.0%	100.0 %
	% within Adherence	4.6%	0.0%	2.5%
	% of Total	2.5%	0.0%	2.5%

The cross table 17 shows, the results of adherence by HIVstigma, as shown in the table 51.9%) (n=55), of participants with low levels of perceived HIV stigma and 55.9% (n=52), of participants with high levels of perceived HIV stigma reported high adherence to ART. While 48.1% (n=51), of participants with low levels of perceived HIV stigma and 44.1% (n=41), of participants with high levels of perceived HIV stigma reported low adherence to ART. Therefore, majority of participants from both groups namely high and low levels of perceived HIV stigma reported high adherence. Furthermore, the Pearson's chi-squire test results showed that these two variables were independent indicating no statistically significant difference between HIV stigma and adherence ($\chi 2$ (1) = .323; p >.570).

Table 17. Crosstabulations of HIV stigma with adherence to ART

			Adherence		
			High Adherence	Low Adherence	Total
HIV Stigma	Low levels of Perceived HIV-Stigma	Count	55	51	106
		Expected Count	57.0	49.0	106.0
		% within HIV Stigma	51.9%	48.1%	100.0%
		% within Adherence	51.4%	55.4%	53.3%
		% of Total	27.6%	25.6%	53.3%
	High Levels of Perceived HIV-Stigma	Count	52	41	93
		Expected Count	50.0	43.0	93.0
		% within HIV Stigma	55.9%	44.1%	100.0%
		% within Adherence	48.6%	44.6%	46.7%
		% of Total	26.1%	20.6%	46.7%

5.3 Inferential statistical analyses

Inferential statistical analyses are forms of statistical procedures that are performed to arrive at the conclusions about the empirical relationalships between variables and they are designed specifically to test hyphotheses by utilizing empirical evidence that accept or reject each hyphothesis (Grey & Kinnear, 2012).

5.3.1 Extent of adherence to antiretroviral therapy

Table 3 and Table 4 show the extent of adherence to ART among adult patients living with HIV/AIDS. Participants who forgot to take their medicine were 59.0% (n=118), more than those who did not forget 41.0% (n=82), however most of them were not careless at times about taking their treatment 82.6% (n=157). This suggest that their forgetfulness about taking the medication was not determined by carelessness, for that reason there are other factors accounting for that behavior. Majority of participants did not stop taking their medicine even if at times they feel worse 92.0% (n=183). Only 4.0% (n=8), of participants who never took their medicine over the previous week, while 80.5% (n=153), of participant were able to take their treatment over the past weekend. Majority of participants 78.2% (n=129), reported that over the past 3 months they never took their medicine at all for less than two days and most of them had never gone to bed hungry in the past two weeks 72.6% (n=146). Furthermore, the number of participants who have ever disclosed their HIV status to anyone 86.6% (n=147), was greater than that of participants who have never disclosed 13.4% (n=27). Overall, the participants with high adherence to ART were 53.7% (n=108), compared to those reported low adherence to ART 46.3% (n=93). Therefore, the extent of adherence to ART among this population was more than half of the

sample at 53.7%, in this context the data indicates that the prevalence of adherence to ART among this population was satisfactory.

5.3.2 Associations between depression and adherence to ART

The Spearman's rank order correlation coefficient was performed and the results signified that there was a significant inverse association at a 99% confidence interval between depression and adherence to ART (r_s = -.314, p < .001) (see Table 11). The researcher transformed the continuous predictor variable (depression) into a categorical variable using original scale scoring guide to meet the key assumptions of Pearson's Chi-Squire test of independence. The Pearson's Chi-squire test results (see Table 16) indicate that there was a statistically significant difference between depression and adherence ($\chi 2$ (4) = 16.140; p < .003). These results suggest that depression was a significant predictor of adherence to ART.

5.3.3 Associations between HIV stigma and adherence to ART

Similar procedures were used to examine the relationship between HIV stigma and adherence to ART. The researcher also transformed the continuous predictor variable (HIV stigma) into a dichotomous variable using median to satisfy the assumptions of Chi-squared test procedure. Thus, every participant that scored equals to and above the median of (23.0000) had high level of perceived HIV stigma and those who scored less had low level of perceived HIV stigma. The Pearson's chi-squire test of independence results indicated that there was no significant difference between HIV stigma and adherence ($\chi 2$ (1) = .323; p > .570) (see Table 17). Similarly, the Spearman's rank order correlation coefficient results indicated that there was a non-significant inverse correlation between HIV stigma and adherence to ART (r_s = -.119, p > .095)

(see Table 11). These results were indicative of that HIV stigma did not predict adherence to ART.

5.3.4 Intervening effect of self-efficacy on depression and adherence to ART

Binary logistic regression procedure was used to assess the intervening effect of self-efficacy on the relationship between depression and adherence to ART. Binary logistic regression is a form of statistical technique normally conducted to examine the effect of two or more explanatory variables on predicting the odds of the dichotomous (binary) outcome variable on basis of the theoretical or hypothesized model of the study (Wilson & Lorenz, 2015).

Binary logistic regression was calculated using forward stepwise (conditional) method of model fitting which involves starting with a null model, and then use a selected model fit criterion to test whether the addition of each chosen variable improves the model to a statistically significant extent. Table 18 shows the results of the *Omnibus Test of Model Coefficients* which was used to check whether the current model over the baseline model was an improvement with an inclusion of the independent variables. The model chi-squire test was used to see if there was a significant difference between current model and the Log-Likelihoods (-2LL) of the baseline (null) model. According to the results in Table 18 the overall model chi-square was significant ($\chi 2 = 24.805$, $df = 2$, $p < .001$) suggesting that the inclusion of the explainatory variables at each step, did improve the predictive power of the current model.

Table 18. Omnibus Tests of Model Coefficients

Omnibus Tests of Model Coefficients				
		Chi-square	df	Sig.
Step 1	Step	20.512	1	.000
	Block	20.512	1	.000
	Model	20.512	1	.000
Step 2	Step	4.293	1	.038
	Block	24.805	2	.000
	Model	24.805	2	.000

The model summary in Table 19 presents the values of pseudo-R^2 and -2 Log Likelihoods for the full model. At the first step, the inclusion of the depression variable in the model reduced the 2-LL statistic by 20.512 and when the self-efficacy variable at the second step was also added to the model the 2-LL was further reduced by 4.293. Thus, for the full current model the 2-LL (goodness of fit value) was 211.871 and that of the baseline model was 236.676, therefore, a decline of 24.805 obtained from the *Omnibus Test of Model Coefficients* was indicative of the improvement in the model after the addition of the predictor variables.

The R^2 values describes an estimation of the amount of variation that is accounted for by the model in the outcome variable. The Cox & Snell R Square at the first step was at 10% and it was improved slightly at 12% on the second model. While, Nagelkerke R Square which can reach a maximum of '1' indicated that at the first step of model the predictor variable explained roughly 14.2 % of variation whereas at the second model the rate of variation was at 17%. However, there is a caution when applying these values because they are an approximations for that reason, they do not account for the magnitude of variation explained by the model as R-square does in linear regression (Hosmer & Lemeshow, 2000).

Table 19. Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	216.164[a]	.100	.142
2	211.871[a]	.120	.170

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 20 presents the results of Hosmer –Lemeshow test (goodness of fit) that explores whether there is a significant variation between the observed and predicted odds. The goodness of fit model should be indicated by non-significant chi-square value with a significant level that is more than 0.05 (Hosmer & Lemeshow, 2000). For the overall full model the chi-square value of goodness of fit suggest that the model was a good fit to the data since the p- value was more than 0.05 ($\chi 2 = 13.943, df=8, p> .083$). However, the chi-square statistic cannot be interpreted independently from the sample size on which it is based.

Table 20. Hosmer and Lemeshow Test

Hosmer and Lemeshow Test			
Step	Chi-square	Df	Sig.
2	13.943	8	.083

The classification table shows the proportions of specificity and sensitivity for the forward stepwise model. According to the results in Table 21 the sensitivity of prediction for the forward stepwise model after adding the second predictor was 91.9% representing the subjects where the predicted event (high adherence) was observed. On the other hand, the specificity of

prediction at the second step was 20.7% of the cases where the predicted event was not observed. The overall full model correct classification was 70.6% of the cases compared to 70.1% in the baseline (null) model, signifying trivial improvement after the inclusion of explanatory variables.

Table 21. Classification Table

			Predicted Adherence		
	Observed		High Adherence	Low Adherence	Percentage Correct
Step 1	Adherence	High Adherence	128	8	94.1
		Low Adherence	48	10	17.2
	Overall Percentage				71.1
Step 2	Adherence	High Adherence	125	11	91.9
		Low Adherence	46	12	20.7
	Overall Percentage				70.6

Table 22 describes, the results of binary logistic regression for each variable included in the equation and the table provides values of regression coefficient (B), the Wald Chi-Square statistic to test statistical significance and essential Odds Ratio (Exp (B)) for predictor variables respectively. The explainatry variables were participant's depression and self-efficacy, thus as shown in Table 22 the model was able to correctly classify 94.1% of those who reported high adherence and 17.2% of those who reported low adherence to ART with an overall success rate of 71.1% after depression was included in the model on step 1. After the addition of self-efficacy, the overall success rate of the model slightly declined by (0.5%) from (71.1%) to (70.6%). As shown in Table 22 below for all predictors the Wald Chi-Square statistics for depression on step one ($\chi 2 = 16.091, df=1, p< .001$) and for self-efficacy after controlling for the

effect of depression on step two ($\chi 2 = 4.020, df = 1, p < .045$) were statistically significant, respectively.

The regression coefficients for all predictors were significant, however the (B) coefficient for depression on step one was negative (-.159), indicating that decreasing depression is associated with increased odds of achieving high adherence to ART. The (B) coefficient of self-efficacy (.038) on step two was smaller and in the opposite direction after controlling for the effect of depression on the outcome variable. The results of Exp(B) (Odds ratio) for depression at step one indicated that for each point increase in the depression score, the odds of reporting high adherence among participants decreased by a multiplicative factor of (OR=.85 or 85%). This implies that the participant with a score of two on the depression scale was .85 times less likely to report high adherence than the one with a score of one. This indicate that as the odds of depression increases, the odds of high adherence decrease due to the direction of the relationship between these variables. The odds ratio for self-efficacy on step two after controlling for the effect of depression was 1.04 (or 0.4%) signifying that for each point increase in the scale score, the probability of reporting high adherence increased by a multiplicative factor of (OR=1.04). This means that the participant with a score of two on the self-efficacy scale was 1.04 times more likely to report high adherence than the one with a score of one.

The mediation analysis was performed between the independent variable (depression), mediator variable (self-efficacy) and outcome variable (adherence to ART) using binary logistic regression as shown in Table 22. The single mediator model was used along with the causal step approach (Baron & Kenny, 1986) to test regression coefficient that together could show whether the mediation was occurring between these variables or not. According to the results, depression on the first step was statistically related to adherence to ART *(OR= .853; 95% CI, .789–.922,*

P<001). Self-efficacy on the second step was also statistically significant after controlling for the effect of depression on adherence to ART *(OR= 1.04; 95% CI, 1.001– 1.078, P<.045).* However, the effect of depression on step two did not change much at all even after controlling for the effect of self-efficacy and the relationship was still significant *(OR= .853; 95% CI, .777–.914, P<001).* The Sobel test was also conducted to determine the indirect effect transmitted through mediator variable using regression coefficient values provided in Table 22. Thus, the results revealed a non-significant indirect effect (Sobel test for indirect effect, Z= 1.01, *P*> 0.31), indicating that the association between depression and adherence to ART was not reduced significantly by self-efficacy, therefore there was no evidence of mediation.

Table 22. Variables in the Equation

Variables in the Equation									
								95% C.I.for Exp(B)	
		B	S.E.	Wald	Df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Depression	-.159	.040	16.091	1	.000	.853	.789	.922
	Constant	.112	.266	.178	1	.673	1.118		
Step 2[b]	Depression	-.172	.041	17.101	1	.000	.842	.777	.914
	Self-Efficacy	.038	.019	4.020	1	.045	1.039	1.001	1.078
	Constant	-.938	.593	2.502	1	.114	.391		

a. Variable(s) entered on step 1: Depression.

b. Variable(s) entered on step 2: Self-Efficacy.

5.3.5 Intervening effect of social support on HIV stigma and adherence to ART

Although the bivariate analysis yielded the results that are not statistically significant between HIV stigma and adherence to ART, the researcher also created the binary logistic regression model to determine whether the prediction of adherence by HIV stigma when entered at the same

step together with social support would remain non-significant. In this section the enter method of multivariable binary logistic regression was conducted which involves the addition of all predictor variables at the same step. Table 23 shows the results of the *Omnibus Test of Model Coefficients*, for the current model, therefore the overall model chi-square was not statistically significant ($\chi 2 = 5.089, df = 2, p > .079$), indicating that the inclusion of the explainatory variables did not improve the predictive power of the new model.

Table 23. Omnibus Tests of Model Coefficients

Omnibus Tests of Model Coefficients				
		Chi-square	Df	Sig.
Step 1	Step	5.089	2	.079
	Block	5.089	2	.079
	Model	5.089	2	.079

The summary of the model is shown in Table 24. After the addition of all predictor variables in the current model the -2 Log Likelihoods was reduced by 5.089. The -2LL (goodness of fit value) for the null model was (5.089 and 231.587= 236.676), then for this model was 231.587 demonstrating insignificant decline from 236.676 to 231.587. These -2LL values were indicative of the insufficient improvement in the model after the inclusion of the predictor variables. The Cox & Snell R Squared was at 3% and Nagelkerke R Squared was at 4%, signifying lower degree of variation accounted for by the model in the outcome variable. The R squared values are usually very low, even in the models that well fit the data (Hosmer & Lemeshow, 2000), as it was the case in the current model.

Table 24. Model Summary

Model Summary			
Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	231.587[a]	.026	.037

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001

The hosmer and Lemeshow test shown in Table 25 explores the difference between predicted and observed odds. An overall goodness of fit of the model was specified by p-values more than 0.05 (Hosmer and Lemeshow, 2000). For this model the chi-square value of goodness of fit indicated that the model was a good fit to the data with an associated p-value that was more than .05, ($\chi 2 = 6.561$, $df = 8$, $p > .585$).

Table 25. Hosmer and Lemeshow Test

Hosmer and Lemeshow Test			
Step	Chi-square	Df	Sig.
1	6.561	8	.585

The classification table 26 shows the proportions of specificity and sensitivity for enter method model. As shown in Table 26 the model was able to correctly classify 100% of those who reported high adherence and 1.7 % of those reported low adherence to ART with an overall success rate of 70.6% indicating slight improvement of 0.5% from 70.1% of the null model.

Table 26. Classification Table

Observed		Predicted Adherence		
		High Adherence	Low Adherence	Percentage Correct
Adherence	High Adherence	136	0	100.0
	Low Adherence	57	1	1.7
Overall Percentage				70.6

Table 27 presents, the results of binary logistic regression for each predictor variables entered in the model were participant's HIV stigma and social support. The Wald Chi-Square statistics for HIV-stigma was non-significant in the context of the other predictor (social support) (*χ2 =.791, df=1, p>.374).* However, the Wald Chi-Square value of social support was statistically significant (*χ2 =3.972, df=1, p<.046),* after controlling for the effect of HIV stigma on the outcome variable. This indicate that there was no direct effect of social support on predicting adherence to ART among this population, but the effect improved after controlling for the effect of HIV-stigma on adherence to ART.

The regression coefficients (B) of HIV stigma was negative and non-significant (-.020), signifying that the decrease in HIV stigma is associated with increased odds of adherence to ART. The (B) coefficient of social support was positive and significant (.017), indicating that the decreasing social support is associated with decreased odds of attaining high adherence to ART. The odds ratio (OR) for HIV stigma indicated that for each percentage increase in the HIV stigma score, the odds of reporting high adherence among participants decreased by a multiplicative factor of (OR=.98 or 98%). This means that the participant with a higher score

from one to two on HIV stigma scale was .98 times less likely to report high adherence than the participant with a score of one or less. The odds ratio for social support was 1.02 (or 0.2%) indicating that for each unit increase in the social support scale score, the probability of reporting high adherence to ART increased by a multiplicative factor of (OR=1.02). This means that the participant with a score of two on the social support scale was 1.02 times more likely to report high adherence than the one with a score of one or less.

The mediation analysis was not conducted among the independent variable (HIV stigma), mediator variable (social support) and outcome variable (adherence to ART) given that HIV stigma was not significantly associated with adherence to ART (see Table 11 & Table 27). The effect of HIV stigma on adherence to ART was not statistically significant *(OR= .980; 95% CI, .937– 1.025, P>.374),* even after controlling for the effect of social support in the logistic regression analysis using enter method. However, the effect of social support on adherence to ART was significant, after controlling for the effect of HIV stigma (*OR= 1.017; 95% CI, 1.000–1.035, P<.046).*

Table 27. Variables in the Equation

Variables in the Equation									
								95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	HIV-Stigma	-.020	.023	.791	1	.374	.980	.937	1.025
	Social Support	.017	.009	3.972	1	.046	1.017	1.000	1.035
	Constant	-1.519	.788	3.713	1	.054	.219		

a. Variable(s) entered on step 1: HIV-Stigma, Social Support.

5.4 Summary

In conclusion, the findings indicate that majority of participants in this study were females 71.0% (n=142), between the ages of 36-45 years 30.3% (n=61). Additionally, most participants in this study were not married (n=147, 74.2%) and all belonged to African population group 100% (n=201). Furthermore, majority of participants had a secondary maximum level of education 48.3% (n=97), and most were unemployed 65.7% (n=132). Prevalence rate of participants who reported high adherence to ART 53.7% (n=108), was slightly greater than as those who reported low adherence to ART 46.3% (n=93). In addition, all other subsequent findings presented by this chapter, were based on appropriate statistical tests that were performed to test the study hypotheses outlined in the previous Chapter. The findings indicated that depression predicts adherence to ART, but prediction of adherence by HIV stigma was not significant and there was no evidence of mediating roles of both social support and self-efficacy in this study. The subsequent chapter provides a discussion of the findings of this study.

CHAPTER SIX: DISCUSSION

The purpose of this study was to investigate the relationship between depression, HIV stigma and adherence to ART among adult patients living with HIV in South Africa and the mediating role of self-efficacy and social support. This chapter presents discussion of the findings along with reference to the relevant previous literature. Mainly, the current study examined the relationships among the variables namely depression, HIV stigma, self-efficacy, social support, and outcome variable (adherence to ART) utilizing SPSS. Although, the mediator variables cannot be interpreted in their entirety, it is only feasible to discuss the directionality of their effects established within the regression model. The discussion centers predominantly on whether, the interactive mechanism of the said variables predicts the degree of adherence behavior among adults PLWHA in South Africa consistent with the specific objectives of the study.

The key findings of this study indicated that the prevalence rate of adherence to ART was satisfactory among this population. Another important finding was that there was no significant association found between HIV stigma and adherence to ART. Contrariwise, there was a significant inverse correlation between depression and adherence to ART. Therefore, depression does predict adherence to ART among this population. Furthermore, the mediation (pathways) model was tested and the findings did not significantly find self-efficacy as a mediator on depression and adherence to ART.

The findings also showed that the rate of low adherence to ART was approximately half of the sample (46.3%) while the rate of high adherence to ART was just over half of the total number of participants (53.7%). Additionally, the magnitude of low adherence observed in this study, is comparable to that of previous studies conducted in South Africa with proportions

ranging from 32% to 63% of non-adherent participants (Van Dyk, 2010; Kitshoff & Naidoo, 2012; Adefolalu *et al.*, 2014; George & MacGrath, 2019). Although, majority of participants reported high adherence in this study, poor adherence to ART is still an overarching and long-lasting challenge among people living with HIV (Heyer & Ogunbanjo, 2006).

Moreover, the findings of the current study corroborates Heyer and Ogunbanjos' (2006) idea since high proportion of participants observed in this study reported high level of adherence to ART, however over half of the sample (59%) reported to ever forget to take their medicine over the past three months. This also accords with the findings from the previous multi-country study in Uganda, Tanzania, and Zambia by Koole *et al*., (2016) which found that among all ART patients, slightly over half of patients (53%) who have ever missed taking their ART, reported forgetfulness as the main reason for missing ART. On the other hand, this study found that about (21.8%) of participants did not take their medicine at all for over two days over the previous three months, thus this result differ from the earlier findings that found only (3%) of participants missed taking treatment for more than two days in the previous three months (Koole *et al*., 2016). Further, finding from this study indicate that (27.4%) of patients reported to have ever gone to bed hungry in the past two weeks, and this result concurs with Koole *et al*.'s (2016) findings which revealed that having not enough food was encountered by about one-third (30%) of the study participants who reported ever missing their ART.

Participants deemed as not adhering to ART are typically facing shortage of food at home and thus afraid of side effects namely dizziness, if they were to risk taking their HIV treatment without having eaten any foodstuff (Kheswa, 2017). Considering that in this study about one-third of participants have ever gone to bed hungry and (8%) of participants they decide to stop taking their treatment if at times they feel worse. Majority of the participants indicated that they

ever forgot to take treatment over the past three months, a possible explanation for this could be attributed to the high prevalence of unemployed participants observed in this study. This findings, accord with those reported by Kheswa (2017) in respect of unemployment as a common problem that influence adherence to ART given that some of the patients they cannot manage to have a good and sufficient meals a day required for strengthening their immune system, memory as well as an overall well being.

Several studies analyzing the determining factors of non-adherence have identified among other factors that forgetfulness, food insecurity, and unemployment were major barriers to adherence to ART (Mathebula, 2014; Azia *et al.*, 2016; Kheswa, 2017). The proportions of retention in care and adherence of ART users are diminishing in South Africa over time, followed by the increasing evidence of low levels of adherence to ART among adult patients living with HIV (Department of Health, 2016). Therefore, the intervention strategies have been formulated and others are yet to be devised to address the overarching impediments to ART adherence and such strategies are being integrated with group and community-based ART adherence models in order to curb the extent of poor adherence to ART across various communities (Azia *et al.* 2016; Kheswa, 2017).

Firstly, this study hypothesized that depression predicts adherence to ART. This hypothesised relationship was supported by bivariate results thus the null hypothesis was rejected. The findings indicated that depression was significantly associated with adherence to ART. Furthermore, the results indicated a negative correlation between depression and adherence to ART, signifying an inverse relationship between these variables. These findings support those observed in the previous study undertaken in Malawi by Umar, *et al.,* (2019) which found that depression was significantly and negatively correlated with adherence to ART. This

study demonstrated a better effect size of association compared to those observed in two previous studies: the study carried out in Ethiopia the effect size was -0.14 (Tadios & Davey, 2006) and the study conducted in Malawi was -0.15 (Umar, *et al.,* 2019).

Moreover, this finding differs from that of some previous studies which have found no significant association between depression and adherence to ART (Kitshoff and Naidoo, 2012; Coutinho *et al.,* 2018), but they are broadly consistent with those of several past studies which have found these variables to be significantly associated, (Belenky *et al.*, 2014; Moraes & Casseb 2017; Ngum *et al.,* 2017; Beyene-Gebrezgiabher *et al*., 2019). Ngum *et al.,* (2017) argued that depression is an important barrier to adherence to ART, therefore this implies that depressed patients tend not to display adherence behaviors to ART thereby producing poor health outcomes. Further, findings indicated that (46.3%) of participants reported low adherence to ART as oppose to (53.7%) of those with high adherence to treatment. Among (61.5%) of participants with depressive symptoms, (22.5%) had low adherence to ART as compared to (23.5%) of those without depression. These results nearly match with those of the previous study by Ngum *et al.,* (2017), who found that (47.3%) participants were non-adherent as compared to 52.7% of participants who were adherent to ART.

Furthermore, the frequency of depressive symptoms for the current study was slightly lesser than what was reported in other studies: Ngum *et al*. in Cameroon (63%) and Kitshoff and Naidoo in South Africa (62%) (Kitshoff & Naidoo, 2012; Ngum *et al.,* 2017). The prevalence rate of depression in this study was about a second third of the sample and depression was significantly and negatively associated with adherence to ART. Therefore, these findings are very important given that depression is a treatable condition (Ngum *et al.,* 2017), and this could have a positive effect on the degree of adherence to ART among patients with HIV/AIDS in

South Africa. Secondly, this study hypothesized that HIV stigma predicts adherence to ART. The hypothesised relationship was not supported by a series of bivariate and simple regression tests therefore the null hypothesis was retained. Contrary to most previous studies, this study did not find a significant association between HIV stigma and adherence to ART. This implies that the relationship between these variables did not have sufficient degree of linearity or logit. These findings match those observed in the earlier longitudinal study by Martinez *et al.* (2012), in USA which found that HIV stigma was not a statistically associated with adherence to ART. Conversely, the findings are not congruent with those of the previous studies which have found a significant difference in the degree of adherence to ART between patients with low and high levels of HIV and the significant relationship exist between these variables (Katz *et al.*, 2013; Mao *et al.*, 2017; Nurfalah *et al.*, 2019; Umar, *et al.*, 2019).

HIV stigma either experienced or perceived is widely reported by PLWHA and has been noted to be a major barrier for health care (Martinez *et al.*, 2012). HIV stigma has been revealed to adversely affect adherence-related behaviors among PLHIV in a wide variety of settings (Nurfalah *et al.*, 2019). Furthermore, the findings of this study indicated that among (46.7%) of participants with high level of perceived HIV stigma, (20.6%) reported low adherence to ART as compared to (25.6%) of those with low level of perceived HIV stigma. Although, majority of participants reported low level of perceived HIV stigma, nearly half of the sample had high level of perceived HIV stigma in the current study. Thus, this is indicative of that this study similar to other previous studies confirms that perceived HIV stigma among PLWHA is prevalent and does exist, however in this context it was not by itself found to significantly affect adherence of patients to ART. Moreover, Katz *et al.*, (2013) pointed out that the relationship of HIV stigma with adherence to ART have proved to be inconclusive given that the lack of consistent findings

between these variables may be accounted for by other factors influencing adherence to ART. Therefore Ngum *et al.,* (2017) further state that studies conducted in various contexts might not be universal due to there being diverse social factors relying on the cultural influences.

Thirdly, this study hypothesized that self-efficacy mediates the relationship between depression and adherence to ART. The hypothesized mediation role of self-efficacy was not corroborated by a multivariable regression and single mediator model, thus the null hypothesis was retained. The bivariate results showed that self-efficacy was positively but not significantly associated with adherence to ART and the magnitude of correlation between these variables was moderate. This finding is inconsistent with that of the study conducted by Umar *et al.*, (2019) who found that self-efficacy was significantly and positively correlated with adherence to ART. Moreover, the magnitude of correlation in Umar *et al*'s study was better at a 99% confidence interval with correlation coefficient of .22 (Umar *et al.*, 2019), as compared to .14 correlation coefficient found in the current study.

The regression and mediation analysis were carried out, thus in the first regression model depression was entered as an explanatory variable, and in the second model self-efficacy was included as the mediator variable. In the mediation analysis the interaction between depression and self-efficacy was tested for both direct and indirect effect on adherence to ART as a dependent variable. The findings indicated that self-efficacy did not significantly reduce the relationship of depression and adherence to ART, thus this suggest that there was no evidence of mediation. Such findings contrast those of the previous study which have found a significant partial mediation effect (Sobel test for indirect effect, Z= -2.92, *P*= 0.0035) of self-efficacy on the relationship between depression and adherence to ART (Umar *et al.*, 2019).

Moreover, the results of logistic regression revealed a significant association between

self-efficacy, depression, and adherence to ART. These findings further support those of the previous study by Andini *et al.* (2019) who found a significant link between self-efficacy, depression and adherence among Indonesian adult women living with HIV. Since, this study found that self-efficacy did not mediate the significant interaction between depression and adherence to ART. This is suggestive of that, although when patients are confident or motivated to perform adherence-related behaviours to ART, thus such confidence or motivation of theirs do not significantly reduce the depressive moods which have been confirmed to significantly affect their adherence to ART. Researchers have argued that when PLWHA are depressed they feel hopeless, helpless and they tend to develop negative feelings about themselves which decreases their efficacy to retain in HIV care (Andini *et al.*, 2019). However, the findings of the current study contended such argument due to the reason that patients with high self-efficacy could remain depressed thereby continue being either adherent or non-adherent to ART despite having sufficient self-efficacy.

Lastly, it was hypothesized that social support mediates the relationship between HIV stigma and adherence to ART. The hypothesized relationship was not supported by a series of regressions therefore the null hypothesis was not rejected. The binary logistic regression results indicated that HIV stigma was not a significant predictor of adherence to ART within the regression model, and this finding match that of the previous study by Martinez *et al.*, (2012) who found HIV stigma as a non-significant predictor of adherence to ART (B= -0.012, SE = 0.020, $p > 0.50$) using logistic regression. The researcher continued with the regression analysis despite the lack of direct relationship between HIV stigma and adherence to ART given that there is a dearth of empirical data among this patient population. Further, social support was not significantly correlated with adherence to ART in bivariate analysis but on the other hand, does

significantly impact adherence to ART after controlling for the effect of HIV stigma in logistic regression.

Noteworthy is that when HIV stigma is low, social support is positively and significantly influencing adherence to ART. The findings of non-significant direct relationship between social support and adherence to ART are consistent with those of Naar-King *et al*. (2006) and George and MacGrath (2018), indicative of that there may be other explanatory factors. Nonetheless, this study suggest that health care providers can enhance adherence to ART in the presence of HIV stigma by addressing issues that may impact social support of ART users. Thus, George and McGrath (2018) posts that, high levels of HIV stigma subvert HIV disclosure thereby inhibit access of PLWHA to social support. Social support measure demonstrated a large mean as compared to other measures, signifying that the participants reported good social support, however a significant association was not found, until after controlling for the effect of HIV stigma within regression.

Additional findings obtained through a Pearson's chi-square test of independence revealed a statistically significant difference between employment status and adherence to ART. From findings the age of the study participants ranged from 18 to 75 years, with a mean age of 39.28 and most participants were between the ages of 36 to 45 years compared to other age groups. Age was deemed as categorical variable with six categories (18-24, 25-35, 36-45, 46-55, 56-65 and ≥ 66 years) and there was no statistically significant difference found between age and adherence to ART. Such, findings are not consistent with those of the prior studies (Kitshoff and Naidoo, 2012; Ngum *et al.,* 2017; De Jager *et al.,* 2018). Majority of participants were unemployed, and they accounted for a second third of the study sample with a statistically significant difference found between participants' employment status and adherence to ART.

This finding concurs with Kitshoff and Naidoo's (2012) findings, which showed a significant association between unemployment and non-adherence to ART. This suggested that unemployed participants were more likely to have lower levels of adherence to ART (Kitshoff & Naidoo, 2012).

Additionally, participants who demonstrated low levels of adherence to ART were mostly females, with a secondary maximum level of education. However, the findings attained through chi-square test indicated no statistically significant difference between sex, participants' highest level of education and adherence to ART. Based on distribution of participants by sex, the findings from this study were not consistent with those of the previous study by Khotimah *et al*. (2018) who found a predominant number of male participants who did not adhere to ART. Conversely, the findings from this study regarding no statistically significant difference found between sex, level of education and adherence to ART have been confirmed by past studies: Kitshoff and Naidoo (2012) in South Africa and Khotimah *et al*., (2018) in Indonesia. The socio-demographic characteristics might be significant factors behind the phenomenon of lower levels of adherence to ART among this population.

Thus, for some other characteristics such as sex, and maximum level of education, the distribution of participants between low adherence group and high adherence group was almost similar. Although, this is not indicative of that adherence to ART in this study was not to a certain degree influenced by socio-demographic characteristics of participants. Kitshoff and Naidoo (2012) asserts that the lack of finances in South Africa is a major barrier to adherence to ART because it emanates from the unemployment status, which is evident predominately among PLWHA. Therefore, interventions spanning from intrapersonal to interpersonal processes, and to structural factors are needed in order to address the lager social forces subverting adherence to

ART in South Africa.

In closing this chapter, the research findings were supportive of the hypothesized relationship of depression with adherence to ART. The results also revealed that the degree of adherence to ART is influenced significantly by one of participants' socio-demographic characteristics such as employment status. However, in this study HIV stigma failed to predict adherence to ART, thus this is indicative of that there is need for further investigation into the predictive relationship between these variables utilizing different measures with more heterogeneous and lager population of patients enrolled in ART. The subsequent chapter provides the conclusions and recommendations deriving from the findings of this study.

CHAPTER SEVEN: CONCLUSION

The overall aim of this research was to investigate the relationship between depression, HIV stigma and adherence to ART among adult patients living with HIV/AIDS and the mediating roles of self-efficacy and social support. This chapter outlines key findings, major conclusions, and recommendations for future research, consistent with the objectives of the study as outlined in the first chapter. Furthermore, the chapter also presents the implications emanated from key findings for social work practice.

This study examined the relationship between HIV stigma and adherence to ART among adult patients living with HIV/AIDS. The study has found no significant relationship between these variables, despite the considerable rate of HIV stigma prevalence observed among patients. This finding suggests that in this patient population, HIV stigma does not predict the odds of adherence to ART. Thus, this implies that, a high levels of perceived HIV stigma were not significantly affecting the ability and the likelihood of patients to adhere to ART. The results of this investigation show that HIV stigma on itself among this patient population is not a adequate condition to effect on patterns of adherence to ART. Nurfalah *et al.,* (2019) posits that self-stigma may also lead to psychological disorders that influence adherence to ART. Thus, there is no confirmed evidence concerning the causal relationship between HIV stigma and depression, therefore future research ought to examine more closely the links among these variables and their combined effect on adherence to ART.

Moreover, despite the lack of direct correlation among HIV stigma and adherence to ART, the researcher carried on with multiple regression analysis, given that there is paucity of empirical data with this patient population. The findings revealed social support as a significant predictor of adherence to ART only after adjusting for the effect of HIV stigma in logistic

regression. This finding suggest that social support does influence adherence to ART, only in a combined effect with HIV stigma. These findings are important in informing future interventions that seek to bolster social support to improve adherence to ART, while not disregarding HIV stigma. Furthermore, helping this patient population with being able to turn to their loved ones, friends, families, and health care professionals for any form of support can enhance their adherence to ART and alleviate prevalence of HIV stigma among them.

This study also examined the relationship between depression and adherence to ART, thus a significant relationship was found between these variables. This finding suggest that depression predicts the likelihood of adherence to ART among adult patients living with HIV. Thus, in the developing world, there is a dearth of literature that studies the influence of depression despite its great predominance among PLWHA. The prevalence of depressive symptoms is high, accounting for nearly a second third of the sample. However, a trivial proportion of participants with major depressive symptoms suggest that severity of depression in this study population is low, regardless of the significant association found among depression and adherence to ART.

Thus, the evidence from this study suggest that clinical guidelines and interventions should be devised and implemented by clinicians in the hospital-based setting to evaluate depression when patients demonstrate non-adherent behavior to ART. The findings further suggest that the public health care professionals should incorporate the delivery of healthcare services with clinical interventions designed to spot on the depressive symptoms that may be identified through routine assessment (screening) in order to simultaneously address adherence to ART. Although, this research field has drawn a great deal of attention and has been broadly researched, more effort should be made to address the paucity of empirical data on association

between depression and adherence to ART in South Africa and in the developing countries.

Moreover, the study examined the mediating effect of self-efficacy on depression and adherence to ART. The study findings have confirmed that there is no evidence of intercession by self-efficacy on the association between depression and adherence to ART. In the regression model the effect of self-efficacy was significant when the effect of depression was controlled for thus, the results indicate that both self-efficacy and depression significantly influence adherence to ART. Evidence from this study emphasize the importance of private and public healthcare systems to place a major priority on the delivery of mental healthcare services (depression care) to PLWHA, combined with interventions aimed at improving self-efficacy for adherence of patients to ART. Thus, the early screening for symptoms of depression and cost-effective interventions aimed to improve self-efficacy of patients should be established to enhance their adherence to ART.

Overall, this study concludes that, the development of viable intervention strategies seek to address barriers to adherence needs to include a specific understanding of the interplay of different factors in influencing adherence to ART and take mental health needs of patient with HIV as a priority. Additionally, further investigation is needed which could possibly provide robust mediational evidence behind the effect of depression on adherence to ART. Thus, addressing mental health needs of patients can substantially improve their mental health status and eventually bolster adherence to ART resulting in good health outcome and well-being of patients living with HIV.

7.1 Recommendations for future research

There is an interwoven myriad of factors leading to overarching challenges encountered by the Department of Health in improving the rates of patients retaining in HIV care and adherence to ART, which requires further investigations to address a complex mechanisms of these barriers. In this study, the effect of HIV stigma, remained non-significant in logistic regression, however the significance was found with social support after controlling for the effect of HIV stigma within the regression model. This suggest that future studies should explore and utilize other robust measures of HIV stigma and adherence to ART along with larger sample size to firmly confirm whether these variables associated.

Moreover, the effect of social support was only significant after the effect of HIV stigma was controlled for, which suggest that adult patients receiving ART may require viable interventions that seeks to improve social support so that better levels of adherence to ART can be achieved regardless of the presence of HIV stigma. Likewise, further studies are required to explore the association among social support and adherence to ART, with more diversified and lager sample size of adult patients with HIV in order to obtain more conclusive results. The current study revealed the mechanisms by which depression affect proper adherence to ART, with an important but small margin role of self-efficacy in reducing the effect of depression on adherence to ART among this adult patient population. These results also suggest that possible interventions should be provided to alleviate depression and bolster confidence of patients to adhere to their ART.

Since, this study did not establish the mediating role of self-efficacy on the mechanism by which depression influence adherence to ART, such findings have paved the way for additional research to re-investigate the intervening effect of self-efficacy with a large and more

diverse sample to arrive at definite conclusions. In addition, the current study revealed that employment status significantly differentiated between low adherent and high adherent group, based on such findings future studies could further explore the mechanisms by which depression and HIV stigma influence adherence to ART while taking employment status into consideration. Future, investigations could consider moderating effects of these factors on the said predictive mechanisms as the current study did not aim to examine such mechanisms among these factors.

Additionally, the department of health should underscore on developing and implementing evidence-based interventions, corroborated by an advanced understanding of the interaction between a myriad of factors that influence adherence to ART. The department of health has to make mental health care services as of greatest priority in all public healthcare facilities where early evaluation (screening) for depression among adult patients with HIV becomes a routine clinical guideline combined with other intervention efforts that seeks to bolster self-efficacy and social support to better improve adherence to ART under different challenging conditions.

7.2 Implications for social work practice

Findings of the current investigation have a great potential to inform social work practice, especially in the specialized field of healthcare. Social workers play a pivotal role in providing care for patients living with HIV by performing different roles namely case manager, counsellor, therapist, educator, advocate, researcher, program evaluator, activist, and policy analyst (Zastrow, 2004). The healthcare social workers perform interventions which predominantly includes counselling utilizing psychosocial assessment or treatment, social support, crisis treatments and self-efficacy interventions in their practice.

Moreover, social workers need to apply various methods and levels of social work

interventions (casework, group work, community work, management, and research) in ensuring the provision of comprehensive care for patients enrolled in ART program. This implies that patients should be cared for on different levels in terms of their individuality, group level and community level. Thus, social workers have a specific knowledge and skills to integrate intervention methods as a comprehensive approach aimed at a change that is desired (Zastrow, 2004). Based on evidence from this study social workers should address psychological (depression), behavioral (self-efficacy) and social factors (social support) by assessing psychosocial health of patients and their families and providing interventions to address psychosocial problems which may possibly lead to an improved levels of adherence to ART.

Furthermore, social work interventions should be aligned with the principles of self-determination, empowerment, social justice, and values such as service to humanity, worth, and human dignity. They should be sufficiently trained to skillfully integrate these key principles in their interventions and to effectively meet the mental health care needs of PLWHA. Social workers should also comprehensively assess the impact of mental health disorders (depression) on adult patients with HIV, and their families and intervene at a wider level to alleviate its negative impact on adherence to ART. In addition, social work contributes a unique social perspective in the field of mental health practice and ART has also brought a distinctive bio-psychosocial needs of patients. Therefore, social worker ought to assist patients as well as families with psychosocial issues snamely social support, depression, and self-efficacy which are indeed linked with adherence to ART.

The social workers who delivers healthcare services as members of the multidisciplinary team should possess a basic knowledge of mental health policies and guidelines to effectively devise interventions to meet the mental health care needs and improve adherence of patients to

ART (Swanepoel & De beer, 2011). The social work profession give emphasis to social justice which places the profession in the forefront of program and policy formulation, and implementation for the responsiveness of the service to the psychosocial needs of the patients to enhance their adherence to ART. Therefore, this calls for social workers to consider the evidence from this study and their specific roles such as aforementioned roles in designing and implementing evidence-based interventions in order to broadly address the psychosocial circumstances of the adult patients regarding adherence to ART.

In conclusion, interventions should also focus on imparting vocational skills which could help patients with HIV to devise livelihood strategies in order to address the conditions of unemployment among them. This chapter has outlined the key findings, major conclusions, and recommendations for future research, in relation to the key objectives of the study as presented in the first chapter. Additionally, the chapter has presented the implications derived from key findings for social work field practice.

References

Abas, M., Ali, G. C., Nakimuli-Mpungu, E., & Chibanda, D. (2014). Depression in people living with HIV in sub-Saharan Africa: time to act. *Tropical Medicine & International Health*: TM & IH; 19(12):1392-1396.

Adefolalu, A., Nkosi, Z., Olorunju, S., & Masemola, P. (2014). Self-efficacy, medication beliefs and adherence to antiretroviral therapy by patients attending a health facility in Pretoria. *South African Family Practice*, *56*(5), 281-285.

Agala, C. B., Fried, B. J., Thomas, J. C., Reynolds, H. W., Lich, K. H., Whetten, K., & Morrissey, J. P. (2020). Reliability, validity and measurement invariance of the Simplified Medication Adherence Questionnaire (SMAQ) among HIV-positive women in Ethiopia: a quasi-experimental study. *BMC public health*, *20*, 1-16.

Ahmad, S. (2018). Can ethical leadership inhibit workplace bullying across East and West: Exploring cross-cultural interactional justice as a mediating mechanism. *European Management Journal*, *36*(2), 223-234.

Allen, R. (2014). The role of the social worker in adult mental health services. *London: The College of Social Work*.

Ameyan, W., Kamara, H., Sesay, J., Sheriff, M., Dumbuya, K., Timbo, M, & Guillard, E. (2017). A participatory approach to improving retention in HIV treatment and care for newly diagnosed patients in a secondary health facility in Sierra Leone. *J AIDS Clin Res*, *8*(686), 2.

Andini, S., Yona, S., & Waluyo, A. (2019). Self-efficacy, depression, and adherence to antiretroviral therapy (ART) among Indonesian women with HIV. *Enfermeria clinica*, *29*, 687-690.

Aregbesola, O. H., & Adeoye, I. A. (2018). Self-efficacy and antiretroviral therapy adherence among HIV positive pregnant women in South-West Nigeria: a mixed methods study. *Tanzania Journal of Health Research*, *20*(4).

Asiamah, N., Mensah, H. K., & Oteng-Abayie, E. F. (2017). General, target, and accessible population: Demystifying the concepts for effective sampling. *The Qualitative Report*, *22*(6), 1607.

Atukunda, E. C., Musiimenta, A., Musinguzi, N., Wyatt, M. A., Ashaba, J., Ware, N. C., & Haberer, J. E. (2017). Understanding patterns of social support and their relationship to an ART adherence intervention among adults in rural Southwestern Uganda. *AIDS and Behavior*, *21*(2), 428-440.

Azia, I. N., Mukumbang, F. C., & Van Wyk, B. (2016). Barriers to adherence to antiretroviral treatment in a regional hospital in Vredenburg, Western Cape, South Africa. *Southern African Journal of HIV Medicine*, *17*(1).

Babbie, E. (2007). Research design. *The practice of social research*, 85-88.

Babonea, A. M., & Voicu, M. C. (2011). Questionnaires pretesting in marketing research. *Challenges of the Knowledge Society*, *1*, 1323-1330.

Bandura, A. (1994). Social cognitive theory and exercise of control over HIV

infection. In *Preventing AIDS* (pp. 25-59). Springer, Boston, MA.

Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology*, *51*(6), 1173.

Barrera, M. (1986). Distinctions between social support concepts, measures, and models. *American journal of community psychology*, *14*(4), 413-445.

Bartlett, J. E., Kotrlik, J. W., & Higgins, C. C. (2001). Organizational research: Determining appropriate sample size in survey research. *Information Technology, learning, and Performance Journal*, 19(1), 43-50.

Bartlett, J. W., & Frost, C. (2008). Reliability, repeatability and reproducibility: analysis of measurement errors in continuous variables. *Ultrasound in Obstetrics and Gynecology: The Official Journal of the International Society of Ultrasound in Obstetrics and Gynecology*, *31*(4), 466-475.

Bedelu, M., Ford, N., Hilderbrand, K., & Reuter, H. (2007). Implementing antiretroviral therapy in rural communities: the Lusikisiki model of decentralized HIV/AIDS care. *The Journal of infectious diseases*, *196*(Supplement_3), S464-S468.

Bekker, L. G., Venter, F., Cohen, K., Goemare, E., Van Cutsem, G., Boulle, A., & Wood, R. (2014). Provision of antiretroviral therapy in South Africa: the nuts and bolts.

Belenky, N. M., Cole, S. R., Pence, B. W., Itemba, D., Maro, V., & Whetten, K.

(2014). Depressive symptoms, HIV medication adherence, and HIV clinical outcomes in Tanzania: a prospective, observational study. *PLoS One*, *9*(5), e95469.

Berger, B. E., Ferrans, C. E., & Lashley, F. R. (2001). Measuring stigma in people with HIV: Psychometric assessment of the HIV stigma scale. *Research in nursing & health*, *24*(6), 518-529.

Berkman, L. F., & Glass, T. (2000). Social integration, social networks, social support, and health. *Social epidemiology*, *1*(6), 137-173.

Beyene Gebrezgiabher, B., Huluf Abraha, T., Hailu, E., Siyum, H., Mebrahtu, G., Gidey, B., & Angesom, T. (2019). Depression among adult HIV/AIDS patients attending ART clinics at Aksum Town, Aksum, Ethiopia: a cross-sectional study. *Depression research and treatment*, *2019*.

Bhagat, R. S., & Chassie, M. B. (1978). The role of self-esteem and locus of control in the differential prediction of performance, program satisfaction, and life satisfaction in an educational organization. *Journal of Vocational Behavior*, *13*(3), 317-326.

Biondo, J., & MacDonald Jr, A. P. (1971). Internal-external locus of control and response to influence attempts 1. *Journal of Personality*, *39*(3), 407-419.

Caplan, G. (1974). *Support Systems and Community Mental Health*. (Behavioral Publications, New York.

Carter M (2005). Adherence, Information series for HIV positive people, NAM.

Retrieved March 14, 2019: http://www.aidmap.com.

Carter, D. F., & Hurtado, S. (2007). Bridging key research dilemmas: *Quantitative research using a critical eye*.: Wiley Periodicals, Inc.

Cassel, J. (1976). The contribution of the social environment to host resistance: the Fourth Wade Hampton Frost Lecture. *American journal of epidemiology, 104*(2), 107-123.

Chibango, C. (2013). South Africa's HIV and AIDS policy and legislation: An analysis. *Greener Journal of Medical Sciences*, *3*(6), 240-250.

Chilisa, B., & Kawulich, B. (2012). Selecting a research approach: paradigm, methodology, and methods. *C Wagner, B Kawulich, & M Garner, Doing social research: A global context*, 51-61.

Christensen A. (2004) Patient adherence to medical treatment regimens: *bridging the gap between behavioral science and biomedicine.* New Haven, CT: Yale University Press.

Cobb, S. (1976). Social support as a moderator of life stress. *Psychosomatic medicine.*

Cohen, J. (1988). Statistical power analysis for the behavioral sciences (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, S., & Hoberman, H. M. (1983). Positive events and social supports as buffers of life change stress 1. *Journal of applied social psychology, 13*(2), 99-125.

Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological bulletin*, *98*(2), 310.

Cohen, S., Underwood, L. G., & Gottlieb, B. H. (Eds.). (2000). *Social support measurement and intervention: A guide for health and social scientists*. Oxford University Press.

Collins, H. M., & Cox, G. (1976). Recovering relativity: did prophecy fail?. *Social Studies of Science*, *6*(3-4), 423-444.

Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology*, *78*(1), 98–104.

Coutinho, M. F. C., O'Dwyer, G., & Frossard, V. (2018). Antiretroviral treatment: adherence and the influence of depression in users with HIV/Aids treated in primary care. *Saúde em Debate*, *42*, 148-161.

Creswell, J. W. (2014). *Research design*: *qualitative, quantitative, and mixed methods approaches.*(4th Ed).SAGE Publications, Inc.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *psychometrika*, *16*(3), 297-334.

Cutrona, C. E., & Russell, D. W. (1990). Type of social support and specific stress: Toward a theory of optimal matching.

Dalal, R. P., MacPhail, C., Mqhayi, M., Wing, J., Feldman, C., Chersich, M. F., &

Venter, W. D. (2008). Characteristics and outcomes of adult patients lost to follow-up at an antiretroviral treatment clinic in Johannesburg, South Africa. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *47*(1), 101-107.

Dalmida, S. G., McCoy, K., Koenig, H. G., Miller, A., Holstad, M. M., Thomas, T., Clayton-Jones, D., Grant, M., Fleming, T., Wirani, M.M & Mugoya, G. (2017). Examination of the role of religious and psychosocial factors in HIV medication adherence rates. *Journal of religion and health*, *56*(6), 2144-2161.

Daly, J., Elliott, D., Cameron-Traub, E., & Salamonson, Y. (2000). Health status, perceptions of coping, and social support immediately after discharge of survivors of acute myocardial infarction. *American Journal of Critical Care*, *9*(1), 62.

De Jager, G. A., Crowley, T., & Esterhuizen, T. M. (2018). Patient satisfaction and treatment adherence of stable human immunodeficiency virus-positive patients in antiretroviral adherence clubs and clinics. *African journal of primary health care & family medicine*, *10*(1), 1-8.

De Vos, A. S., Delport, C. S. L., Fouche, C., & Strydom, H. (2011). *Research at grass roots: A primer for the social science and human professions*. Van Schaik Publishers.

Dean, A., & Lin, N. (1977). The stress-buffering role of social support. *Journal of Nervous and Mental Disease*, *165*(6), 403–417.

Department of Health, South Africa. 2016. *The South African Antiretroviral*

Treatment Guidelines. Pretoria, Retrieved April 29, 2020 from: https://www.gov.za/sites/default/files/gcis_document/201710/national-department-health-annual-report-2016-2017a.pdfb

Department of Health. 2003. *National Antiretroviral Guidelines*. South Africa: Maintenance Press.

Department of Labour. 2003. *HIVAIDS Technical Assistance Guidelines*. Cape Town: Department of Labour.

Ditzen, B., & Heinrichs, M. (2014). Psychobiology of social support: the social dimension of stress buffering. *Restorative neurology and neuroscience*, *32*(1), 149-162.

Dohrenwend, B. S., & Dohrenwend, B. P. (1981). Socioenvironmental factors, stress, and psychopathology. *American Journal of Community Psychology*, *9*(2), 123.

Duru, E. (2007). Re-examination of the psychometric characteristics of the multidimensional scale of perceived social support among Turkish university students. *Social Behavior and Personality: an international journal*, *35*(4), 443-452.

Emir, B. C. (2016). Literature and Psychology in the Context of the Interaction of Social Sciences.

Ensel, W. M., & Lin, N. (1991). The life stress paradigm and psychological distress. *Journal of Health and Social behavior*, 321-341.

EThekwini District AIDS Council Quarter 1. (2017/2018). *By 2030 eThekwini will be*

Africa's most Caring and Liveable City. Retrieved March 07, 2019 from: www.kznonline.gov.za/hivaids/councils/...Councils...AIDS/.../eThekwini%20.

Furman K. Mbeki's AIDS denialism: Thabo Mbeki's support of dissident HIV/AIDS scientists is a cautionary tale for policy makers dealing with competing sets of evidence. Think Africa Press, 17 November 2011. Retrieved April 12, 2019 from: http://thinkafricapress.com/south-africa/mbeki-aids-denialism.

George, S., McGrath, N., & Oni, T. (2019). The association between a detectable HIV viral load and non-communicable diseases comorbidity in HIV positive adults on antiretroviral therapy in Western Cape, South Africa. *BMC infectious diseases*, *19*(1), 1-11.

Goffman, E. (1963). Stigma and social identity. *Understanding deviance: Connecting classical and contemporary perspectives*, *256*, 265.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report*, 8(4), 597-606.

Gottlieb, B. (1985). Theory into practice: Issues that surface in planning interventions which mobilize support. *In Social support: Theory, research and applications* (pp. 417-437). Springer, Dordrecht.

Gray, C. D., & Kinnear, P. R. (2012). *IBM SPSS statistics 19 made simple*. Psychology Press.

Guba, E. G., & Lincoln, Y. S. (2001). Guidelines and checklist for constructivist (aka fourth generation) evaluation.

Habboushe DF. (2001). Coping style and locus of control: *predicting daily adherence to self-monitoring of blood glucose in women with gestational diabetes mellitus*. Dissertation abstracts international;section B:2484.

Habib, F., & Durrani, A. M. (2016). Relation of healthy eating and exercise with glycemic control among type 2 diabetic patients. *Int J Health Sci Res*, *6*(2), 360-363.

Hassan, Z. A., Schattner, P., & Mazza, D. (2006). Doing a pilot study: why is it essential?. *Malaysian family physician: the official journal of the Academy of Family Physicians of Malaysia*, *1*(2-3), 70.

Heestermans, T., Browne, J. L., Aitken, S. C., Vervoort, S. C., & Klipstein-Grobusch, K. (2016). Determinants of adherence to antiretroviral therapy among HIV-positive adults in sub-Saharan Africa: *a systematic review*. BMJ global health, 1(4), e000125.

Henderson, S. (1977). The social network, support and neurosis: The function of attachment in adult life. *The British Journal of Psychiatry*, *131*(2), 185-191.

Heyer, A., & Ogunbanjo, G. A. (2006). Adherence to HIV antiretroviral therapy: Part I: A review of factors that influence adherence. *South African Family Practice*, 48(8), (p. 5-9).

Hosmer, D.W. and Lemeshow, S. (2000). *Applied logistic regression*. 2nd Edition, John Wiley & Sons, Inc., New York.

House, J. S. (1981). Work stress and social support. Reading MA: Addison-Wesley

House, J. S., Landis, K. R., & Umberson, D. (1988). Social relationships and health. *Science*, *241*(4865), 540-545. Ioannides, K.L., Chapman

Hudelson, C., & Cluver, L. (2015). Factors associated with adherence to antiretroviral therapy among adolescents living with HIV/AIDS in low- and middle-income countries: a systematic review. *AIDS Care. 27* (7), 805–16.

Human Sciences Research Council. (2014). *South African National HIV Prevalence, Incidence and Behaviour Survey 2012.* Retrieved April 12, 2019 from: www.hsrc.ac.za/uploads/pageContent/4565/SABSSM%20IV%20LEO%20final.pdf.

Hupcey, J. E. (1998). Clarifying the social support theory-research linkage. *Journal of advanced nursing*, *27*(6), 1231-1241.

Jacoby, A. (1994). Felt versus enacted stigma: A concept revisited: Evidence from a study of people with epilepsy in remission. *Social science & medicine*, *38*(2), 269-274.

James, W. H., Woodruff, A., & Werner, W. (1965). Effect of internal and external control upon changes in smoking behavior. *Journal of Consulting Psychology*, *29*(2), 184.

Johnson, M. O., Neilands, T. B., Dilworth, S. E., Morin, S. F., Remien, R. H., & Chesney, M. A. (2007). The role of self-efficacy in HIV treatment adherence: validation of the HIV Treatment Adherence Self-Efficacy Scale (HIV-ASES). *Journal of behavioral medicine*, *30*(5), 359-370.

Johnson, T., & Fendrich, M. (2005). Modeling sources of self-report bias in a survey of drug use epidemiology. *Annals of epidemiology*, *15*(5), 381-389.

Joppe, M. (2000). *The Research Process*. Retrieved February 25, 2019, from http://www.ryerson.ca/~mjoppe/rp.htm

Judge, T. A., & Ilies, R. (2002). Relationship of personality to performance motivation: A meta-analytic review. *Journal of applied psychology*, *87*(4), 797.

Kahn, R. L., Antonucci, T. C., Baltes, P. B., & Brim, O. G. (1980). Life-span development and behavior. *New York: Academic*.

Karademas, E. C. (2006). Self-efficacy, social support and well-being: The mediating role of optimism. *Personality and individual differences*, *40*(6), 1281-1290.

Katz, I. T., Ryu, A. E., Onuegbu, A. G., Psaros, C., Weiser, S. D., Bangsberg, D. R., & Tsai, A. C. (2013). Impact of HIV-related stigma on treatment adherence: systematic review and meta-synthesis. *Journal of the International AIDS Society*, *16*, 18640.

Kekwaletswe, C. T., Jordaan, E., Nkosi, S., & Morojele, N. K. (2017). Social support and the mediating roles of alcohol use and adherence self-efficacy on antiretroviral therapy (ART) adherence among ART recipients in Gauteng, South Africa. *AIDS and Behavior*, *21*(7), 1846-1856.

Kelly, J. D., Hartman, C., Graham, J., Kallen, M. A., & Giordano, T. P. (2014). Social

support as a predictor of early diagnosis, linkage, retention, and adherence to HIV care: results from the steps study. *Journal of the Association of Nurses in AIDS Care*, *25*(5), 405-413.

Kheswa, J. G. (2017). Exploring the factors and effects of non-adherence to antiretroviral treatment by people living with HIV/AIDS. *Indo-Pacific Journal of Phenomenology*, *17*(1).

Khotimah, S., Hargono, R., & Fatah, M. Z. (2018). Self-efficacy and adherence to antiretroviral (ARV) drug therapy among people living with HIV-AIDS (PLWHA). *International Journal of Public Health and Clinical Sciences*, *5*(5), 81-87.

Kitshoff, C., & Naidoo, S. S. (2012). The association between depression and adherence to antiretroviral therapy in HIV-positive patients, KwaZulu-Natal, South Africa. *South African Family Practice*, *54*(2).

Knobel, H., Alonso, J., Casado, J. L., Collazos, J., González, J., Ruiz, I., & GEEMA Study Group. (2002). Validation of a simplified medication adherence questionnaire in a large cohort of HIV-infected patients: the GEEMA Study. *Aids*, *16*(4), 605-613.

Koole, O., Denison, J. A., Menten, J., Tsui, S., Wabwire-Mangen, F., Kwesigabo, G., ... & Colebunders, R. (2016). Reasons for missing antiretroviral therapy: results from a multi-country study in Tanzania, Uganda, and Zambia. *PloS one*, *11*(1), e0147309.

Kort-Butler, L. A. (2017). Health-related strains and subsequent delinquency and marijuana use. *Youth & Society*, *49*(8), 1077-1103.

Krauss, S. E. (2005). Research paradigms and meaning making: A primer. *The qualitative report*, *10*(4), 758-770.

Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The PHQ-9: validity of a brief depression severity measure. *Journal of general internal medicine*, *16*(9), 606-613.

L'akoa, R. M., Noubiap, J. J. N., Fang, Y., Ntone, F. E., & Kuaban, C. (2013). Prevalence and correlates of depressive symptoms in HIV-positive patients: a cross-sectional study among newly diagnosed patients in Yaoundé, Cameroon. *BMC psychiatry*, *13*(1), 1-7.

Lakey, B., & Cassady, P. B. (1990). Cognitive processes in perceived social support. *Journal of Personality and Social Psychology*, *59*(2), 337.

Lakey, B., & Cohen, S. (2000). *Social support theory and measurement.* In S. Cohen, L. G. Underwood, & B. H. Gottlieb (Eds.), *Social support measurement and intervention: A guide for health and social scientists* (p. 29–52). Oxford University Press.

Lakey, B., & Drew, J. B. (1997). A social-cognitive perspective on social support. In *Sourcebook of social support and personality* (pp. 107-140). Springer, Boston, MA.

Langford, C. P. H., Bowsher, J., Maloney, J. P., & Lillis, P. P. (1997). Social support: a conceptual analysis. *Journal of advanced nursing*, *25*(1), 95-100.

Leavy, P. (2017). *Research design: Quantitative, qualitative, mixed methods, arts-based, and community-based participatory research approaches*. Guilford Publications.

Lee, R. S., Kochman, A., & Sikkema, K. J. (2002). Internalized stigma among people living with HIV-AIDS. *AIDS and Behavior*, *6*(4), 309-319.

Lemeshow, S., Hosmer, D. W., Klar, J., Lwanga, S. K., & World Health Organization. (1990). *Adequacy of sample size in health studies*. Chichester: Wiley.

Leon, L., Jauffret-Roustide, M., & Le Strat, Y. (2015). Design-based inference in time-location sampling. *Biostatistics*, *16*(3), 565-579.

Levenson, H. (1981). Differentiating among internality, powerful others, and chance. *Research with the locus of control construct*, *1*, 15-63.

Li, X., Huang, L., Wang, H., Fennie, K. P., He, G., & Williams, A. B. (2011). Stigma mediates the relationship between self-efficacy, medication adherence, and quality of life among people living with HIV/AIDS in China. *AIDS patient care and STDs*, *25*(11), 665-671.

Link, B. G., & Phelan, J. C. (2001). Conceptualizing stigma. *Annual review of Sociology*, *27*(1), 363-385.

Malle, B. F. (2004). How the mind explains behavior. *Folk Explanation, Meaning and Social Interaction. Massachusetts: MIT-Press.Management of HIV & AIDS in Adults and Adolescents*. Pretoria, Retrieved May 05, 2019 from: 00023294.pdf (mm3admin.co.za)

Mao, Y., Li, X., Qiao, S., Zhou, Y., & Zhao, Q. (2017). Ethnicity, Stigma and

Adherence to Antiretroviral Therapy (ART) among People Living with HIV/AIDS in Guangxi, China. *Journal of AIDS & clinical research*, *8*(1).

Marsh, H. W., Richards, G. E., & Barnes, J. (1986). Multidimensional self-concepts: A long-term follow-up of the effect of participation in an Outward Bound program. *Personality and Social Psychology Bulletin*, *12*(4), 475-492.

Martinez, J., Harper, G., Carleton, R. A., Hosek, S., Bojan, K., Clum, G., & Ellen, and the Adolescent Medicine Trials Network, J. (2012). The impact of stigma on medication adherence among HIV-positive adolescent and young adult females and the moderating effects of coping and satisfaction with health care. *AIDS patient care and STDs*, *26*(2), 108-115.

Maskew, M., MacPhail, P., Menezez, C., & Rubel, D. (2007). Lost to follow up– contributing factors and challenges in South African patients on antiretroviral therapy. *South African medical journal*, *97*(9), 853-857.

Mathebula, T. J. (2015). *Reasons for default follow-up of antiretroviral treatment at Thekganang ARV clinic* (Doctoral dissertation, University of Pretoria).

Mbonye, M., Nakamanya, S., Birungi, J., King, R., Seeley, J., & Jaffar, S. (2013). Stigma trajectories among people living with HIV (PLHIV) embarking on a life time journey with antiretroviral drugs in Jinja, Uganda. *BMC public health*, *13*(1), 1-11.

McKay, G. (1984). Social Support, Stress and the Buffering Hypothesis: A. Theoretical Analysis. *Handbook of psychology and health*, *2*, 253.

Mead, G. H. (1934). *Mind, self and society* (Vol. 111). University of Chicago Press.: Chicago.

Mishra, P., Pandey, C. M., Singh, U., Gupta, A., Sahu, C., & Keshri, A. (2019). Descriptive statistics and normality tests for statistical data. *Annals of cardiac anaesthesia*, *22*(1), 67.

Moraes, R. P. D., & Casseb, J. (2017). Depression and adherence to antiretroviral treatment in HIV-positive men in São Paulo, the largest city in South America: Social and psychological implications. *Clinics*, *72*(12), 743-749.

Moratioa, G. (2008). *Psychosocial factors that affect adherence to antiretroviral therapy amongst HIV/AIDS patients at Kalafong hospital* (Doctoral dissertation, University of Pretoria).

Moratioa, G. (2008). *Psychosocial factors that affect adherence to antiretroviral therapy amongst HIV/AIDS patients at Kalafong hospital* (Doctoral dissertation, University of Pretoria).

Morowatisharifabad, M., Mazloomy Mahmoodabad, S., Baghianimoghadam, M., & Rouhani Tonekaboni, N. (2009). Relationships between locus of control and adherence to diabetes regimen. *Journal of research in health sciences*, *9*(1), 37-44.

Muijs, D. (2010). *Doing Quantitative Research in Education with SPSS*. SAGE Publications.

Mulelu, R. A. (2016). *Knowledge, Attitudes and Experiences of PeopleLiving with*

HIV who are on Antiretroviral Treatment at a Public Health Clinic in Limpopo, South Africa (Doctoral dissertation).

Mulqueeny, D. M., & Taylor, M. (2017). Patients' recommendations for a patient-centred public antiretroviral therapy programme in eThekwini, KwaZulu-Natal. *Southern African journal of HIV medicine*, *18*(1).

Naar-King, S., Templin, T., Wright, K., Frey, M., Parsons, J. T., & Lam, P. (2006). Psychosocial factors and medication adherence in HIV-positive youth. *AIDS Patient Care & STDs*, *20*(1), 44-47.

Nakimuli-Mpungu, E., Bass, J. K., Alexandre, P., Mills, E. J., Musisi, S., Ram, M. & Nachega, J. B. (2012). Depression, alcohol use and adherence to antiretroviral therapy in sub-Saharan Africa: a systematic review. *AIDS and Behavior*, *16*(8), 2101-2118.

National Department of Health, South Africa. 2009. *HIV & AIDS and STI Strategic Plan for South Africa*. Pretoria, Retrieved May 13, 2019 from: https://pmg.org.za/files/docs/090706stratplan-edt.pdf

Nattrass, N. (2008). AIDS and the scientific governance of medicine in post-apartheid South Africa. *African affairs*, *107*(427), 157-176.

Neff, M (2012). Relationships among Acculturation, Self-positivity Bias, Stigma, and Condom Use in a Sample of Urban College Students. Theses dissertation. Virginia Commonwealth, University.

Neuman, W.L. (2014). *Social research methods: Qualitative and quantitative*

approaches. Pearson.

Ngum, P. A., Fon, P. N., Ngu, R. C., Verla, V. S., & Luma, H. N. (2017). Depression among HIV/AIDS patients on highly active antiretroviral therapy in the southwest regional hospitals of Cameroon: a cross-sectional study. *Neurology and therapy*, *6*(1), 103-114.

Norbeck, J. S., Lindsey, A. M., & Carrieri, V. L. (1981). The development of an instrument to measure social support. *Nursing research*.

Ntshwarang, P. N., & Malinga-Musamba, T. (2012). Social workers working with HIV and AIDS in health care settings: A case study of Botswana. *Practice*, *24*(5), 287-298.

Nurfalah, F., Yona, S., & Waluyo, A. (2019). The relationship between HIV stigma and adherence to antiretroviral (ARV) drug therapy among women with HIV in Lampung, Indonesia. *Enfermeria clinica*, *29*, 234-237.

Osterberg, L., & Blaschke, T. (2005). Adherence to medication. *New England journal of medicine*, *353*(5), 487-497.

Phillips, K. D., Moneyham, L., & Tavakoli, A. (2011). Development of an instrument to measure internalized stigma in those with HIV/AIDS. *Issues in Mental Health Nursing*, *32*(6), 359-366.

Pierce, T., Baldwin, M. W., & Lydon, J. E. (1997). A relational schema approach to

social support. In *Sourcebook of social support and personality* (pp. 19-47). Springer, Boston, MA.

Polit, D. F., & Beck, C. T. (2010). Generalization in quantitative and qualitative research: Myths and strategies. *International journal of nursing studies*, *47*(11), 1451-1458.

Reinius, M., Wettergren, L., Wiklander, M., Svedhem, V., Ekström, A. M., & Eriksson, L. E. (2017). Development of a 12-item short version of the HIV stigma scale. *Health and Quality of Life Outcomes*, *15*(1), 1-9.

Republic of South Africa. (1996). *Constitution of the Republic of South Africa, Act 108 of 1996*. Retrieved April 11, 2020, from Centre for Human Rights: http://www.chr.up.ac.za/hr_docs/countries/docs/SA_english.pdf

Republic of South Africa. (2000). *KwaZulu-Natal Provincial Health Act, Act 4 of 2000*. Retrieved March 25, 2020 from: KZN Health Act, 4/2000.

Republic of South Africa. (2003). *National Health Act, Act 61 of 2003.* Retrieved March 25, 2020, from Department of Health: National Health Act 61 of 2003 | South African Government (www.gov.za).

Ross, A. W. (1975). Predicting success in weight reduction as a function of locus of control: A unidimensional and multidimensional approach. *Journal of Consulting and Clinical Psychology*, *43*(1), 119-119.

Ross, C. E., & Mirowsky, J. (1989). Explaining the social patterns of depression:

Control and problem solving--or support and talking?. *Journal of health and social behavior*, 206-219.

Rothgeb, J.M. (2008). Methods for testing and evaluating survey questions. *Public Opinion Quarterly*, Vol. 68, No. 1, pp. 109-130.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological monographs: General and applied*, *80*(1), 1.

Rotter, J. B. (1975). Some problems and misconceptions related to the construct of internal versus external control of reinforcement. *Journal of consulting and clinical psychology*, *43*(1), 56.

Rotter, J. B., Chance, J. E., & Phares, E. J. (1972). Applications of a social learning theory of personality. *Journal of consulting and clinical psychology.*

Roxburgh, M. (2006). An exploration of factors which constrain nurses from research participation. *Journal of clinical nursing*, *15*(5), 535-545.

Roxburgh, S. (2004). "There Just Aren't Enough Hours in the Day': The Mental Health Consequences of Time Pressure. *Journal of health and social behavior*, *45*(2), 115-131.

SANAC. South African National AIDS Council. (2007). *HIV & AIDS and STI Strategic Plan for South Africa 2007-2011*. Pretoria, Retrieved April 30, 2020 from: https://www.unaids.org/en/resources/documents/.../20070604_sa_nsp_final_en.pdf

SANAC. South African National AIDS Council. (2010). Clinical Guidelines: PMTCT (Prevention of Mother-to-Child Transmission). Retrieved 16 May, 2019 from: https://sahivsoc.org/Files/NDOH_PMTCT%20Apr%202008.pdf.

SANAC. South African National AIDS Council. (2011).*The National Strategic Plan on HIV, STIs and TB, 2012 - 2016*. Pretoria, Retrieved April 30, 2020 from: http://www.sahivsoc.org/upload/documents/National_Strategic_Plan_2012.pdf

SANAC. South African National AIDS Council. (2017). *Let our actions count: South Africa's National Strategic Plan for HIV, TB and STIs 2017-2022*. Pretoria, Retrieved May 1, 2020 from: https://sanac.org.za/wp-content/uploads/2020/01/114725-ME-Plan-3rd-Proof-5-Aug.pdf

Sarason, B. R., Pierce, G. R., & Sarason, I. G. (1990). *Social support: The sense of acceptance and the role of relationships.* In B. R. Sarason, I. G. Sarason, & G. R. Pierce (Eds.), *Wiley series on personality processes. Social support: An interactional view* (p. 97–128). John Wiley & Sons.

Sarason, B. R., Sarason, I. G., Hacker, T. A., & Basham, R. B. (1985). Concomitants of social support: Social skills, physical attractiveness, and gender. *Journal of Personality and Social Psychology*, *49*(2), 469.

Sarason, I. G., & Sarason, B. R. (2009). Social support: Mapping the construct. *Journal of Social and Personal Relationships*, *26*(1), 113-120.

Shumaker, S. A., & Brownell, A. (1984). Toward a theory of social support: Closing

conceptual gaps. *Journal of social issues*, *40*(4), 11-36.

Simelela, N. P., & Venter, W. D. F. 2014. A brief history of South Africa's response to AIDS. *SAMJ: South African Medical Journal*, *104*(3), 249-251.

Simoni, J. M., Frick, P. A., & Huang, B. (2006). A longitudinal evaluation of a social support model of medication adherence among HIV-positive men and women on antiretroviral therapy. *Health psychology*, *25*(1), 74.

Sin, N. L., & DiMatteo, M. R. (2014). Depression treatment enhances adherence to antiretroviral therapy: a meta-analysis. *Annals of Behavioral Medicine*, *47*(3), 259-269.

Singh A.S., Masuku M. (2014). Sampling techniques and determination of sample size in applied statistics research: *an overview International Journal of Economics, Commerce and Management, United Kingdom*, 2(11): 1–22

Song, Lijun, Joonmo Son, and Nan Lin. 2011. “Social Support.” Pp. 116-128 in *The Sage Handbook of Social Network Analysis*, Carrington. London: SAGE.

Statistics South Africa. (2018). Mid-year population estimates 2018. Retrieved March 06, 2019 from: https://www.statssa.gov.za/publications/P0302/P03022018.pdf.

Strömwall, L. A., Alfredsson, H., & Landström, S. (2013). Rape victim and perpetrator blame and the Just World hypothesis: The influence of victim gender and age. *Journal of sexual aggression*, *19*(2), 207-217.

Sumbi, M. V. (2011). Assessment of factors influencing adherence to antiretroviral

therapy at Nyeri provincial hospital in Central Kenya (Doctoral dissertation).

Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics*. Boston: Pearson Education.

Tadios, Y., & Davey, G. (2006). Antiretroviral treatment adherence and its correlates in Addis Ababa, Ethiopia. *Ethiopian medical journal*, *44*(3), 237-244.

Tao, J., Vermund, S. H., & Qian, H. Z. (2018). Association between depression and antiretroviral therapy use among people living with HIV: a meta-analysis. *AIDS and Behavior*, *22*(5), 1542-1550.

Theofanidis, Dimitrios, & Fountouki, Antigoni. (2019). *Limitations And Delimitations In The Research Process*. Perioperative nursing (GORNA), E-ISSN:2241-3634, 7(3), 155–162.

Thoits, P. A. (1982). Conceptual, methodological, and theoretical problems in studying social support as a buffer against life stress. *Journal of Health and Social behavior*, 145-159.

Thoits, P. A. (1995). Stress, coping, and social support processes: Where are we? What next?. *Journal of health and social behavior*, 53-79.

Thoits, P. A. (1999). Sociological approaches to mental illness. *A handbook for the study of mental health*, 121-138.

Thompson, M. A., Aberg, J. A., Hoy, J. F., Telenti, A., Benson, C., Cahn, P., P., Eron,

J.J., Günthard, H.F., Hammer, S.M., Reiss, P. & Richman, D. D. (2012). Antiretroviral treatment of adult HIV infection: *2012 recommendations of the International Antiviral Society–USA panel.* Jama, 308(4), 387-402.

Tilden, V. P., & Weinert, C. (1987). Social support and the chronically ill individual. *The Nursing Clinics of North America*, *22*(3), 613-620.

Tsai, A. C., Bangsberg, D. R., Emenyonu, N., Senkungu, J. K., Martin, J. N., & Weiser, S. D. (2011). The social context of food insecurity among persons living with HIV/AIDS in rural Uganda. *Social science & medicine*, *73*(12), 1717-1724.

Turner, R. J. (1999). *Social support and coping.* In A. V. Horwitz & T. L. Scheid (Eds.), *A handbook for the study of mental health: Social contexts, theories, and systems* (p. 198–210). Cambridge University Press

Tyupa, S. (2011). A theoretical framework for back-translation as a quality assessment tool. *New Voices in Translation Studies*, *7*(1), 35-46.

Uchino, B. N. (2006). Social support and health: a review of physiological processes potentially underlying links to disease outcomes. *Journal of behavioral medicine*, *29*(4), 377-387.

Umar, E., Levy, J. A., Donenberg, G., Mackesy-Amiti, M. E., Pujasari, H., & Bailey, R. C. (2019). The Influence of Self-efficacy on The Relationship Between Depression and HIV-related Stigma with ART Adherence Among The Youth in Malawi. *Jurnal Keperawatan Indonesia*, *22*(2), 147-160.

UNAIDS. (2013). *UNAIDS Annual Report on Global AIDS epidemic 2013*. Retrieved June 16, 2020, from: 2013 UNAIDS Report on the global AIDS epidemic | UNAIDS

UNAIDS. (2008). *Report on Global AIDS Epidemic*: Geneva. Retrieved May 19, 2019, from: jc1510_2008globalreport_en_0.pdf

UNAIDS. (2010). *Report on Global AIDS Epidemic*: Geneva. Available at: https://www.unaids.org/globalreport/Global_report.htm (Accessed 09 April 2019).

UNAIDS. (2012). UNAIDS Annual Report on Global AIDS Epidemic 2012. Retrieved June 02, 2020, from: 2012 UNAIDS Report on the Global AIDS Epidemic UNAIDS

UNAIDS. (2014). *UNAIDS Gap Report 2014*: Geneva. Retrieved June 17, 2020, from: https://www.unaids.org/en/media/unaids/contentassets/documents/unaidspublication/2014/UNAIDS_Gap_report_en.pdf

UNAIDS. (2016). *Report on Global AIDS Epidemic 2016:* Geneva. Retrieved May 11, 2021 from: Global AIDS Update 2016 UNAIDS

UNAIDS. (2018). UNAIDS Data 2019: Geneva. Retrieved June 02, 2020, from: UNAIDS data 2018 UNAIDS.

UNAIDS. (2019). *UNAIDS Data 2019*: Geneva. Retrieved May 15, 2020, from: UNAIDS data 2019 UNAIDS.

UNAIDS. (2020). *UNAIDS Data 2019*: Geneva. Retrieved January 11, 2021, from:

UNAIDS data 2020 UNAIDS.

Uthman, O. A., Magidson, J. F., Safren, S. A., & Nachega, J. B. (2014). Depression and adherence to antiretroviral therapy in low-, middle-and high-income countries: a systematic review and meta-analysis. *Current Hiv/aids Reports*, *11*(3), 291-307.

Van Dyk, A.C. (2010) Treatment adherence following national antiretroviral rollout in South Africa. *African Journal of AIDS Research* 9(3), pp. 235-247.

Vawda, Y. A., & Variawa, F. (2012). Challenges confronting health care workers in government's ARV rollout: rights and responsibilities. *Potchefstroom Electronic Law Journal/Potchefstroomse Elektroniese Regsblad*, *15*(2).

Vishwakarma, G. (2017). *Sample Size and Power Calculation*. Research methodology. Rajiv Gandhi Cancer Institute.

Wagner, G. J., Ghosh-Dastidar, B., Robinson, E., Ngo, V. K., Glick, P., Mukasa, B., & Akena, D. (2018). Effects of depression alleviation on ART adherence and HIV clinic attendance in Uganda, and the mediating roles of self-efficacy and motivation. *AIDS and Behavior*, *21*(6), 1655-1664.

Wallston, B. S., Wallston, K. A., Kaplan, G. D., & Maides, S. A. (1976). Development and validation of the health locus of control (HLC) scale. *Journal of consulting and clinical psychology*, *44*(4), 580.

Wallston, K. A., Strudler Wallston, B., & DeVellis, R. (1978). Development of the

multidimensional health locus of control (MHLC) scales. *Health education monographs*, *6*(1), 160-170.

Wheaton, B. (1985). Models for the stress-buffering functions of coping resources. *Journal of health and social behavior*, 352-364.

Williams, P. (2005). *What is social support? : A grounded theory of social interaction in the context of the new family* (Doctoral dissertation).

Wills, T. A. (1991). *Social support and interpersonal relationships.* In M. S. Clark (Ed.), *Review of personality and social psychology, Vol. 12. Prosocial behavior* (p. 265–289). Sage Publications, Inc.

Wilson, J. R., & Lorenz, K. A. (2015). *Modeling binary correlated responses using SAS, SPSS and R* (Vol. 9). Springer.

World Health Organization. 2004. *The Global Burden of Disease 2004*. Retrieved April 19, 2020 from: WHO The global burden of disease: 2004 update

World Health Organization. 2010. World Health Statistics 2010. Retrieved April 22, 2020 from: WHO World Health Statistics 2010

World Health Organization. 2013. *World Health Statistics 2013*. Retrieved May 18, 2020 from: https:// World health statistics /EN_WHS2013_Full.pdf

World Health Organization. The World Health Report 2003. Geneva: World Health

Organization; 2002. Retrieved April 27, 2020 from: https://www.who.int/whr/2003/en/whr03_en.pdf

Zaky, N. H. (2016). The relationship between health locus of control, knowledge and adherence to antihypertensive regimen among woman with preeclampsi. *Am J Nurs Res*, *4*, 41-50.

Zastrow, C. (2004*). Introduction to social work and social welfare: Empowering people.* Belmont: Thomson Brooks/Cole.

Zimet, G. D., Dahlem, N. W., Zimet, S. G., & Farley, G. K. (1988). The multidimensional scale of perceived social support. *Journal of personality assessment*, *52*(1), 30-41.

Zimmerman, B. J., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American educational research journal*, *31*(4), 845-862.

Zuckerman, M., & Gerbasi, K. C. (1977). Belief in a just world and trust. *Journal of Research in Personality*, *11*(3), 306-317.

Appendix A: Study questionnaire (English Version)

UNIVERSITY OF KWAZULU-NATAL

School of Applied Human Sciences

Discipline of Social Work

Masters Research

INFORMED CONSENT

Information Sheet and Consent to Participate in Research

Dear Participant

My name is Muziwandile Luthuli from University of Kwa-Zulu Natal (Howard College) in Humanities under the School of Applied Human Sciences, email address is 215022449@stu.ukzn.ac.za and my contact number is 0711567684.

You are kindly asked to consider partaking in the research study that aims to investigate the relationship between depression, HIV stigma and adherence to antiretroviral therapy (ART) among adult patients living with HIV at a tertiary hospital in Durban, South Africa: The mediating roles of self-efficacy and social support.

The study may possibly encompass the subsequent risks and or discomforts: The psychological risks namely emotional trauma or distress and social risks such as stigma and discrimination. On the other hand, we hope that the study will offer the benefits to participants as followa: first and foremost, the study does not entail direct benefits to its participants however, it will be beneficial substantially in informing policy makers as well as healthcare professionals to improve adherence practices and develop evidence-based interventions geared to enhance adherence to ART among PLWHA. In the event of the occurrence of the potential risks outlined above when conducting the research, the process will be stopped and relevant referral will be made for psychosocial interventions that are available within the hospital setting.

This study has undergone full ethical review and been approved by the department of health and UKZN Humanities and Social Sciences Research Ethics Committee (HSSREC) (approval number 00000607/2019).

If you happen to have any problems or concerns/questions you are welcomed to contact the researcher at the following contact details (0711 567 684 or by email at 215022449@stu.ukzn.ac.za) or contact the (HSSREC), using contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION

Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

The participation in this research is totally voluntary and you may withdraw at any time, and the refusal or withdrawal from participating in this study, will not result in the deprivation of usual standard of healthcare service you normally entitled to here the hospital clinic. The information that you provide will be used for academic research only not for other purposes not mentioned here. Thus, if you desire to participate and remain in the study, the duration of your participation will not exceed 35 minutes.

Furthermore, due consideration will be taken to ensure confidentiality and anonymity of the participants, because this study is quantitative in design, thus the data collection tool to be used will not require your personal identifying details. The information about each research participant will have a number or alphabet on it instead of the real names. The data set that is hard copied will be kept safely in a lockable cabinet in the office of the research Supervisor while soft copies captured on SPSS will be kept securely in a secret coded folder that will be only accessible to the principal investigator and research supervisor. After a period of five years, in accordance with the rules of the University, the information will be either deleted or disposed by shredding and burning. Therefore, If you agree to participate kindly please read through the in the consent section and then provide signature as well as the today's date.

CONSENT

I consent that I have been informed about the study mentioned above by the researcher, Muziwandile Luthuli.

I comprehend the purpose and processes of the study as the principal investigator has alluded.

I agree that I have been afforded an opportunity to ask questions about the study and have had responses to my satisfaction.

I assert that my participation in this study is totally voluntary and that I can withdraw from it at any point in time without disturbing any of the service that I am typically eligible to here in the health facility.

If I happen to have any further questions/concerns or queries pertaining to the study, I know that I may contact the principal investigator using the contact details provided.

If I happen to have any additional queries or concerns about my rights as a study participant, or if I am concerned about a certain part of the study or about the principal investigator then I may contact HSSREC using the contact details as follows:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557 - Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

_____ _____
Signature of Participant **Date**

_____ _____
Signature of Witness **Date**
(Where applicable)

Instructions: Please answer the following questions about your socio-demographic information and tick in the box the response that best applies to you.

Part I

1. What was your age at your last birthday? :_____(years)
2. What is your sex?
   - ☐ Female
   - ☐ Male
3. What population group do you identify with?
   - ☐ African
   - ☐ White
   - ☐ Indian/Asian
   - ☐ Coloured
   - ☐ Other (please specify) :_____
4. What is your marital status?

- ☐ Never married
- ☐ Married
- ☐ Divorced
- ☐ Widowed
- ☐ Separated

5. What is your highest level of education?

- ☐ No education
- ☐ Primary education
- ☐ Secondary education
- ☐ Tertiary education

6. What is your employment status?

- ☐ Unemployed
- ☐ Formally Employed
- ☐ Self-employed
- ☐ Retired

7. Where do you currently reside? :_____
8. Which religion do you identify with?

- ☐ Muslim
- ☐ Christianity
- ☐ Hinduism
- ☐ No religion
- ☐ ther (please specify) :_____

9. What is your estimated monthly income?

- ☐ Below R3000
- ☐ R3000-R6000
- ☐ R6001-10 000
- ☐ More than R10 000

Part II

This section of the questionnaire askes about adherence to ARV medication over the **past 3 months**. Please read the questions below and tick in the box the response that best applies to you.

10. Do you ever forget to take your medicine?
    - ☐ Yes

☐ No

11. Are you careless at times about taking your medicine?

☐ Yes

☐ No

12. If at times you feel worse, do you stop taking your medicine?

☐ Yes

☐ No

13. Thinking about the last week. How often have you taken your medicine?

☐ Never

☐ 1-2 times

☐ 3-5 times

☐ 6-10 times

☐ More than 10 times

14. Did you not take any of your medicine over the last weekend?

☐ Yes

☐ No

15. Over the past 3 months, how many days have you not taken any medicine at all?

☐ Less than 2 days

☐ More than 2 days

16. Have you ever gone to bed hungry in the past 2 weeks?

☐ Yes

☐ No

17. Have you ever disclosed your HIV status to anyone?

☐ No

☐ Yes, to my Spouse/partner

☐ Yes, to a family member (s)

☐ Yes, to my Children

☐ Yes, to a Friend

☐ Yes, Other (please specify) :_____

Part III

This part of the questionnaire relates to your psychological well-being. Each question is followed by four possible responses: *(0) Not at All, (1) Several Days, (2) More Than Half the Day, (3) Nearly Every Day*. Please indicate (circle) one that best applies to you.

Over **the past 2 weeks**, how often have you been bothered by any of the following problems:

		Not At all	**Several Days**	**More Than Half the Day**	**Nearly Every Day**
19	Little interest or pleasure in doing things	0	1	2	3
20	Feeling down, depressed or hopeless	0	1	2	3
21	Trouble falling asleep, staying asleep, or sleeping too much	0	1	2	3
22	Feeling tired or having little energy	0	1	2	3
23	Poor appetite or overeating	0	1	2	3
24	Feeling bad about yourself or that you're a failure or have let yourself or your family down	0	1	2	3
25	Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
26	Moving or speaking so slowly that other people could have noticed. Or, the opposite being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
27	Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3

Part IV

This part of the questionnaire relates to stigma related to HIV. We are interested in your experiences, feelings, and opinions as to how people with HIV feel and how they are treated. Each statement is followed by four possible responses: *(1) Strongly Disagree, (2) Disagree, (3) Agree, (4) Strongly Agree*. Please read each statement carefully and indicate by circling your level of agreement or disagreement with each statement as follows.

Items	Statements	**Strongly Disagree**	**Disagree**	**Agree**	**Strongly Agree**
28	People I care about stopped calling after learning I have HIV	1	2	3	4

29	I have lost friends by telling them I have HIV	1	2	3	4
30	Some people avoid touching me once they know I have HIV	1	2	3	4
31	I work hard to keep my HIV a secret	1	2	3	4
32	Telling someone I have HIV is risky	1	2	3	4
33	I am very careful who I tell that I have HIV	1	2	3	4
34	Most people believe a person who has HIV is dirty	1	2	3	4
35	People with HIV are treated like outcasts	1	2	3	4
36	Most people are uncomfortable around someone with HIV	1	2	3	4
37	I feel guilty because I have HIV	1	2	3	4
38	People's attitudes about HIV make me feel worse about myself	1	2	3	4
39	feel I'm not as good a person as others because I have HIV	1	2	3	4

Part V

This part of the questionnaire relates to your belief in your own ability to deal with different situations. Each question is followed by four possible responses: *(0) Not at all Confident, (1) Moderately Confident, (2) Confident, (3) Totally Confident*. Please indicate (circle) the response that best applies to you.

In the past month, how confident have you been that you can:

Items		**Not at all Confident**	**Moderately Confident**	**Confident**	**Totally Confident**
40	Stick to your treatment plan even when side effects begin to interfere with daily activities?	0	1	2	3
41	Integrate your treatment into your daily routine?	0	1	2	3
42	Integrate your treatment into your daily routine even if it means taking medication or doing other things in front of people who don't know you are HIV-infected?	0	1	2	3

43	Stick to your treatment schedule even when your daily routine is disrupted?	0	1	2	3
44	Stick to your treatment schedule when you aren't feeling well?	0	1	2	3
45	Stick to your treatment schedule when it means changing your eating habits?	0	1	2	3
46	Continue with your treatment even if doing so interferes with your daily activities?	0	1	2	3
47	Continue with the treatment plan your physician prescribed even if your T-cells drop significantly in the next three months?	0	1	2	3
48	Continue with your treatment even when you are feeling discouraged about your health?	0	1	2	3
49	Continue with your treatment even when getting to your clinic appointments is a major hassle?	0	1	2	3
50	Continue with your treatment even when people close to you tell you that they don't think that it is doing any good?	0	1	2	3
51	Get something positive out of your participation in treatment, even if the medication you are taking does not improve your health?	0	1	2	3

Part VI

This part of the questionnaire relates to your support. We are interested in how you feel about the following statements and each statement is followed by seven possible responses: *(1) Very Strongly Disagree (2) Strongly Disagree, (3) Mildly Disagree, (4) Neutral, (5) Mildly Agree, (6) Strongly Agree, (7) Very Strongly Agree*.

Read each statement carefully. Please indicate (circle) how you feel about each statement:

Items	Statements	**Very Strongly Disagree**	**Strongly Disagree**	**Mildly Disagree**	**Neutral**	**Mildly Agree**	**Strongly Agree**	**Very Strongly Agree**
52	There is a special person who is around when I am in need.	1	2	3	4	5	6	7
53	There is a special person with whom I can share my joys and sorrows.	1	2	3	4	5	6	7

54	My family really tries to help me.	1	2	3	4	5	6	7
55	I get the emotional help and support I need from my family.	1	2	3	4	5	6	7
56	I have a special person who is a real source of comfort to me.	1	2	3	4	5	6	7
57	My friends really try to help me.	1	2	3	4	5	6	7
58	I can count on my friends when things go wrong.	1	2	3	4	5	6	7
59	I can talk about my problems with my family.	1	2	3	4	5	6	7
60	I have friends with whom I can share my joys and sorrows.	1	2	3	4	5	6	7
61	There is a special person in my life who cares about my feelings.	1	2	3	4	5	6	7
62	My family is willing to help me make decisions.	1	2	3	4	5	6	7
63	I can talk about my problems with my friends.	1	2	3	4	5	6	7

……THANK YOU……

Appendix B: Study questionnaire (IsiZulu Version)

Inhlolovo Yemibuzo

INYUVESI YA KWAZULU-NATAL

Isikole SeSayensi Yabantu

Kumnyango Womkhakha Wezenhlalakahle

Ucwaningo Lwesigaba Sakwa Masters

UKUCELWA KWESIVUMELWANO ESISEKELWE

Ishidi Lokwazisa kanye Nemvume Yokubamba iqhaza Kucwaningo

Mhlanganyeli othandekayo

Igama lami ngu Muziwandile Luthuli ngisuka e-Yunivesithi ya Kwa-Zulu Natal (Howard College) kwi kolishi lezabantu (Humanities) ngaphansi kwesikole se-Applied Human Sciences, ikheli lami le-imeyili lithi 215022449@stu.ukzn.ac.za bese inombolo yam yogcingo ithi 0711567684.

Uyamenywa ukuthi ubhekele ukubamba iqhaza ocwaningweni oluhlose ukuhlola ubudlelwano phakathi kokudangala, ukubandlululwa kwegciwane lesandulela ngculaza, ukuzikhandla, ukwesekwa kwezenhlalo kanye nokunamathela kwimishanguzo yesandulela ngculazi phakathi kweziguli zabantu abadala abaphila negciwane lesandulela ngculazi kanye nengculazi esibhedlela sochwepheshe eThekwini, eMzansi Africa.

Ucwaningo lungase luphathelane nezingozi ezilandelayo kanye / noma ukungaphatheki kahle: izingozi zengqondo ezinjengokuhlukumezeka ngokozwelo noma usizi nezingozi zomphakathi ezinjengokubandlululwa nokucwaswa. Siyethemba ukuthi lolu cwaningo luzodala izinzuzo ezilandelayo kubahlanganyeli: ucwaningo ngeke lunikeze izinzuzo eziqondile kubahlanganyeli, kepha-ke, kuzosiza ukwazisa abenzi bezinqubomgomo kanye nabasebenza kwezempilo ukuthuthukisa izindlela zokubambelela kanye nokuthuthukisa ukungenelela okususelwa ebufakazini obenzelwe ukuqinisa ukubambelela kwi-ART kubantu abaphila negcewane lesandulela gculazi ne gculazi. Esimeni lapho kwenzeka khona ingozi ebakhona ebalulwe ngenhla lapho kwenziwa ucwaningo, inqubo izomiswa bese kudluliselwa umbambi

weqhaza onenkinga endaweni efanelekile ezongenelela kwezengqondo nezenhlalakahle etholakala ngaphakathi kwesibhedlela.

Lolu cwaningo selubukeziwe futhi lwavunywa yiKomiti Yezokuziphatha Nezenhlalo Yezenhlalo Yezizwe Zase-UKZN (inombolo yokuvuma 00000607/2019).

Uma kwenzeka kunezinkinga noma ukukhathazeka / imibuzo ungaxhumana nomcwaningi kule nombolo (0711 567 684 noma nge-imeyili ku 215022449@stu.ukzn.ac.za) noma uthinte i-UKZN Humanities & Social Sciences Research Ethics Committee (HSSREC), usebenzisa imininingwane yokuxhumana elandelayo:

HUMANITIES & SOCIAL SCIENCES RESEARCH ETHICS ADMINISTRATION
Research Office, Westville Campus
Govan Mbeki Building
Private Bag X 54001
Durban
4000
KwaZulu-Natal, SOUTH AFRICA
Tel: 27 31 2604557- Fax: 27 31 2604609
Email: HSSREC@ukzn.ac.za

Ukubamba iqhaza kulolu cwaningo kungokuzithandela futhi ungahoxisa nganoma yisiphi isikhathi, futhi uma unqaba / uhoxa ngokuzibandakanya kwakho ngeke uthole isijeziso noma ukulahlekelwa ukwelashwa eMtholampilo Wesibhedlela. Imininingwane oyinikezayo izosetshenziselwa ucwaningo lwezezifundo kuphela hhayi kwezinye izinjongo ezingashiwo lapha. Ngakho-ke, uma ukhetha ukubhalisa futhi uhlale ocwaningweni, isikhathi sokubamba kwakho iqhaza ngeke sibe ngaphezu kwemizuzu engama-35.

Ngaphezu kwalokho, kuzocatshangwa okufanelekile ukuze kuqinisekiswe ubumfihlo nokungaziwa kwababambiqhaza, ngoba lolu cwaningo lungelikhulu ekwakhiweni, ngakho-ke ithuluzi lokuqoqa imininingwane elizosetshenziswa ngeke lidinge imininingwane yakho. Imininingwane emayelana nalowo obambe iqhaza ocwaningweni izoba nenombolo noma izinhlamvu zamagama kuyo esikhundleni samagama angempela.
Imininingwane esetshenziswe ekopishelwe emaphepheni izogcinwa kwikhabethe elikhiyekayo ehhovisi lomphathi wocwaningo lapho amakhophi athambile athathwe kwi-SPSS azogcinwa ngokuvikelekile kumafolda enamaphasiwedi enezimpawu ezizotholwa kuphela umcwaningi oyinhloko kanye nomphathi wocwaningo. Ngemuva kwenkathi yeminyaka emi-5, ngokuya ngemithetho yeNyuvesi, lolu lwazi luzosuswa noma lubhujiswe ngokusikwa nagokushiswa.

Uma uvuma ukubamba iqhaza kulolucwaningo, ngomusa sicela ufunde ngesimemezelo esigabeni semvume bese unikezela ngesiginesha ngemuva kweshidi elihlukile ozonikezwa lona.

ISIVUMELWANO

Ngiyavuma ukuthi ngazisiwe ngocwaningo olunesihloko esithi (Ubudlelwano Phakathi Kokudangala, Ukubandlululwa Kwegciwane Lesandulela Ngculaza, Ukuzikhandla, Ukwesekwa Kwezenhlalo Kanye Nokubambelela kwi-ART Phakathi

Kweziguli Zabantu Abadala Abaphila Negciwane Lesandulela Ngculazi Kanye Nengculazi Esibhedlela Sochwepheshe eThekwini.) ngu (Muziwandile Luthuli). Ngiyayiqonda inhloso nezinqubo zocwaningo. Nginikezwe ithuba lokuphendula imibuzo mayelana nalolu cwaningo futhi ngithole izimpendulo ngokwaneliseka kwami. Futhi ngiyaqonda ukuthi uhlu lwemibuzo ngeke luthathe imizuzu engaphezu kwamaminithi ayi-35. Ngiyavuma futh ngiyaqondisisa ukuthi ukubamba iqhaza kwami kulolu cwaningo kungokuzithandela ngokuphelele futhi ngingahoxisa nganoma yisiphi isikhathi ngaphandle kokuphazamisa noma yiziphi izinzuzo engivame ukuba nazo la emtholampilo wesbhedlela.

Uma ngineminye imibuzo / ukukhathazeka noma imibuzo ephathelene nocwaningo ngiyaqonda ukuthi ngingaxhumana nomcwaningi noma umphathi wocwaningo kwimininingwa yokuxhumana elandelayo.

1. Muziwandile Luthuli (Umncwaningi)
   inombolo yeselula: 0711 567 684
   i-imeyili: 215022449@stu.ukzn.ac.za

2 Prof Johannes John-Langba, (uMphathi)
   inombolo yocingo: 031 260 2792
   i-imeyili: Johnlangbaj@ukzn.ac.za

_____ _____

Isiginesha Yomhlanganyeli **Usuku**

_____ _____

Isiginesha Yofakazi **Usuku**

Imiyalelo: Uyacelwa ukuba uphendule imibuzo elandelayo mayelana nemininingwane yakho yenhlalo ngokwabantu bese ubeka uphawu ebhokisini kwimpendulo esebenza kancono kuwe.

Ingxenye yo-I:

18. Yayinjani iminyaka yakho ngosuku lwakho lokuzalwa lokugcina? :_____(iminyaka)
19. Buyini ubulili bakho?
    - ☐ Owesifazane
    - ☐ Owesilisa
20. Yiluphi uhlanga ohlangana nalo?
    - ☐ UmAfrican
    - ☐ Mhlophe
    - ☐ Umdiya
    - ☐ Coloured
    - ☐ Okunye (sicela ucacise): _____
21. Sithini isimo sakho somshado?
    - ☐ Angishadile
    - ☐ Ngishadile
    - ☐ Ngihlukanisile
    - ☐ Ngingumfelokazi/Umfelwa
    - ☐ Sihlukene

22. Iliphi izinga lakho eliphakeme lemfundo?
    - ☐ Ayikho imfundo
    - ☐ Imfundo yamabanga aphansi
    - ☐ Imfundo yesibili
    - ☐ Imfundo ephakeme
23. Sithini isimo sakho somsebenzi?
    - ☐ Angisebenzi
    - ☐ Ngiqashiwe
    - ☐ Ngiyazisebenza
    - ☐ Ngithathe umhlalaphansi
24. Uhlala kuphi njengamanje? :_____
25. Iyiphi inkolo ohlangana nayo?
    - ☐ Muslim
    - ☐ UbuKristu
    - ☐ UbuHindu
    - ☐ Ayikho inkolo
    - ☐ Okunye (sicela ucacise) :_____
26. Sithini isilinganiso somholo wakho wanyanga zonke?
    - ☐ Ngaphansi kuka-R3000
    - ☐ R3000-R6000
    - ☐ R6001-10 000
    - ☐ Ngaphuzu kuka-R10 000

Inxenye yesi-II:

Le ngxenye yohlu lwemibuzo ibuza ngokulandela imishanguzo yesandulela ngculazi ne gculazi **ezinyangeni ezi-3 ezedlule.** Uyacelwa ukuthi ufunde imibuzo engezansi bese ubeka uphawu ebhokisini kwimpendulo esebenza kangcono kuwe.

10. Wake wakhohlwa ukuphuza imishanguzo yakho?
    - ☐ Yebo
    - ☐ Cha
11. Awukhathaleli/awunandaba yini ngezikhathi ezithile ngokuthatha imishanguzo yakho?
    - ☐ Yebo
    - ☐ Cha
12. Uma ngezinye izikhathi uzizwa kabi, ngabe uyayeka ukuthatha imishanguzo yakho?
    - ☐ Yebo
    - ☐ Cha
13. Ukucabanga ngeviki eledlule. Uyithathe kangaki imishanguzo yakho?

☐ Azange

☐ Izikhathi ezi-1-2

☐ Izikhathi ezi-3-5

☐ Izikhathi ezi-6-10

☐ Izikhathi ezingaphuzu kwe-10

14. Awuthathanga nanoma yimuphi yemishanguzo yakho ngempelasonto edlule?

☐ Yebo

☐ Cha

15. Ezinyangeni ezi-3 ezedlule, zingaki izinsuku ongakaze uthathe imishanguzo yakho nhlobo?

☐ Kungaphansi kwezinsuku ezimbili

☐ Kungaphezu kwezinsuku ezimbili

16. Wake walala ulambile emavikini amabili edlule?

☐ Yebo

☐ Cha

17. Wake waveza kunoma uba ngegciwane lakho lesandulela ngculazi?

☐ Cha

☐ Yebo, kumlingani wami

☐ Yebo, kwilungu lomndeni

☐ Yebo, kwizingane zami

☐ Yebo, kumngani

☐ Yebo, Okunye (sicela ucacise): _____

Ingxenye ye-III

Le ngxenye yemibuzo iphathelene nenhlala-kahle yakho yengqondo. Umbuzo ngamunye ulandelwa izimpendulo ezine ezingenzeka: (0) Akunjalo nhlobo, (1) Izinsuku Ezimbalwa, (2) Ngaphezu Kwesigamu Sosuku, (3) Cishe Zonke Izinsuku. Sicela ukhombise ngokukokelezela eyodwa esebenza kangcono kuwe.
Emavikini ama-2 edlule, kukangakanani lapho uhlushwa khona yilezi zinkinga ezilandelayo:

		Lutho neze	Izinsuku Ezimbalwa	Ngaphezu kwesigamu sosuku	Cishe zonke izinsuku
18	Intshisakalo encane noma injabulo ngokwenza izinto	0	1	2	3
19	Ukuzizwa udangele, ucindezelekile noma uphelelwe yithemba	0	1	2	3

20	Inkinga yokulala, ukulala, noma ukulala ngokweqile	0	1	2	3
21	Ukuzizwa ukhathele noma ukuba namandla amancane	0	1	2	3
22	Ukudla okungekuhle noma ukudla ngokweqile	0	1	2	3
23	Ukuzizwa kabi ngawe noma ukuthi wisahluleki noma usuzivumele ukuzidicilela wena noma umndeni wakho phansi	0	1	2	3
24	Inkinga yokugxila ezintweni, njengokufunda iphephandaba noma ukubuka umabonakude	0	1	2	3
25	Ukuhamba noma ukukhuluma kancane kangangokuba abanye abantu bebengakubona. Noma, okuphambene nokuba yinqaba noma ukungabi nalutho kangangokuba ubelokhu uzungeza kakhulu kunokujwayelekile	0	1	2	3
26	Imicabango yokuthi ungangcono ushonile noma ukuzilimaza ngandlela thile	0	1	2	3

Ingxenye ye-IV

Le ngxenye yemibuzo iphathelene nokucwaswa okuhlobene ne-HIV. Sithanda ukwazi ngolwazi, ngemizwa nemibono yakho maqondana nokuthi abantu abane-HIV bazizwa kanjani nokuthi baphathwa kanjani. Isitatimende ngasinye silandelwa izimpendulo ezine ezingenzeka: (1) Ukungavumi kakhulu, (2) Ukungavumelani, (3) UkuVuma, (4) UkuVuma Ngamandla. Sicela ufunde isitatimende ngasinye ngokucophelela bese ukhombisa ngokukokelezela izinga lakho lesivumelwano noma ukungavumelani nesitatimende ngasinye ngokulandelayo:

Izinto	Izitatimende	Angivumi kakhulu	Angivumelani	Vuma	Vuma ngamandla
27	Abantu engibakhathalelayo bayeka ukufona ngemuva kokufunda ukuth ngine-HIV	1	2	3	4
28	Ngilahlekelwe abangane ngokubatshela ukuthi ngine-HIV	1	2	3	4
29	Abanye abantu bagwema ukungithinta uma sebazi ukuthi ngine-HIV	1	2	3	4
30	Ngisebenza kanzima ukugcina imfihlo yami ye-HIV iyimfihlo	1	2	3	4
31	Ukutshela umuntu ukuthi ngine-HIV kuyingozi	1	2	3	4
32	Ngiyaqaphelisisa kakhulu ukuthi ubani engimtshela ukuthi ngine-HIV	1	2	3	4

33	Abantu abaningi bakholelwa ukuthi umuntu one-HIV ungcolile	1	2	3	4
34	Abantu abane-HIV baphathwa njengabaxoshwa	1	2	3	4
35	Abantu abaningi abakhululeki lapho besondele nomuntu one-HIV	1	2	3	4
36	Ngizizwa nginecala ngoba ngine-HIV	1	2	3	4
37	Izimo zabantu ngegciwane lengculazi zingenza ngizwe kabi ngami	1	2	3	4
38	Ngibona sengathi angisiyena umuntu omuhle njengabanye ngoba ngine-HIV	1	2	3	4

Ingxenye ye-V

Le ngxenye yemibuzo iphathelene nenkolelo yakho emandleni akho okubhekana nezimo ezahlukahlukene. Umbuzo ngamunye ulandelwa izimpendulo ezine ezingenzeka: (0) Lutho neze Ukuzithemba, (1) Ukuzethemba Ngesizotha, (2) Ukuzithemba, (3) Ukuzithemba ngokuphelele. Sicela ukhombise ngokukokelezela impendulo esebenza kangcono kuwe.

Enyangeni edlule, ubuzithemba kanjani ukuthi ungakwazi uku:

		Lutho neze Ukuzithemba	Ukuzithemba Ngesizotha	Ukuzithemba	Ukuzithemba Ngokuphelele
39	Namathela ezinhlelweni zakho zokwelashwa noma ngabe imiphumela emibi iqala ukuphazamisa imisebenzi yansuku zonke?	0	1	2	3
40	Hlanganisa ukwelashwa kwakho nenqubo yakho yansuku zonke?	0	1	2	3
41	Hlanganisa ukwelashwa kwakho nenqubo yakho yansuku zonke noma ngabe kusho ukuphuza imishanguzo noma ukwenza ezinye izinto phambi kwabantu abangazi ukuthi une-HIV?	0	1	2	3
42	Namathela ohlelweni lwakho lokwelashwa noma ngabe inqubo yakho yansuku zonke iyaphazamiseka?	0	1	2	3
43	Namathela esimisweni sakho sokwelashwa lapho ungazizwa kahle?	0	1	2	3
44	Namathela ohlelweni lwakho lokwelashwa lapho ngisho kunezinguquko kwindlela odla ngayo?	0	1	2	3
45	Qhubeka nokwelashwa kwakho noma ngabe ukwenza njalo kuyaphazamisa imisebenzi yakho yansuku zonke?	0	1	2	3
46	Qhubeka ngecebo lokwelashwa udokotela wakho njengob ululekiwe noma ngabe ama-T-cell akho ehla kakhulu ezinyangeni ezintathu ezizayo?	0	1	2	3

47	Qhubeka nokwelashwa kwakho noma ngabe uzizwa udangele ngempilo yakho?	0	1	2	3
48	Qhubeka nokwelashwa kwakho noma ngabe ukuya emtholampilo kuyinkinga enkulu?	0	1	2	3
49	Qhubeka nokwelashwa kwakho noma ngabe abantu abasondelene nawe bekutshela ukuthi abacabangi ukuthi kukhona okuhle abakwenzayo?	0	1	2	3
50	Thola okuthile okuhle ngokuzibandakanya kwakho ekwelashweni, noma ngabe imishanguzo oyidlayo ayithuthukisi impilo yakho?	0	1	2	3

Ingxenye ye-VI

Le ngxenye yemibuzo iphathelene nokusekelwa kwakho. Sinesifiso sokwazi uzizwa kanjani ngalezi zitatimende ezilandelayo mase kuthi isitatimende ngasinye silandelwa izimpendulo eziyisikhombisa ezingenzeka: (1) Vumelani Kakhulu Kakhulu (2) Vumelani Kakhulu, (3) Ngobumnene Angivumelani, (4) Angithathi-hlangothi, (5) Ngivuma ngobumnene, (6) Ngivuma Ngamandla, (7) Ngivuma Ngamandla Kakhulu. Funda isitatimende ngasinye ngokucophelela. Sicela ukhombise ngokukokelezela ukuthi uzizwa kanjani ngesitatimende ngasinye:

	Izitatimende	Angivu-melani Kakhulu Kakhulu	Angivu-melani Kakhulu	Ngobum-nene Angivu-melani	Angithathi hlangothi	Ngivuma Ngobum-nene	Ngivuma Ngamandla	Ngivuma ngamandla kakhulu
51	Kunomuntu okhethekile osondele lapho ngidinga usizo uhlese ekhona	1	2	3	4	5	6	7
52	Kunomuntu okhethekile engingahlanganyela naye injabulo yami nosizi	1	2	3	4	5	6	7
53	Umndeni wami uzama ngempela ukungisiza.	1	2	3	4	5	6	7
54	Ngithola usizo lozwelo nokusekelwa engikudingayo emndenini wami	1	2	3	4	5	6	7
55	Nginomuntu okhethekile ongumthombo wangempela wenduduzo kimi	1	2	3	4	5	6	7
56	Abangane bami bazama ngempela ukungisiza.	1	2	3	4	5	6	7
57	Ngiyakwazi ukubheka abangane	1	2	3	4	5	6	7

	bami uma izinto zingahambi kahle							
58	Ngingakhuluma ngezinkinga zami nomndeni wami.	1	2	3	4	5	6	7
59	Nginabangane engingahlanganyela nabo injabulo yami nosizi.	1	2	3	4	5	6	7
60	Kunomuntu okhethekile empilweni yami onendaba nemizwa yami.	1	2	3	4	5	6	7
61	Umndeni wami uzimisele ukungisiza ekwenzeni izinqumo.	1	2	3	4	5	6	7
62	Ngingakhuluma ngezinkinga zami nabangane bami.	1	2	3	4	5	6	7

…… NGIYABONGA……..

Appendix C: Department of Health ethical approval letter

health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langalibalele Street, Pietermaritburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3189/ 3123 Fax: 033 394 3782
Email: [redacted]
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management

NHRD Ref No.: KZ_201911_026

Dear Mr MQ Luthuli
UKZN

Approval of research

1. The research proposal titled **'The relationship between depression, HIV-stigma and adherence to Antiretroviral Therapy among adult patients living with HIV and AIDS at a tertiary hospital in Durban: The mediating role of self-efficacy and social support'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at King Edward VIII Hospital.

2. You are requested to take note of the following:
   a. Kindly liaise with the facility manager BEFORE your research begins in order to ensure that conditions in the facility are conducive to the conduct of your research. These include, but are not limited to, an assurance that the numbers of patients attending the facility are sufficient to support your sample size requirements, and that the space and physical infrastructure of the facility can accommodate the research team and any additional equipment required for the research.
   b. Please ensure that you provide your letter of ethics re-certification to this unit, when the current approval expires.
   c. Provide an interim progress report and final report (electronic and hard copies) when your research is complete to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

[redacted]

Dr E Lutge

Chairperson, Health Research Committee

Date: 05/11/19

Fighting Disease, Fighting Poverty, Giving Hope

Appendix D: University of KwaZulu-Natal: HSSREC ethical approval letter

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

13 December 2019

Mr Muziwandile Qiniso Luthuli (215022449)
School Of Applied Human Sc
Howard College

Dear Mr Luthuli,

Protocol reference number: HSSREC/00000607/2019
Project title: The Relationship between Depression, HIV-Stigma and Adherence to Antiretroviral Therapy (ART) among Adult Patients Living with HIV/AIDS at a Tertiary Hospital in Durban: The Mediating Role of Self-Efficacy and Social Support

Approval Notification – Full Committee Reviewed Protocol

This letter serves to notify you that your response received on 09 December 2019 to our letter of 05 December 2019 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee (HSSREC) and the protocol has been granted **FULL APPROVAL**

Any alteration/s to the approved research protocol i.e. Questionnaire/Interview Schedule, Informed Consent Form, Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through the amendment/modification prior to its implementation. In case you have further queries, please quote the above reference number. PLEASE NOTE: Research data should be securely stored in the discipline/department for a period of 5 years.

This approval is valid for one year from 13 December 2019.
To ensure uninterrupted approval of this study beyond the approval expiry date, a progress report must be submitted to the Research Office on the appropriate form 2 - 3 months before the expiry date. A close-out report to be submitted when study is finished.

Yours faithfully

[redacted]

.....
Professor Urmilla Bob
University Dean of Research

/dd

Humanities & Social Sciences Research Ethics Committee
Dr Rosemary Sibanda (Chair)
UKZN Research Ethics Office Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Website: http://research.ukzn.ac.za/Research-Ethics/

Appendix E: Turnitin report

Turnitin Report
Social Work: Research Dissertation 2021

by Muziwandile Luthuli

Submission date: 17-Mar-2021 09:03AM (UTC-0700)
Submission ID: 1527908296
File name: FINAL_RESEARCH_DISSERTATION.docx (1.25M)
Word count: 50424
Character count: 286716

Social Work: Research Dissertation 2021

ORIGINALITY REPORT

14%	12%	7%	3%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	scholarship.shu.edu Internet Source	1%
2	uir.unisa.ac.za Internet Source	<1%
3	www.tandfonline.com Internet Source	<1%
4	repository.up.ac.za Internet Source	<1%
5	link.springer.com Internet Source	<1%
6	repository.nwu.ac.za Internet Source	<1%
7	researchspace.ukzn.ac.za Internet Source	<1%
8	Firhan Nurfalah, Sri Yona, Agung Waluyo. "The relationship between HIV stigma and adherence to antiretroviral (ARV) drug therapy among women with HIV in Lampung, Indonesia",	<1%