



DEVELOPING A MANAGEMENT FRAMEWORK FOR PREDICTING ADHERENCE TO HIV CARE AND TREATMENT IN ESWATINI

A thesis submitted

by

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ABSTRACT

The primary objective of this research was to develop a management framework for predicting adherence to HIV care and treatment in Eswatini. To achieve this goal, the study delved into the comprehension of adherence to HIV care and treatment among people living with HIV/AIDS (PLHIV); identified psychological factors influencing adherence to HIV care and treatment; evaluated Theory of Planned Behavior (TPB)-based indicators to assess their effectiveness in predicting adherence behaviour to HIV care and treatment before commencing antiretroviral therapy (ART); and validated the applicability of the TPB in predicting adherence to HIV care and treatment.

The study employed a sequential exploratory mixed methods approach in its research methodology. An initial qualitative study was conducted to explore the adherence beliefs of newly diagnosed PLHIV towards HIV care and treatment. The process involved gathering qualitative data on the beliefs of 19 recently diagnosed HIV-positive patients from a local HIV Clinic in Manzini, Eswatini. A thematic analysis revealed 226 beliefs, which were then condensed into 45 themes to establish the final set of significant beliefs categorised under TPB precursors: behavioural outcomes, subjective standards, and perceived behavioural control. The results of this qualitative study played a crucial role when constructing the TPB questionnaire, as the data gathered from the study were used as variables in creating the questionnaire.

The TPB questionnaire, derived from the qualitative research, was distributed to 152 participants as part of the main quantitative study. This investigation unveiled the complex interplay between individuals' perceptions of social norms, attitudes, and perceived behavioural control in shaping their adherence to HIV care and treatment. While the opinions of influential figures in participants' lives were significant, the study found that participants' personal beliefs and attitudes towards adherence had a more substantial influence.

During a span of 12 months, the 152 participants were closely observed, and their adherence to HIV care and treatment was assessed at baseline and endline points to evaluate the predictive validity of the TPB measure. The analysis of the collected data revealed that, despite participants appearing to adhere to their medication regimen

based on clinic visits and self-reported pill usage, their viral loads remained detectable. This study underscored the drawbacks of solely relying on self-reported data and emphasized the necessity of employing alternative approaches to accurately assess levels of adherence.

The study revealed limitations in the application of the TPB in addressing adherence to HIV care and treatment in developing nations with socioeconomic challenges. The original TPB model mainly concentrates on predicting and explaining behavioural intentions but overlooks the objective evaluation of the observed behaviour. When assessing adherence to HIV treatment, it is crucial to analyse the effectiveness of the behaviour being observed to identify the elements that lead to good adherence. This research suggests expanding the existing TPB model to overcome its limitations by including factors other than observable behaviour.

A conceptual management framework for HIV care and treatment based on the TPB was developed to overcome the shortcomings of the TPB in predicting adherence to HIV care and treatment in underdeveloped countries. Four crucial additions were incorporated: (1) an enhanced behavioural intention (2) developmental challenges driven by socio-economic factors (3) subjective confirmation regarding the behavioural action, and (4) behavioural validation of the behavioural action.

In addition to various aspects, it recommended that the conceptual framework developed by this study to manage HIV/AIDS care and treatment based on the TPB should undergo a validation process before its implementation with the aim of validating its effectiveness.

DECLARATION

I declare that this thesis is my own unaided work. It is being submitted for the Degree of Doctor of Philosophy in Psychology at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other University.

A handwritten signature in black ink, appearing to be 'T. Mango', is written over a solid horizontal line.

T. Mango

02 day of SEPTEMBER 2024.

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LIST OF ACRONYMS

A	Attitude
AHF	AIDS Healthcare Foundation
AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral therapy
BI	Behavioural intention
CD4	Cluster of differentiation 4
CDC	Centers for Disease Control and Prevention
COVID	Coronavirus Disease
EDM	Electronic drug monitoring
HAART	Highly active antiretroviral therapy
HIV	Human Immunodeficiency Virus
HTS	HIV Testing and Counselling Services
ICAP	International Centre for AIDS Care and Treatment Programmes
IMB	Information-Motivation-Behavioral Skills Model
IMB	International Business Machines Corporation
LTC	Linkage to care
LTFU	Lost to follow-up
M	Mean
MPAPI	Mobile Phone-Assisted Personal Interviewing
NB	Normative beliefs
NERCHA	National Emergency Response Council on HIV/AIDS
NGOs	Non-governmental organisations
OARAC	Office of AIDS Research Advisory Council
OE	Outcome evaluation
OIs	Opportunistic infections
PA	Pill adherence
PBC	Perceived behavioural control
PC	Pill count
PC	Power of control factors
PICT	Provider-initiated counselling and testing
PLHIV	People living with HIV
PMTCT	Prevention of mother-to-child transmission

PMAQ	Patient Medication Adherence Questionnaire
PR	Pill remaining
PU	Pill usage
RII	Relative Importance Index
SCT	Social Cognitive Theory
SMoH	Eswatini Ministry of Health
SN	Subjective norm
SPSS	Statistical Package for the Social Sciences
SD	Standard deviation
TACT	Target, action, context, and time
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
TTM	Transtheoretical Model for Behaviour Change
U=U	Undetectable = untransmittable
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
VCT	Voluntary counselling and testing
WFP	World Food Programme
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION

1.1 Background

The Human Immunodeficiency Virus (hereafter referred to as HIV) is the etiological agent of Acquired Immune Deficiency Syndrome (hereafter referred to as AIDS), which poses a substantial challenge to global health and development. Public health officials and policymakers worldwide remain deeply concerned about the prevalence and consequential effects of HIV/AIDS. According to the Joint United Nations Programme on HIV/AIDS (hereafter referred to as UNAIDS), the global prevalence of HIV infection has reached approximately 84.2 million individuals since its initial identification in 1981 (UNAIDS, 2022; Sharp & Hahn, 2011). Tragically, an estimated 40.1 million individuals have succumbed to AIDS-related complications. According to the latest data from UNAIDS, the global population of individuals living with HIV was estimated to be 38.4 million as at the end of 2021 (UNAIDS, 2022a).

The HIV epidemic has had a significant impact on the African region, where it is considered most severe with a prevalence estimated to be one in every twenty-five adults, and accounting for over two-thirds of the global population living with HIV (UNAIDS, 2022a). Furthermore, UNAIDS indicated that in 2021, the HIV-infected population was distributed as follows: 53% in eastern and southern Africa, and 13% in western and central Africa (UNAIDS, 2022a). Despite comprising only 11% of the global population, sub-Saharan Africa remains disproportionately burdened by the HIV/AIDS pandemic. The World Health Organisation (WHO) Global Health Observatory reported that in 2022, 0.7% of adults aged 15-49 years globally were living with HIV while in the WHO African Region, 3.2% were living with HIV. A comparison of these figures indicates a greater than three-times prevalence of adults living with HIV in Africa compared to the rest of the world. Sub-Saharan Africa serves as the epicentre of this ongoing health crisis (UNAIDS, 2021). In 2021, sub-Saharan Africa was home to eight out of the top ten countries with the highest prevalence of HIV/AIDS. These countries include Swaziland – renamed Eswatini in 2018 (hereafter referred to as Eswatini) - with a prevalence rate of 27.9%, Lesotho with 20.9%,

Botswana with 18.6%, South Africa with 18.3%, Namibia with 11.8%, Zimbabwe with 11.6%, Zambia with 10.8%, and Malawi with 7.7% (UNAIDS, 2021).

The aetiology of the high prevalence of HIV/AIDS in sub-Saharan Africa remains uncertain. Nevertheless, scholars have identified various potential factors that contribute to this devastating phenomenon, including the intricate interplay of cultural, behavioural, social, and economic elements. The prevalence of HIV transmission in the African region is believed to be influenced by cultural practices that permit concurrent sexual partnerships, such as polygyny and widow inheritance. Reniers and Watkins (2010) argued that the current mathematical models are insufficient in capturing the impact of polygyny on the dissemination of HIV, as they discovered an inverse ecological association between the two variables. However, subsequent research consistently demonstrates a positive correlation between concurrent sexual partnerships and the transmission of HIV (Fenske, 2015; Gazimbi et al., 2020; Kretzschmar & Caraël, 2012).

One of the contributing factors to the epidemic in Africa has been identified as a lack of knowledge regarding the disease that can primarily be attributed to the wide array of beliefs, customs, spiritual ideologies practiced in Africa (Nweze et al., 2017). In addition, various therapeutic methodologies as well as multiple medical systems used to address both health and illness is referred to as medical pluralism (Wade et al., 2007). Medical pluralism is a phenomenon observed in sub-Saharan Africa characterised by individuals actively participating in a practise commonly referred to as "shopping and switching". This practise involves seeking healthcare from a variety of modalities, which encompass traditional as well as faith-based systems of care (Moshabela et al., 2017). Studies have consistently shown that the utilisation of multiple, fragmented medical systems can hinder the prompt availability of HIV testing and the commencement of antiretroviral treatment (ART) for people living with HIV (hereafter referred to as PLHIV), especially when their healthcare journeys involve traditional and faith healers (Ndou-Mammbona, 2022; Azia et al., 2023).

The impact of individuals' traditional beliefs and religious affiliations on their attitudes and perceptions regarding HIV/AIDS is of considerable importance. The concept that African traditional religion has the potential to offer a remedy for HIV/AIDS by means

of administering antidotes as advised by traditional health practitioners (Zuma et al., 2017) has led to individuals delaying their utilisation of HIV care and treatment, and persisting in such traditional care (Tso et al., 2016). According to Moshabela et al. (2016), delays in seeking medical treatment among PLHIV may be associated with their preference for seeking solace and assistance from traditional and faith healers. In a study conducted by Pantelic et al. (2015) in KwaZulu Natal, South Africa, it was found that a significant proportion, approximately 20%, of individuals utilising ART actively seek advice and assistance from traditional healers. Furthermore, a cohort study was conducted in two HIV programmes in South Africa with the aim of identifying factors influencing adherence. The study revealed a correlation between the utilisation of traditional healers and instances of unsuppressed viral loads and treatment interruptions (Dahab et al., 2010).

According to Mufune (2015), the increase in HIV transmission in sub-Saharan Africa can be attributed to economic marginalisation and the resulting social disintegration that arises from poverty. The HIV/AIDS epidemic in sub-Saharan Africa is a multifaceted phenomenon, and the progression of the disease in the region cannot be ascribed to a single cause or factor, as supported by available evidence.

Eswatini is the smallest country in sub-Saharan Africa and according to the World Population Review (2024) demonstrates the highest global prevalence of HIV infection. The prevalence of HIV, as defined by the Centers for Disease Control and Prevention (hereafter referred to as CDC), refers to the proportion of individuals within a specific population who are currently infected with the HIV virus (CDC, 2019a). Based on the findings of the National Emergency Response Council on HIV/AIDS (hereafter referred to as NERCHA), a considerable segment of the Swati population falling within the reproductive age range of 15-49 years, approximately 26.8%, along with the overall population, estimated at 19%, are currently living with HIV/AIDS. Consequently, the high prevalence of HIV/AIDS has resulted in its recognition as the foremost contributor to mortality within the country, as evidenced by approximately 2,400 out of 17,000 deaths in 2020 being ascribed to this particular syndrome (NERCHA, 2021).

According to NERCHA (2021), there has been a decline in the incidence of HIV infection among individuals aged 15 years and older in Eswatini. The HIV incidence rate represents the number of newly acquired infections within a given population during a specified timeframe (NERCHA, 2021). The incidence rate exhibited a notable decline, decreasing from 2.6% (n=10,800) in 2010 to 0.9% (n=4,300) in 2020. Moreover, it is expected that the decline in this rate will persist, reaching a projected value of 0.7% (n=3,800) by 2023. Thus, according to NERCHA (2021), the recorded number of new HIV infections decreased from 13,600 in 2010 to 4,800 in 2020. In 2021, however, there was a significant increase in this figure to 6,900 infections, as documented by the UNAIDS (2021) Eswatini Country Factsheet.

In 2021, an HIV-related study was conducted by the Global Fund to examine the impact of COVID-19 on health services and systems involving 502 healthcare facilities situated in Africa and Asia. The study incorporated data from the country of Eswatini. The results of the Global Fund (2021) study indicated that the COVID-19 pandemic had a notable influence on the provision of HIV referrals and testing services. The data collected during the period of April to September 2020 indicated a notable decrease of 37% in HIV referrals during the second and third quarters of 2020 in comparison to the corresponding period in 2019 (Global Fund, 2021). The referrals involved cases in which patients needing further diagnosis and treatment for HIV or sexually transmitted infections were directed to the subsequent stages in the HIV service process. The importance of referrals in preventing HIV transmission within the wider community cannot be emphasised enough. The potential interruption of this process could have led to individuals contracting HIV unknowingly and hindered HIV-positive patients from obtaining essential treatment, thereby intensifying health complications or perpetuating the transmission of HIV. This phenomenon may potentially explain the abrupt surge observed in the HIV incidence rate within the context of Eswatini during 2021. Based on the projections provided by NERCHA (2021), it is anticipated that there will be a decrease in the occurrence of HIV, with an estimated incidence of 4,300 cases by 2023.

Eswatini, despite exhibiting the highest global prevalence of HIV, has demonstrated notable advancements in effectively addressing the epidemic over the past decade (UNAIDS, 2021). According to the NERCHA, the estimated prevalence of HIV among

individuals aged 15 years and above in Eswatini was 27.6% in 2010 and by 2020 this declined to 26.8%. Based on projections, it is anticipated that this prevailing pattern will persist, resulting in an estimated reduction to 26.0% in 2021, followed by a subsequent decline to 24.4% by 2023.

The data presented suggest that the prevalence of HIV in Eswatini has achieved a state of equilibrium. The principal factor contributing to this phenomenon is the increased accessibility of ART within the nation. In 2020, Eswatini successfully attained the UNAIDS HIV/AIDS targets of 90-90-90. The objectives of UNAIDS HIV/AIDS targets were to achieve a 90% rate of HIV awareness among individuals living with HIV, a 90% rate of ART coverage among those aware of their HIV status, and a 90% rate of viral load suppression among individuals receiving treatment by the year 2020 (UNAIDS, 2015). This notable accomplishment positioned Eswatini as the first country worldwide to achieve these specific targets. According to the latest report by UNAIDS (2021), these objectives are focused on achieving a reduction in new infections and fatalities by the year 2030 and so the stated objective was accomplished ten years earlier, thus substantiating Eswatini's commendable progress in addressing the HIV/AIDS epidemic.

The UNAIDS (2021) report determined that Eswatini exhibits the highest rate of treatment coverage for individuals afflicted with HIV in the sub-Saharan Africa area. Specifically, 91% of individuals living with HIV in Eswatini are reported to be undergoing ART and the current rate of viral suppression among PLHIV stands at 89%. In contrast, the proportion of PLHIV receiving ART in the sub-Saharan Africa region in 2021 was only 78%.

Thus, the data presented in this figure indicate a significant degree of compliance with HIV care and treatment within this particular demographic of PLHIV receiving ART in Eswatini. The primary goal is to achieve comprehensive suppression of viral load, aiming to reduce mortality rates among individuals who are infected and to decrease the occurrence of new HIV infections. The existing body of literature indicates that maintaining a high level of adherence to ART has been linked to the effective suppression of viral load (Das et al., 2010; Shoko & Chikobvu, 2019).

The implementation of ART in Eswatini was initiated in late 2003 through a pilot programme that was carried out in a single government hospital (NERCHA, 2012a). Over the course of its development, the provision of this service has undergone a process of decentralisation, resulting in its distribution across regional district hospitals, health centres, and clinics (NERCHA, 2012a). This decentralisation has involved the participation of various stakeholders, including government entities, non-governmental organisations (hereafter referred to as NGOs), and private sector actors (NERCHA, 2012a). The primary objective of this decentralisation effort was to enhance accessibility of the service, with a particular focus on individuals residing in rural areas (NERCHA, 2012a). By the end of 2013, a comprehensive ART service had been implemented in a total of 133 healthcare facilities across the nation (SMoH). These facilities served either as sites for initiating ART treatment, for medication refills, or for providing follow-up care to patients. According to a report by the Eswatini Ministry of Health (SMoH) in 2013, the proportion of ART sites in Eswatini constituted approximately 50% of the total number of public and private health facilities. Based on the findings of the NERCHA in 2021, it was observed that a significant proportion of the ART initiation in Eswatini took place at community clinics, constituting approximately 70% of the total cases. The remaining 30% of ART initiation was attributed to hospitals and other healthcare centres. The provision of ART is offered free of charge to patients in need, facilitated by publicly funded healthcare institutions, outreach sites, and NGOs.

As indicated, in 2003, the Ministry of Health in Eswatini established a comprehensive National Antiretroviral Therapy (ART) Programme, which offers essential care and treatment for PLHIV. According to the national guidelines, it is crucial to ensure the enrolment of all patients diagnosed with HIV into this ART Programme as it offers ongoing, inclusive healthcare that addresses both medical and psychosocial dimensions, in contrast to the provision of acute or episodic care. The main goal of this programme is to hinder the advancement to the AIDS stage, prevent and handle prevalent opportunistic infections (hereafter referred to as OIs), and promote the prompt initiation of ART (SMoH, 2015).

The standard care package of the ART programme consists of three essential components, namely clinical, psychosocial, and preventative. The clinical component

encompasses various essential elements, such as conducting baseline assessments, monitoring the progression of HIV disease, administering treatment for OIs, managing the adverse effects of treatment, screening for tuberculosis and cancer, and providing palliative care (The International Centre for AIDS Care and Treatment Programmes (ICAP, 2010)). The psychosocial aspect encompasses various elements, including the preparation and evaluation of adherence, continuous counselling and support for adherence, provision of psychosocial support, as well as counselling and support for the disclosure process (ICAP, 2010). The preventive aspect encompasses primary prevention, positive prevention encompassing pre- and post-exposure prophylaxis, prevention of mother-to-child transmission, and nutrition assessment (ICAP, 2010).. The implementation of a comprehensive HIV care system that encompasses the entire spectrum of services, starting from the point of diagnosis and extending to the management of the disease, plays a crucial role in improving the overall well-being of individuals who are living with HIV.

Based on the objectives set forth by NERCHA for 2018, it was anticipated that by the year 2023, a substantial proportion of the adult population (95%) as well as children (95%) who had been officially diagnosed with HIV and tested positive would be actively engaged in the ART programme (NERCHA, 2018a). There has been a notable increase in the number of individuals who are actively receiving ART in recent years, indicating a favourable trend. According to the NERCHA (2021), a study conducted in 2010 estimated that approximately 53% of PLHIV, specifically 92 700 out of a total of 174,000 individuals were receiving ART. This increased to an approximate value of 95% in 2020, with a corresponding count of 191,070 out of a total of 200,000. The notable increase in the population of PLHIV who accessed treatment by the end of 2020 can primarily be attributed to Eswatini's rapid expansion and dissemination of HIV services (NERCHA, 2021). Additionally, the implementation of the 2015 World Health Organization (WHO) "test and treat" recommendations, which involve initiating ART for PLHIV regardless of their disease stage, has played a significant role in this achievement (NERCHA, 2021).

By the end of 2021, the number of individuals who were actively engaged in receiving ART in Eswatini had reached 200,000, from a total of 210,800 individuals, leading to a treatment coverage rate of 95% (UNAIDS, 2021). Despite a gradual rise

in the number of individuals currently undergoing ART, there persists a shortfall in ART coverage when considering the total of 210,800 PLHIV who enrolled in the ART programme after testing positive for the virus. The discrepancy between the number of individuals currently receiving ART and the number of PLHIV who were enrolled in the ART programme following their HIV diagnosis can be attributed to various factors, including mortality, discontinuation of treatment, and attrition from the programme (SMoH & WHO, 2010).

1.2 Problem statement

Based on the findings of the Eswatini HIV Incidence Measurement Survey, a comprehensive study conducted in a Eswatini to collect data from households across the country, it was determined that 73.1% of adults who tested positive for HIV were able to achieve viral load suppression (SMoH, 2019). The achievement of viral load suppression is regarded as a pivotal measure for assessing the effectiveness of treatment in individuals living with HIV. According to a study conducted by Ross et al. (2020), it was found that non-adherence plays a crucial role in the decline of viral suppression and so the observed rate of 73.1% for viral load suppression in Eswatini indicates that the country may be experiencing challenges in upholding the desired levels of adherence to HIV care and treatment.

The persistent challenge of non-adherence to HIV care and treatment has been a prominent issue within the context of Eswatini. According to the NERCHA study conducted in 2012, the ART programme, which includes all individuals testing positive for HIV and which offers continuous monitoring regardless of eligibility, reported a loss to follow-up of 9% among the 87.4% of individuals living with HIV who were enrolled in the programme. Among the entirety of patients within the population who were no longer being monitored, a significant majority of 51% were determined to be untraceable, resulting in their classification as non-compliant with the programme. According to the Eswatini Integrated HIV Management guidelines, a patient is considered to be lost to follow-up (hereafter referred to as LTFU) if they have not attended their scheduled appointment within 90 days after the specified date (SMoH, 2018). Based on a study conducted by the Ministry of Health in Eswatini in collaboration with the WHO, a notable proportion of individuals who cease HIV care

and treatment and become LTFU tend to do so during the first six months after initiating ART. Based on the findings of the SMOH (2010), a notable percentage of individuals, precisely 40.7%, terminated their ART regimen within a timeframe of fewer than six months subsequent to their commencement of ART. Furthermore, a significant proportion of patients (29.7%) discontinued their participation in the study between six and 12 months following the initiation of ART. These data reveal that a substantial proportion of ART discontinuation among PLHIV occurred within the first year of initiating treatment. Specifically, just over 70% of reported cases of ART discontinuation took place during this initial period of 12 months.

The challenge of LTFU is not limited to Eswatini alone. Several studies conducted in sub-Saharan Africa where most HIV-infected individuals reside indicated that the rate of LTFU is higher in this region compared to other global regions (Asiimwe et al., 2016; Leshargie et al., 2022). Chauke et al. (2020) reported that retention in care and treatment in sub-Saharan Africa exhibits a diverse range of estimates, with a regional mean of 76% observed over a duration of 12 months. The estimated range spans from 65% to 89%. Chauke et al. (2020, p. 3) provided a definition for the term retention in HIV care and treatment as “the continued engagement in health services, from enrolment in care to discharge or death of an individual living with HIV”. Based on the research conducted by Kebede et al. (2021), it was observed that the rate of LTFU in sub-Saharan Africa exhibited a range from 23.4% in South Africa to 57.4% in Tanzania.

The importance of maintaining continuity in HIV care and treatment cannot be overstated due to its pivotal role in attaining viral load suppression as this, in turn, serves as a preventive measure against HIV-related morbidity and mortality, viral rebound, drug resistance, treatment failure, and further transmission. Overall, ensuring adherence to HIV care and consistent utilisation of prescribed ART are imperative in effectively reducing the risk of HIV transmission and the advancement of the disease to AIDS and the aim of the current study was to monitor this in citizens of Eswatini.

Cohen et al. (2011) reported a study involving a sample of 1,763 couples from nine countries of which 54% of the participants were from Africa. Study participants were

divided into two groups: one partner was identified as HIV positive, while the other partner was HIV negative. The findings of the study demonstrated that the prompt initiation of ART resulted in a decrease in the transmission of HIV through sexual means, as reflected in a decrease in viral concentration in both the bloodstream and genital tract following administration of ART. Nevertheless, in order to ensure the viability of this proposition, a substantial degree of adherence to treatment is imperative. According to existing research, individuals who promptly commence treatment in order to prevent HIV transmission to others are more prone to exhibiting non-adherence to their HIV care and treatment. This phenomenon can be attributed to the fact that patients initiate therapy at an earlier phase of the disease (Adakun et al., 2013; Maqutu et al., 2010). The situation is further aggravated by the fact that individuals are initiated on ART before they are prepared to adhere to the prescribed treatment regimen (Wagner et al., 2016). Numerous interventions were devised with the aim of enhancing adherence to ART among patients. Nevertheless, there exists a scarcity of interventions that specifically target patients before treatment initiation or are tailored to meet the unique adherence support needs (Wagner et al., 2016). Despite the emphasis placed by treatment guidelines on the significance of patients' readiness to adhere to treatment before initiating ART, it seems that this prerequisite is not consistently fulfilled (Wagner et al., 2016). The customization of adherence support for patients is hindered by the lack of patient profiling, which is necessary for identifying patients who are unprepared and at a heightened risk of non-adherence.

From 2012 to 2015, there was a significant improvement in the initial 12-month retention rates for PLHIV who were undergoing ART, with rates ranging from 93% to 95% (NERCHA, 2021). The reported percentage exceeded the national target of 90% and according to the report released by NERCHA in Eswatini, there was a decrease in the proportion of patients LTFU over the years - specifically, the percentage of LTFU patients declined from 9% in 2009 to 4% in 2015 (NERCHA, 2021). In a study conducted by Khumalo et al. (2016), national data from medical facilities in Eswatini were utilised. The study findings indicated that there was an approximate loss to follow-up of 10.3% during the 12-month follow-up period (NERCHA, 2021). Despite its seemingly small numerical value, the issue of non-adherence to the ART programme in managing HIV/AIDS is significant, as achieving a non-adherence rate of zero percent is essential for improving the effectiveness of the ART programme.

Based on the available data (NERCHA, 2021), Eswatini implemented various successful initiatives that resulted in a notable reduction in the incidence of new HIV infections (n=4,800) in 2020. Nevertheless, as observed in the NERCHA (2021) data, the year 2021 witnessed a setback as the statistical data indicated an upsurge in the prevalence of newly reported infections, reaching a total of 6,900 cases. According to Chauke et al. (2020), the task of attaining and sustaining viral load suppression in Eswatini is challenging and so failing to achieve this goal may increase the likelihood of HIV transmission. Hence, it is imperative to develop an innovative approach that can effectively facilitate the examination of a greater population, initiate them on ART, and guarantee their sustained adherence to treatment. It is crucial to prioritise the improvement of the viral suppression rate in Eswatini as a means of effectively combatting and ultimately eliminating the epidemic.

If the issue of non-compliance with HIV care and treatment is not effectively tackled, this can have significant ramifications for a country such as Eswatini. The existence of HIV has been associated with adverse health consequences, increased rates of mortality, and a potential impediment to the effectiveness of the ART programme in controlling the transmission of the virus. Therefore, it is crucial for Eswatini to embrace a proactive stance rather than a reactive one to ensure compliance. Insufficient compliance with first-line ART can significantly accelerate the emergence of viral resistance and expedite the need for second-line therapeutic interventions (Ramadhani et al., 2014). The medication combination that is administered initially to a patient is often denoted as the first line regimen (WHO, 2009). A second line regimen, comprising new drugs, is necessary in the event that the initial regimen ceases to provide efficient blocking of HIV. If this approach ultimately fails, it is customarily recommended to contemplate a salvage cocktail, which is a combination of medications (WHO, 2009). According to a report by NERCHA (2014), the accessibility of second- and third-line ART regimens in Eswatini is limited. Therefore, it is crucial to improve adherence strategies to the first-line treatment regimen in order to reduce patient attrition from impacting follow-up care. The insights of the findings of the current study can be used to improve the effectiveness of interventions designed to reduce non-compliance with HIV care and treatment protocols.

According to the study conducted by Dlamini and Rubashkyn (2012), several factors within the context of Eswatini were identified as significant contributors to adherence to the ART programme and to influence patient outcomes. These can be categorised into several domains, namely patient-related factors; treatment-related factors; socio-cultural and community-related factors; the provider-patient relationship; factors related to the healthcare system, and external factors. One of the recommendations derived from this study pertained to the imperative need to formulate and implement a behavioural and motivational intervention to effectively target patient-related factors that impact adherence to the ART programme (Dlamini and Rubashkyn, 2012). Despite the implementation of multiple interventions in Eswatini aimed at improving adherence to HIV care and treatment, there remains a cohort of patients enrolled in the ART programme who are lost to follow-up and are classified as non-adherent.

The current study employed the Theory of Planned Behavior (hereafter referred to as TPB) as a theoretical framework to examine the factors that contribute to adherence to HIV care and treatment. In elucidating one of the objectives of the study, the study assesses the adequacy of the TPB theoretical model, which posits that an individual's behaviour is determined by their intention, when applied in the context of adherence to HIV care and treatment. The determination of one's intention is contingent upon three key predictors, namely attitudes, subjective norms, and perceived behavioural control. The study's findings contribute to the growing body of knowledge in social scientific theory, particularly in the area of research that utilises the TPB to understand adherence to HIV care and treatment. An outcome of this study was to establish robust assessments capable of accurately predicting adherence to HIV care and treatment prior to the initiation of ART.

The sub-Saharan African region exhibits a substantial number of individuals afflicted with HIV/AIDS, encompassing approximately two-thirds of the worldwide populace affected. Moreover, it is noteworthy that over 50% of the global AIDS-related fatalities transpired within sub-Saharan African, wherein Eswatini singularly documented a total of 2,600 deaths in 2021 (UNAIDS, 2021). Hence, it is imperative to prioritise the development and evaluation of interventions grounded in theory, which have the capacity to accurately predict adherence to HIV care and treatment. The utilisation of these measures can facilitate the identification of patients who are at a greater

likelihood of discontinuing HIV care and treatment prior to the initiation of ART. Consequently, this can facilitate meticulous monitoring and implementation of interventions designed to enhance adherence to the programme. It is anticipated that this intervention will have a substantial impact on the decrease of mortality associated with AIDS, not only within Eswatini but also throughout the sub-Saharan African region.

In the last decade, Eswatini has exhibited significant advancements in the expansion of HIV care and treatment for individuals living with HIV. The data provided by NERCHA in 2021 demonstrate a notable rise in ART coverage, with an increase from 53% in 2010 to 95% in 2020. Nevertheless, it is anticipated that the demand for treatment will experience a notable increase as a result of the escalating number of new infections, which amounted to 6,900 in 2021, and the implementation of universal early access to ART. In light of the increasing demand for HIV care and treatment, as well as the necessity to proactively combat the epidemic, it is crucial for Eswatini to establish a healthcare system capable of efficiently managing the significant patient volume, while simultaneously providing high-quality care at a reduced cost. In order to optimise the effective utilisation of scarce resources and human capital, it is imperative to contemplate the implementation of a stratified model for the retention and adherence support of ART. This model involves offering focused assistance to patients who would gain the greatest advantage from intensified support, as opposed to providing standardised adherence and retention support to all patients. Healthcare facilities are faced with the challenge of not being able to conduct profiling, which leads them to allocate their limited resources towards offering standardised adherence and retention support. However, this strategy may prove inadequate for individuals who necessitate a greater level of assistance, or risk leading to the inefficient allocation of resources towards those who do not possess such a need.

In order to implement this strategy, it is imperative to conduct a thorough and precise screening and classification of patients based on their risk level for non-adherence to HIV care and treatment, as well as the likelihood of being lost to follow-up in the ART programme. Only after this assessment can patients be assigned to the appropriate adherence support group. In a resource-constrained and high-demand

HIV context represented by Eswatini, the screening process must possess the following attributes to ensure effectiveness and feasibility:

- a) It is advisable to perform screening and stratification procedures at the time of patients' initial presentation to the clinic or during their first visit, rather than during their ongoing HIV care and treatment. Currently, all patients receive consistent adherence and retention support until the first instance of an elevated viral load, low pill count, or loss to follow-up. Subsequently, the implementation of intensified adherence counselling is commenced in accordance with the guidelines provided by the Ministry of Health (SMoH, 2018). The implementation of screening and classification procedures during the initial clinic appointment offers the potential advantage of promptly identifying patients who exhibit a high-risk profile and subsequently providing them with appropriate treatment assistance. This approach has the potential to mitigate the emergence of resistance and reduce premature patient attrition, as it eliminates any delay in the provision of treatment.
- b) The primary aim of the screening process should be to assess the components that were substantiated through observational research and rigorous theoretical and methodological evaluation. This will enable accurate prediction of adherence to HIV care and treatment behaviour within the specific context of Eswatini.
- c) The screening tool must possess a high level of reliability, ensuring that it can effectively and accurately determine the presence of risk in a patient when they are indeed at risk, and conversely, identify the absence of risk in a patient when they are not at risk. Given that the primary objective of the tool is to assess and categorise patients with the overarching aim of delivering enhanced and focused HIV care and treatment assistance to individuals in need, it is imperative for the tool to prioritise high sensitivity. According to Trevethan (2017, p. 3), testing sensitivity can be defined as “a screening test’s probability of correctly identifying, solely from among people who are known to have a condition, all those who do indeed have that condition (i.e., identifying true

positives), and, at the same time, not categorizing other people as not having the condition when in fact they do have it (i.e., avoiding false negatives)".

- d) The successful implementation and efficient execution of the screening tool necessitates the presence of well-defined and standardised protocols and guidelines for each component of the tool. These protocols and guidelines are crucial in facilitating targeted adherence support interventions. Ensuring the maintenance of patient care quality and alleviating the responsibility of healthcare workers to anticipate patient adherence necessitates the implementation of this measure. Previous studies have shown that healthcare professionals generally lack the ability to accurately predict a patient's inclination to adhere to medical care and treatment (Weiser et al., 2003; Gerbert et al., 2000). Healthcare professionals often exhibit a tendency to either overestimate the proportion of patients who adhere with their prescribed care and treatment (Miller et al., 2002) or inadequately identify instances of suboptimal adherence to care and treatment (Miller et al., 2002; Paterson et al., 2000).

One advisable strategy would involve the adoption of a standardised measurement instrument that is grounded in well-established theories and supported by empirical evidence, while also demonstrating a notable degree of sensitivity. The utilisation of this instrument should be implemented during the initial clinic consultation in order to identify patients who possess the highest susceptibility to non-adherence with HIV care and treatment. This approach would facilitate the implementation of all the aforementioned features. This approach would enhance resource allocation to achieve optimal efficiency. The information previously mentioned would subsequently be employed to initiate interventions aimed at facilitating adherence from the inception of the treatment process. One of the principal objectives of this project is to attain this objective.

1.3 Aims and objectives of the study

The current study sought to address the following aim that was to develop a management framework for predicting adherence to HIV care and treatment in Eswatini. In addressing this aim, the study formulated the following study objectives:

- To explore the understanding of adherence to HIV care and treatment of people living with HIV/AIDS (PLHIV).
- To determine psychological predictors of adherence to HIV care and treatment.
- To rigorously test TPB-based measures to determine their efficacy in predicting adherence behaviour to HIV care and treatment prior to initiation to ART.
- To establish the usefulness of the TPB in predicting adherence to HIV care and treatment.
- To investigate the relationship between the TPB measures of adherence and other clinical measures, such as clinic visits, pill counts, and immunological and virological data.

1.4 Rationale of the study

Adherence to HIV care and treatment is vital for achieving optimal health outcomes, including viral suppression and improved quality of life for individuals living with HIV (WHO, 2016). Despite the availability of effective ART, non-adherence remains a significant barrier, leading to adverse health consequences (Altice et al., 2019) and poses a broader public health challenge, as it can lead to increased morbidity, mortality, and transmission rates (WHO, 2016). A management framework that predicts adherence behaviours can help identify at-risk individuals and implement timely interventions.

The TPB provides a robust framework for understanding the psychological and social factors that influence health-related behaviours (Ajzen, 1991). TPB posits that behaviour is determined by three key constructs: attitudes, subjective norms, and perceived behavioural control. By applying this theory, healthcare providers can gain insights into the beliefs and perceptions that drive adherence to HIV care and treatment. Numerous studies have demonstrated the predictive validity of TPB in various health contexts, including medication adherence (Armitage & Conner, 1998;

Godin & Kok, 1996). Research has shown that TPB constructs significantly correlate with adherence behaviours in the context of HIV (Tarkang et al., 2023). Developing a management framework based on TPB allows for a structured approach to addressing these critical factors.

The study findings will significantly contribute to international efforts aimed at improving adherence to HIV care and treatment among people living with HIV. This contribution extends beyond the borders of Eswatini and encompasses other regions of the world, with a particular emphasis on sub-Saharan Africa. The current study has made a significant contribution by developing a management framework with the objective of predicting adherence to HIV care and treatment.

Achieving optimal health outcomes for patients undergoing ART necessitates a significant level of adherence. Upon commencement of the ART regimen, patients are provided with fundamental assistance to facilitate their adherence to the prescribed treatment protocol. The degree of assistance is increased when there are signs of non-compliance, such as missed clinic visits, a decrease in medication adherence, or an increase in viral load. A novel aspect of the study is that, at present, there exists a dearth of methodologies capable of accurately assessing the probability of a patient's adherence to HIV care and treatment subsequent to the initiation of ART. As a result, the development of the aforementioned tool will offer benefits for PLHIV by providing tailored support interventions to promote their adherence to the ART programme. This support will be initiated upon their enrolment in the programme, specifically targeting individuals who are identified and acknowledged as having an increased probability of non-adherence. Overall, the PLHIV will benefit from the identification and assessment of those individuals who are at an increased risk of non-adherence. This will lead to the implementation of adherence support interventions that are customised to address their unique requirements. The absence of a definitive cure for HIV/AIDS has prompted the utilisation of ART as a strategy for managing the condition, consequently altering it into a chronic ailment that is more receptive to medical intervention.

The government of Eswatini is intensifying its endeavours to **enhance the provision of HIV care and treatment**, with the aim of mitigating the adverse health consequences associated with HIV/AIDS. The outcome of this study is to promote the

adoption of a stratified model for adherence to ART and retention support within healthcare facilities. This model would possess enhanced capabilities to effectively manage a substantial volume of patients, uphold a superior standard of care, and optimise the utilisation of scarce human resources. The implementation of this model, which entails the identification of patients necessitating intensified and targeted adherence support, would yield greater efficacy compared to the prevailing approach that assumes a uniform solution for all individuals. The latter approach may prove insufficient for individuals who necessitate additional assistance, potentially leading to a misallocation of resources towards those who do not require, at that point in time, such support.

The empirical evidence derived from research conducted in Eswatini supports the notion that there are **barriers associated with adherence to HIV care and treatment**, as indicated by the viral load suppression data. The measurement of viral load suppression is frequently utilised as a pivotal indicator for assessing the effectiveness of treatment. The absence of a decrease in viral load can be indicative of either non-compliance with the prescribed treatment regimen or the ineffectiveness of the treatment itself. This implies that the current provision of adherence and psychosocial support services to individuals receiving HIV chronic care on the same day as their HIV diagnosis, as outlined in the Eswatini Integrated HIV Management Guidelines of 2018, might be insufficient, or inappropriate. Moreover, this suggests that there is a need for additional services to enhance adherence. The findings of this study can be considered a valuable asset for policymakers in their endeavours to tackle the epidemic, particularly in providing insights for potential modifications to the existing HIV management protocols. The amendments put forth in this study encompass the strategies devised to assess the propensity of newly diagnosed HIV patients to adhere to HIV care and treatment prior to initiating the regimen. This aims to facilitate their access to the necessary support, with the primary goal of increasing viral suppression in patients and by extension positively impacting their communities and ultimately the whole country.

This study adds to the growing body of academic literature specific to the field of health behaviour, with a particular emphasis on the capacity to predict adherence to HIV care and treatment before the commencement of ART. The existing body of

research primarily focuses on the development of methodologies aimed at predicting patients' adherence levels during the course of their ART treatment. Furthermore, this study presents an opportunity to assess the theoretical adequacy of the Theory of Planned Behavior by employing it in the context of predicting adherence to HIV care and treatment. This can be achieved by applying the theoretical framework in the context of predicting individuals' intentions to adhere to HIV care and treatment prior to initiation. If the measures prove to be effective in accurately predicting the behaviour of individuals who are initiated onto ART, it is possible that the number of individuals lost to follow-up could be decreased.

1.5 Scope and delimitations of the study

The aim of this study was to develop and evaluate measures that effectively predict adherence to HIV care and treatment prior to initiation onto ART. The study adopted the assumption that HIV care and treatment adherence are interconnected behaviours, and for the purposes of this study, they were considered as one. This assumption was supported by a growing body of research that demonstrates how comprehensive care can have synergistic effects on the health outcomes of PLHIV. For example, several studies have indicated that regular engagement in health care services such as routine clinic visits or psychosocial support significantly improves adherence to ART, which is crucial for viral suppression (Mugavero et al., 2013). Additionally, integrated care models that combine treatment, ongoing support, and prevention methods, as recommended by the WHO (2016), result in better patient retention and overall improvement in health status. Furthermore, evidence has shown that coordinated provision of HIV healthcare increases the likelihood of achieving sustained viral load suppression, thereby reducing the risk of transmission (Gardner et al., 2011). This evidence supports the assumption that a holistic approach to healthcare improves both individual and public health outcomes.

The research emphasised the behavioural, normative, and control beliefs of individuals living with HIV/AIDS in relation to their adherence to HIV care and treatment. These beliefs are in accordance with the principles of the Theory of Planned Behavior. The participants in this study were selected from the population of individuals who contracted HIV in Eswatini in the year 2019. In order to provide greater

specificity, the individuals who were included as participants in the study were those who had availed themselves of HIV testing services at the LaMvelase HIV Clinic, which is situated in the region of Manzini, Eswatini. The participants chosen for the study were included in a cohort that underwent multiple rounds of examination conducted over the course of one year. To accomplish the goals of the investigation, the researcher utilised a range of research methodologies.

The scope of the investigation was restricted to participants aged 18 years and above, as individuals within this age range were deemed by researchers to possess the cognitive and emotional maturity necessary for exercising sound judgement and assuming personal accountability. The study participants were mandated to have undergone HIV testing, obtained a positive diagnosis, enrolled in an ART programme, and initiated ART treatment on the day of recruitment into the study. The aim of this study was to predict the level of adherence to HIV care and treatment prior to initiation of ART. Consequently, the collection of initial data was conducted on the day of treatment initiation due to the potential occurrence of non-adherence from the outset.

The current investigation hypothesised that there is a positive association between the predictor variables, specifically attitude, subjective norms, and behavioural control, and the probability of complying with HIV care and treatment. The hypothesis posited that greater scores on the aforementioned predictor variables would lead to heightened intentions to adhere to treatment. Consequently, this would enhance the likelihood of patients attending clinic visits, accurately recording pill counts, and displaying improved immunological and virological outcomes, as evidenced by CD4 count and viral load measurements in their clinic records.

1.6 Structure of the thesis

This thesis is structured as follows:

Chapter Two of this study provides a comprehensive review of the relevant literature pertaining to adherence to HIV care and treatment. It examines the established techniques for assessing adherence to ART, the various factors that impact adherence

to ART, and the existing models utilised for predicting adherence to HIV care and treatment.

Chapter Three introduces the Theory of Planned Behavior, which serves as the foundational theoretical framework for the entire investigation. This section examines the suitability of the TPB in the context of HIV research and its relevance to the current study.

In this research report, **Chapter Four** provides a thorough examination of the methodology and design utilised in the study. The report encompasses a concise overview of the research procedure, a comprehensive explanation of the methodology utilised, and a thorough evaluation of the suitability of the methodology for the present investigation. This chapter offers a thorough examination of the methods used in the different phases involved in the research process, accompanied by a detailed investigation of the ethical considerations that are inherent to this study.

The results are outlined in Chapters Five and Six of the report. **Chapter Five** provides a comprehensive and detailed presentation of the findings derived from the elicitation study. In contrast, **Chapter Six** primarily focuses on the quantitative findings obtained from the study, placing significant emphasis on their analysis and interpretation.

In **Chapter Seven**, a thorough examination of the findings is provided, along with the development of a management framework designed to predict adherence to HIV care and treatment.

The final chapter, **Chapter Eight**, provides a thorough overview of the research findings, a critical evaluation of the limitations encountered throughout the research process, and suggestions for potential areas of future research.

CHAPTER TWO

THE HIV/AIDS CONTINUUM OF CARE

2.1 Introduction

Before making any predictions about adherence to HIV care and treatment, it is crucial to gain a comprehensive understanding of the HIV/AIDS epidemic, the continuum of care involved in managing the disease, and the concept of adherence to HIV care and treatment. Additionally, it is important to explore how adherence is measured and monitored, as well as the various factors that can influence adherence. Furthermore, it is imperative to examine the existing interventions implemented in Eswatini to promote and maintain adherence to HIV care and treatment among people living with the virus, commonly referred to as people living with HIV (PLHIV).

The primary objective of this chapter is to provide a comprehensive overview of the current body of literature pertaining to adherence, with a particular focus on adherence to HIV care and treatment on a global scale. Subsequently, the literature review will be further refined to specifically address the context of Eswatini.

2.2 Understanding the HIV care continuum

The HIV care continuum refers to the sequential stages that PLHIV undergo in their healthcare journey. The efficacy of antiretroviral treatment (ART) programmes relies on the advancement of PLHIV through these phases. The continuum of care encompasses a series of intervention objectives that can ultimately lead to the suppression of viral activity, resulting in benefits for both individuals and society as a whole (Kay et al., 2016). The HIV care continuum (Figure 2.1) is represented as a sequential series of stages, which include diagnosis, linkage to healthcare services, retention in healthcare services, initiation of ART, adherence to ART, and achievement of viral suppression (Layer et al., 2014).

Figure 2.1: The HIV care continuum (adapted from McNairy & El-Sadr, 2012)



The progression through the different stages of the HIV continuum of care, starting with HIV testing and extending to long-term engagement in HIV care and treatment programmes, is crucial for the effective implementation of HIV treatment and prevention initiatives. The primary goal of HIV care and treatment is to attain viral suppression, characterised by a significantly diminished or undetectable presence of HIV within the individual's body (CDC, 2019). It is imperative for individuals diagnosed with HIV to achieve a reduction in their viral load as a means of preserving their well-being, enhancing their quality of living, and extending their lifespan. According to McNairy et al. (2017), individuals living with HIV who effectively manage their viral load demonstrate minimal to negligible potential for transmitting the virus to others.

2.2.1 Diagnosis

In order for an HIV response to be effective, it is imperative for individuals to possess awareness of their HIV status. The HIV care continuum commences with HIV Testing and Counselling Services (HTS), serving as the initial and crucial point of entry. The World Health Organization (WHO) and the Joint United Nations Programme on HIV/AIDS (UNAIDS) underscore that the implementation of HTS plays a crucial role in facilitating the identification and linkage of individuals living with HIV to essential resources for the purposes of HIV prevention, treatment, and care (WHO & UNAIDS, 2017).

The WHO and UNAIDS (2017) emphasise that the act of undergoing HIV testing can yield several advantages for individuals who decide to participate in it. Firstly, individuals who have received a positive diagnosis for the HIV virus have the opportunity to access medical intervention and ART promptly upon establishing a link with a healthcare institution. Furthermore, the initiation of an ART regimen at an early stage has been shown to enhance an individual's health outcomes. By effectively

suppressing the viral load, ART can effectively prevent the transmission of HIV to other individuals. These two factors collectively contribute to the optimisation of the probability that an individual will experience an extended period of well-being and vitality. In addition, being aware of one's HIV status enables individuals to make informed decisions regarding the utilisation of various HIV prevention strategies that were scientifically validated as efficacious (WHO & UNAIDS, 2017). Moreover, the HTS is capable of identifying individuals who test negative for HIV but are deemed to be at risk, thereby warranting referral to HIV prevention programmes and potential participation in said programmes (Harripersaud et al., 2017). More importantly, the implementation of HTS guarantees the provision of up-to-date and verifiably accurate information regarding HIV and its treatment. Over and above, the HTS offers guidance on retesting procedures that align with the established national testing guidelines.

There are two distinct approaches to HIV testing: client-initiated HIV counselling and testing services, and provider-initiated HIV counselling and testing services. Client-initiated HIV testing, also referred to as voluntary counselling and testing (hereafter referred to as VCT), is motivated by an individual's right to know their HIV status. This type of testing takes place when an individual actively seeks counselling and testing at a facility that provides such services (Njeru et al., 2011; Abdul et al., 2023). This approach prioritises the assessment and management of subjective risks by counsellors, achieved by developing personalised risk mitigation plans for their clientele.

In 2007, the WHO issued recommendations to implement provider-initiated counselling and testing (hereafter referred to as PICT) alongside client-initiated HIV counselling and testing (Makhunga-Ramfolo et al., 2011). This was proposed as an effective public health intervention aimed at enhancing access to HTS and minimising missed opportunities for testing. The acronym PICT is a term that is a customary element of medical care regularly advised by healthcare professionals to those seeking healthcare services (Kennedy et al., 2013). According to this approach, it is advisable to administer an HIV test to individuals whose clinical symptoms could potentially be attributed to an underlying HIV infection, or as a routine component of medical care for all patients seeking healthcare services at medical institutions (Kennedy et al., 2013). Regular testing is a strategy that optimises the proportion of

individuals who possess knowledge of their HIV status, hence playing a crucial role in mitigating the social stigma surrounding HIV testing.

There are obstacles to the implementation of HTS, which subsequently impact the patient's advancement along the HIV care continuum. These challenges can be observed at both the individual and systemic levels. There are several individual barriers that hinder individuals from undergoing HIV testing. These include the perception of a low risk of infection, the expected psychological burden associated with living with HIV, fear of experiencing stigma related to HIV, the direct and indirect financial expenses associated with accessing HIV testing services and, on a broader social level, gender inequality (Musheke et al., 2013). System-level limitations identified in the studies conducted by Larsson et al. (2011) and Meka et al. (2020) include a high patient load, limited availability of test kits, insufficient room for counselling, and poor counselling abilities. In order to achieve success in the endeavours related to the treatment and prevention of HIV, it is imperative to surmount the existing hurdles.

2.2.2 Linkage to care

Linkage to care, sometimes referred to as LTC, represents the second phase within the HIV care continuum and signifies the initiation of active engagement in HIV care and treatment. The term LTC is used by the CDC to describe the period of time that elapses from the moment an HIV diagnosis is officially recorded to the initiation of medical therapy under the supervision of an HIV care provider. According to Kay et al. (2016), the duration of this time period must not exceed three months. The final stage in the process of connecting individuals to HIV care and treatment, with the objective of prescribing ART, is the enrolment in HIV care and treatment, together with other health services. As stated by the WHO (2013), this step is crucial in order to fully achieve the health and prevention advantages associated with ART. Following the establishment of a linkage, patients are offered continuous care and support to ensure the maintenance of their well-being. The crucial need of promptly linking patients to healthcare services cannot be overemphasised. This urgency stems from the correlation between delays in linking patients to care and an increased probability of advancing to AIDS, as indicated by CD4 cell count criteria while, furthermore, those

who are HIV-positive but not actively engaged in healthcare and treatment present an increased risk for ongoing transmission of the virus (Gardner et al., 2011).

As with the challenges associated with obtaining HTS, the hindrances to linking individuals to care can be categorised into two groups: those that occur at the individual level and those that occur at the system level. Individual-level barriers to linkage to care have been documented in the literature, including concerns about the disclosure of one's HIV-positive status by healthcare workers, apprehension about experiencing discrimination and/or spousal violence and separation, as well as the challenges posed by distance and the associated costs of travelling to healthcare facilities (McNairy et al., 2017). System-level hurdles in healthcare can manifest in several ways, such as inconvenient clinic hours, extended wait times, insufficient numbers of skilled healthcare professionals, and delays in obtaining CD4 cell count and viral load results (Harripersaud et al., 2017). Furthermore, it was noted that patients exhibit less engagement in their healthcare when healthcare professionals lack enough training or have excessive workloads and, restricted physical space within clinics poses challenges in maintaining patient confidentiality, hence further hindering patient participation in their care (Tran et al., 2012).

2.2.3 Retention in care

“Retention in care is defined as the proportion of patients who remain in care as evidenced by a clinical visit or pharmacy visit within a defined period” (Harripersaud et al., 2017, p. 77). It is imperative to undertake endeavours aimed at ensuring the long-term continuity of chronic care for individuals receiving ART. The importance of maintaining patients under medical monitoring to achieve viral suppression is highlighted in the 2016 guidelines provided by the WHO (2016). Patients who do not actively engage in HIV care treatment are not afforded continuous access to ART, prophylactic medications for opportunistic infections, or other medical services, including monitoring for medication toxicities and diagnosis of treatment failure.

There is a growing body of research indicating that individuals who take ART in a sporadic manner face an elevated likelihood of developing viral resistance (Bessong et al., 2021). Several studies have demonstrated a correlation between an increased

frequency of missed medical appointments and elevated viral loads as well as decreased CD4 counts (Mugavero et al., 2014; Reveles et al., 2015). The presence of these variables was associated with a lack in active participation in medical care, which were correlated with unfavourable health outcomes, such as an elevated likelihood of mortality (Gardner et al., 2011). Moreover, these individuals have a significant role in the continuous transmission of HIV within the community.

Several obstacles exist that hinder individuals living with HIV from maintaining their healthcare services once they have commenced treatment, despite the crucial role that retention in care plays within the HIV continuum of care. The aforementioned challenges can be categorised into three distinct groups: structural, psychosocial, and biomedical. Examples of structural barriers include financial constraints, such as the expenses associated with transportation and the loss of wages due to missed work, along with lengthy wait times and inconvenient clinic hours, mobility to seek employment, attitudes held by healthcare providers, and patients' perception of substandard care (Azia et al., 2016; Geng et al., 2010; Maskew et al., 2007).

Psychosocial and behavioural barriers encompass various factors that hinder individuals from effectively managing HIV disease. These barriers include anxiety and hopelessness, the presence of stigma, a diminished perception of the severity of HIV disease, a dearth of social support, and a reluctance to resume clinic attendance following a hiatus (Azia et al., 2016; Wringe et al., 2009). One instance of a biomedical barrier is reduced prevention and management of opportunistic infections as this factor can potentially provide challenges for individuals seeking medical care, consequently leading to a potential deterioration in their overall well-being (Brinkhof et al., 2009). Given the existing impediments, achieving population-level control of HIV remains unattainable due to the persistent risk of treatment-discontinuation among individuals.

2.2.4 Adherence to HIV care and treatment

The clinical success of ART is contingent upon the adherence of persons to their care and medication, as it plays a pivotal role in reducing transmission rates. The level of adherence to treatment regimens is the fourth component of the HIV care continuum, this topic has gained significant attention and interest in recent years, particularly in

respect of the implementation of ART programmes. Given the absence of any existing treatment capable of reversing the consequences of HIV or AIDS, the administration of ART represents the sole viable alternative for enhancing the well-being of individuals afflicted with HIV/AIDS, while concurrently reducing the likelihood of HIV-associated morbidity and mortality (Danel et al., 2015; Palella et al., 1998; Paterson et al., 2000). The successful implementation of ART is dependent upon the consistent and rigorous adherence to the prescribed treatment regimens, as highlighted by Mills et al. (2006). If the adherence threshold is not met, this can lead to treatment failure, disease progression, and the emergence of drug-resistant strains of HIV (Nilsson-Schonnesson et al., 2006; Rai et al. 2013).

Compliance with healthcare professionals' advice is crucial for patients, as a significant proportion of medical treatments necessitate patient self-administration outside of the healthcare setting. For optimal efficacy and patient recovery, adherence to the prescribed guidelines is crucial for the success of these treatments. The Population Council and International Centre for Reproductive Health and Coast Province General Hospital, Mombasa, Kenya (hereafter referred to as Population Council et al.) suggested, in essence, that individuals who are undergoing medical treatment play an active role in their own care by making a deliberate decision to adhere to the prescribed course of action and demonstrating a dedicated commitment to doing so (Population Council et al., 2004).

The WHO defines treatment adherence as “the extent to which a person’s behaviour – taking medications, following a diet and/or executing lifestyle changes – corresponds with agreed recommendations from a health care provider” (WHO, 2003, p. 3). In addition, and as recommended by the Office of AIDS Research Advisory Council (hereafter referred to as OARAC), the process of adhering to HIV care and treatment involves initiating care under the guidance of a healthcare professional (known as linkage to care), consistently attending scheduled visits (referred to as retention in care) and adhering to ART (OARAC, 2022).

In addition to the consistent and timely consumption of the recommended drug, the successful implementation of ART necessitates the adoption of dietary modifications and lifestyle changes for an individual's lifetime. To optimise treatment outcomes, the

adherence to ART necessitates much higher levels of adherence compared to other chronic conditions such as diabetes and hypertension that typically require adherence rates of 70% to 80% (Population Council et al., 2004) while ART adherence demands a more rigorous level of adherence. To attain viral suppression, mitigate disease progression, and minimise the risk of developing drug resistance, the WHO has stipulated that patients on ART must adhere to a medication regimen with a minimum adherence rate of 95% (Tariku et al., 2023; Parsons et al., 2008). Therefore, individuals with HIV must adhere diligently to the recommended ART regimen and the instructions provided by healthcare specialists on medication intake. According to previous studies (Lewis et al., 2006; Rao et al., 2007; Kato et al., 2014), individuals who consistently adhere to ART at a rate of 95% or higher experience significant benefits. These benefits include the suppression of viral load to undetectable levels, enhancement of the immune system following an increase in CD4 cell count, and eventually an improvement in the overall quality of life for those living with HIV.

The continuing presence of the virus within the human body necessitates the consistent adherence to a minimum rate of 95% in order to prevent an escalation in viral load (Garcia et al., 2003; Achappa et al., 2013). Failure to maintain this adherence level can lead to detrimental consequences such as ongoing impairment of the immune system, the progression from HIV to AIDS, and the emergence of drug resistance to ART (Family Health International, 2007). The studies conducted by Lewis et al. (2006) and Rai et al. (2013) revealed a significant association between non-adherence to the prescribed ART regimen and increased mortality risk. Specifically, patients who failed to comply with the prescribed ART schedule were found to have a mortality risk that was 3.8 times higher compared to patients who were on the same treatment protocol and who adhered to the specified ART regimen.

Ensuring strict adherence to every stage within the continuum of care is crucial for attaining the most favourable clinical results and effectively realising the public health advantages associated with HIV care and treatment. This encompasses the adherence to the HIV testing process, establishing connections with HIV care services, commencing ART, maintaining adherence to ART, continuing engagement in care, and achieving viral load suppression (OARAC, 2022).

2.2.4.1 Measuring adherence to HIV care

The initial year following an individual's positive HIV test and subsequent connection to HIV care is a critical and transformative stage that can be characterised as a period of heightened susceptibility (Mugavero et al., 2012). This phenomenon occurs due to the fact that individuals undergoing medical treatment are in the process of adapting to a diagnosis that significantly alters their lives. A significant portion of these individuals are compelled to adhere to routine healthcare appointments, notwithstanding the possibility that a subset of them may possess limited familiarity with navigating the healthcare system and may not be fully equipped to sustain a lifelong adherence to prescribed medication. Inadequate patient retention in HIV care can give rise to suboptimal adherence to ART, thereby exerting a significant impact on the suppression of viral load and, consequently, leading to unfavourable health consequences for patients. The adherence to HIV treatment, encompassing both ART and clinical care, has been recognised as a pivotal measure in optimising patient outcomes. Various countries, such as the United States of America, have revised their HIV treatment guidelines to emphasise the importance of adherence (Mugavero et al., 2010).

Evaluating the retention and adherence to HIV care necessitates the examination of a series of clinic visits that occur over an extended period. This process can be challenging, but it is crucial for understanding the effectiveness of HIV care. These visits occur at predetermined intervals. The measurement of adherence to HIV care and treatment lacks a globally acknowledged approach due to variations in the reasons for assessing adherence depending on whether the evaluation is conducted for research purposes or clinical assessment (Chesney, 2006). Various methodologies have been employed to assess adherence to HIV care, encompassing diverse approaches such as tracking missed appointments, evaluating adherence to scheduled appointments, examining consistency in treatment visits, and identifying gaps in care.

- **Missed appointments:** This metric illustrates the frequency with which a patient has failed to attend scheduled medical appointments over the course of the observation period. While it is feasible to develop applications that utilise

dichotomous or count data due to the ease of quantifying missed visits, it is important to note that this measure lacks a denominator for scheduled visits and does not account for cancelled trips in the analytical process (Mugavero et al., 2010).

- **Appointment adherence:** This metric assesses the extent to which patients adhere to their scheduled appointments by calculating the ratio of completed visits to the total number of visits initially booked. The percentage rate obtained shows the level of adherence to appointments. In a manner akin to the missed visit metric, this particular measure fails to account for visits that were cancelled, and it also neglects to analyse the consequences of visits that were rescheduled. Nevertheless, compared to assessment of missed visits, this metric serves as a far more detailed gauge of compliance with HIV treatment, and its computation is considerably more straightforward (Mugavero et al., 2010).
- **Visit constancy:** Consistent with the standards set forth by the WHO (2015), most HIV treatment guidelines suggest that patients should adhere to a regular schedule of healthcare institution visits, occurring every three to six months. During these visits, patients are expected to get ART and undergo blood tests to assess their viral load and CD4 count. This is considered to be a thorough clinical appointment. Consequently, this metric assesses the proportions of time intervals over the observational period in which at least one complete clinic visit occurred (Yehia et al., 2012). The advantages of this measure encompass its exclusive focus on recording and aggregating completed clinic visits, its improved accuracy in accounting for patients lost to follow-up (LTFU) compared to the preceding measures, and the fact that it accounts for the count when automatic rescheduling occurs within the same time frame of the original appointment (Mugavero et al., 2010). Despite providing more comprehensive information compared to the initial two measures, visit consistency remains computationally challenging, and the duration of the visit interval may vary among patients based on the severity of their illness (Mugavero et al., 2010).

- **Gaps in care:** The aforementioned metric takes into account the duration that has elapsed since the patient's most recent fully concluded clinic visit, with the purpose of ascertaining whether the patient's time span between completed clinic visits exceeds a pre-established threshold, which can vary from four to twelve months (Holtzman et al., 2015). Nevertheless, the utilisation of this metric may present certain difficulties due to the fact that the duration of the gap may differ among individual patients, and patients who experience LTFU will have an indeterminate gap. While the utilisation of this measure has similar benefits to those associated with visit consistency, its implementation can pose difficulties due to these factors (Mugavero et al., 2010).

2.2.4.2 Measuring adherence to ART

The measuring of medication adherence presents challenges due to its distinct, intricate, and ever-changing nature, which exhibits variability across different conditions. Accurate monitoring of adherence to ART is of utmost importance in the evaluation of programmes aimed at enhancing adherence and preventing viral resistance. Currently, there is a lack of a universally accepted method for assessing adherence to ART. Instead, several metrics exist without a clear benchmark for comparison (Yehia et al., 2012). Nonetheless, numerous methods are utilised to assess the level of compliance among patients who are undergoing ART. According to Holtzman et al. (2015), empirical investigations have demonstrated that although there exists a correlation between each of these indicators, they also possess distinct merits and drawbacks. In their studies, Garcia et al. (2003) and Castillo-Mancilla and Haberer (2018) categorised the measurements into two distinct groups to enhance the clarity of the process. The first group comprises measurements reliant on patient-provided data, while the second group consists of measurements that objectively and impartially monitor drug consumption.

- **Patient self-reporting:** The method commonly employed to assess adherence among PLHIV entails administering a questionnaire wherein patients are requested to provide responses pertaining to their personal adherence behaviours. The recall period for skipping a drug might range from four days to a week, a month, or the most recent recall (Population Council et al., 2004).

The Patient Medication Adherence Questionnaire (hereafter referred to as PMAQ) is widely utilised as a prominent instrument for self-reporting in both clinical and research settings (Doung et al., 2001; Garcia et al., 2003). In general, PMAQs inquire about several aspects such as social-demographic variables, familial background, psychological issues, adherence to prescribed medication, and the contextual details pertaining to any missing doses (Garcia et al., 2003; McNabb et al., 2001). In addition to evaluating adherence, PMAQs endeavour to delineate the underlying factors contributing to non-adherence and facilitate dialogue on prospective remedies.

The predominant factors contributing to nonadherence primarily stem from sociodemographic and psychological factors at the individual level. However, there is a notable lack of emphasis on variables at the social and structural levels. Multiple studies (Garcia et al., 2003; Wagner et al., 2001) have indicated that self-reporting tends to result in an overestimation of adherence. This discrepancy can be attributed to either recall bias (Holtzman et al., 2015) or patients' reluctance to disclose accurate information about their adherence, thereby affecting the accuracy of their responses (Culig & Leppée, 2014). Therefore, it was recommended by Wagner et al. (2001) that healthcare providers verify the assertions of adherence made by patients.

- **Pill counts:** An additional approach to check adherence involves the healthcare provider quantifying the number of pills consumed by the patient. In this methodology, the individual is requested to return the tangible pill containers to enable the healthcare practitioner to conduct a manual enumeration of the pills that were distributed but remain unused. The quantity of pills consumed is calculated as the discrepancy between the quantity of pills dispensed to the patient in the previous visit and the quantity of pills returned (Agot et al., 2015). The patient's non-adherence to their prescribed treatment regimen is evidenced by the presence of any remaining unused medicine. Based on the research conducted by Achieng et al. (2013), the inclusion of pill counts as a routine component of clinical care throughout the initial six-month period of HIV treatment was found to enhance medication adherence and improve clinical outcomes within the first year of treatment.

The utilisation of this approach for assessing compliance offers the advantage of being clear, cost-effective, and impartial. However, it also presents certain limitations. One notable limitation of this technique is its reliance on individuals to ensure the presence of all their drugs during their visit to the healthcare facility. Prior studies have identified a phenomenon referred to as "pill dumping" or "pill sharing" among patients prior to their planned treatment appointments, which poses a methodological problem (Population Council et al., 2004; Wagner et al., 2001). According to Okatch et al. (2016), patients may engage in the disposal of tablets prior to pill counts in order to create the illusion of a higher level of adherence than what is actually practised. Furthermore, this approach fails to offer insights into several facets of medicine administration, including the timing of doses and the implementation of drug-free periods, both of which play crucial roles in shaping clinical outcomes. Therefore, relying exclusively on this approach may lead to an overestimation of compliance when employed in isolation.

- **Pharmacy refill records:** The methodology employed for assessing adherence in this approach involves the utilisation of data derived from pharmacy refill records. The approach proposed by Achieng et al. (2013) involves calculating the proportion of patients who adhere to their recommended pharmaceutical regimen. This is achieved by dividing the number of daily dosages prescribed by the total number of days elapsed from the initiation to the completion of treatment. This strategy is predicated on the premise that patients who regularly obtain their medication are adhering to the prescribed treatment regimen (Population Council et al., 2004). Therefore, if patients fail to receive prompt refills from the pharmacy, it can be inferred that they are either non-compliant with their prescription regimen or are intentionally missing doses. This can be assessed by examining the duration of time elapsed between refills, an approach characterised by its simplicity and objectivity in assessing adherence and that has shown to possess robust predictive validity in relation to viral load and CD4 response (Williams et al., 2013).

However, the notion that complete adherence to medication can be achieved by simply collecting tablets at the designated time is based on a flawed premise, as it fails to consider the possibility that patients may not actually consume the prescribed medication. Instead, they may engage in practises such as sharing pills with acquaintances or disposing of them. Furthermore, it is impossible to determine the timing of the dosage using this method, regardless of the conditions. The effectiveness of this approach hinges on the healthcare institution's ability to maintain accurate patient records encompassing pertinent details such as the name and dosage of the prescribed medication, the quantity of medication provided at each refill, the dates of prescription refills, and, ideally, precise dosing instructions (Williams et al., 2013). Nevertheless, this scenario is rarely observed in impoverished environments where conventional paper-based approaches continue to be the primary mode of operation, with limited to no presence of computer systems within healthcare establishments. Finally, it is mandated by the system that patients are required to revisit the same pharmacy for the purpose of obtaining all subsequent prescription refills.

- **Electronic drug monitoring:** Electronic drug monitoring (hereafter referred to as EDM) has been employed for a number of years to assess adherence in various chronic illnesses and is commonly utilised by researchers studying HIV. The fundamental assumption of EDM is that it is feasible to track the frequency and timing of medication intake by utilising a microprocessor integrated into a device such as a medication cap, or by establishing real-time communication via transmission over a cellular network (Williams et al., 2013). Every instance in which the device is opened or triggered results in the documentation of that occurrence, including the time and date. This information is thereafter kept and subsequently sent to a computer for the purpose of analysis (Poppa et al., 2004; Population Council et al., 2004).

One notable advantage of EDM is its ability to facilitate real-time and unbiased monitoring of drug usage and dosage intervals. Nevertheless, the current form of EDM is riddled with challenges. Firstly, it is widely acknowledged in the literature that EDM tends to underestimate medication adherence. This assertion is supported by empirical evidence indicating that patients frequently

engage in the practise of consolidating several doses for consumption at a later time. The act of engaging in this behaviour is commonly known as "pocket dosing" (Williams et al., 2013; Garcia et al., 2003). Furthermore, individuals who misplace or fail to replace the lid for any duration of time may effectively nullify the efficacy of the procedure. In addition, it should be noted that patients possess the capacity to access the monitored pill bottle without physically extracting any pills, leading to a potential overestimation of their adherence level. This phenomenon is commonly referred to as "curiosity checks" (Williams et al., 2013; Bova et al., 2005, p. 107; McNabb et al., 2001). Finally, the practicality of utilisation of EDM in resource-constrained contexts is limited, mostly due to its exorbitant cost.

- **Biological markers:** This methodology assesses the adherence of individuals to antiretroviral medication by quantifying the viral load detected in their bloodstream. The utilisation of biological markers as indicators of adherence has significant promise in terms of its capacity to provide a highly precise evaluation of adherence levels (Liu et al., 2022). The achievement of a low viral load in the bloodstream can be considered indicative of adherence to the prescribed treatment plan, given that the primary objective of ART is to impede the replication of HIV. Although this approach is characterised by its objectivity and is often considered the most effective means of assessing adherence, it possesses inherent limitations that restrict its applicability within certain circumstances. Firstly, it is important to acknowledge the increasing body of evidence suggesting that adherence to prescription medication instructions by patients does not guarantee a corresponding reduction in viral load. This assertion holds validity even in cases where the patient demonstrates a commendable level of commitment to their prescribed treatment regimen (UNAIDS, 2016). The potential causes of this phenomenon can be attributed to various variables, which include the failure of treatment, the development of resistance to ART medications, or insufficient absorption of drugs into the bloodstream (Wagner et al., 2001; Population Council et al., 2004). The issue of monitoring viral load is also of particular concern due to the high cost of the required technology, which may be unattainable in particular circumstances due to limited resources (UNAIDS, 2016).

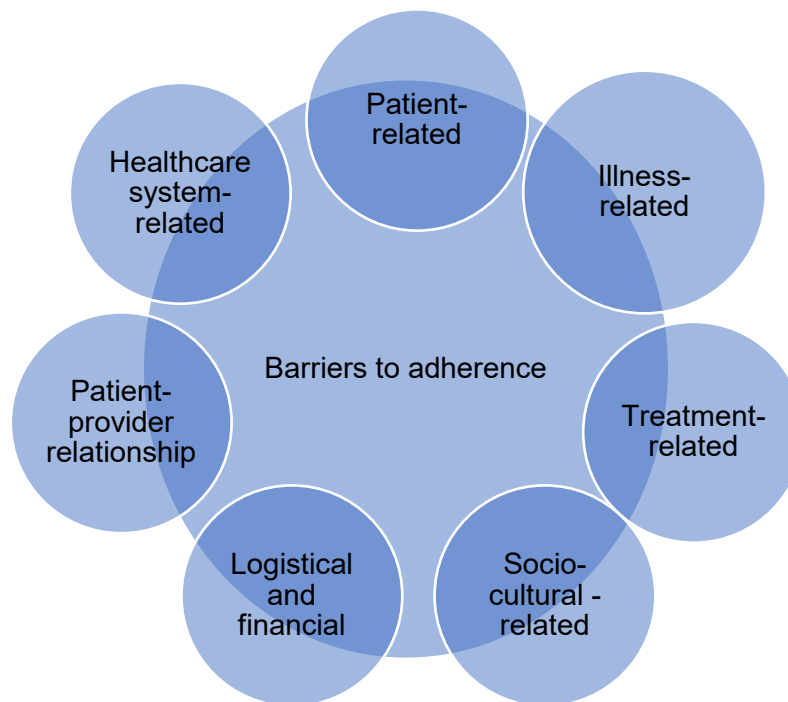
2.2.4.3 Measuring adherence to HIV care and treatment at study site

At the time of data collection for this study, the healthcare facility employed three primary measures to assess adherence to HIV care and treatment, namely pill count, missed visits, and biological markers. At the onset of data collection in 2019, patients were mandated to make monthly visits to the healthcare facility. However, this protocol was modified in 2020 due to the escalation of the COVID-19 pandemic and the subsequent implementation of movement restrictions; the effects of the protocol modifications on the current study are addressed in Chapter Four of this report. Consequently, it became mandatory for patients to attend the healthcare institution on a quarterly basis, with a frequency of once every 90 days. During the course of the COVID-19 pandemic, healthcare institutions monitored patients' adherence to ART by employing both pill count and biological markers. Notably, the pill count consisted of 90+3 pills, as opposed to the previous standard of 30 pills. If patients were unable to attend their scheduled clinic visit at the medical centre, they were provided with an additional allocation of three pills.

2.2.4.4 Empirical review of the factors affecting adherence to ART

In order to enhance adherence, it is crucial to firstly ascertain those underlying factors that hinder patients from adhering to their prescribed medications (Chesney, 2000). This preliminary step is necessary prior to implementing interventions aimed at promoting adherence. As indicated in Figure 2.2. the factors that impact adherence can be classified into several categories, including patient-related factors, illness-related factors, treatment-related factors, socio-cultural-related factors, logistical and financial-related factors, patient-provider relationship factors, and healthcare system factors (Kvarnström et al., 2021).

Figure 2.2: Barriers to adherence (adapted from Dlamini and Rubashkyn, 2012)



- **Patient-related factors:** The patient's behaviour has a pivotal role in determining the efficacy of the prescribed therapeutic intervention. Consequently, it is imperative and necessary to prioritise the factors within the patient's control that are directly associated with them as a first measure to enhance adherence (Chesney, 2000). The level of adherence to a prescribed treatment regimen can potentially be influenced by a patient's comprehension and attitudes about their medical condition and the recommended course of therapy. To achieve optimal adherence, it is vital to possess a comprehensive understanding of the interrelationships existing between viral load and the progression of sickness, as well as the intricate connections between adherence and viral load. According to Fisher et al. (2006), existing research indicates a positive correlation between adherence to HIV/AIDS treatment and the possession of knowledge about the disease as well as an understanding of the consequences associated with non-adherence.

It is common for patients to possess a restricted knowledge regarding the importance of adhering to prescribed drug regimens, often resulting in a propensity to alter dosages based on their own understanding (Kvarnström et

al., 2021). According to the results of research conducted in Eswatini by Dlamini and Rubashkyn (2012), it was shown that participants associated the reduction of symptoms with a perceived improvement in their personal state of well-being, hence influencing their adherence behaviour. There exists a common belief among individuals that medications are exclusively intended for utilisation during periods of disease, and that their usage should be confined to the treatment of a specific ailment for a certain duration, rather than being sustained indefinitely. Consequently, upon experiencing improvement in their symptoms, individuals discontinue the use of the prescribed intervention. The issue of non-adherence is exacerbated by inadequate levels of health literacy (Schatz et al., 2019). The ability of an individual to adhere to the prescribed treatment regimen may also be impeded by misinterpretations of the instructions given by the prescribing healthcare professional, resulting in inaccurate knowledge and misconceptions regarding the treatment protocol. According to a study conducted by Wenger et al. (1999), patients who had positive beliefs about the advantages of ART demonstrated improved compliance with the prescribed treatment plan. In contrast, Lee et al. (2016) discovered that there was a negative correlation between negative result expectations and adherence to ART. Therefore, negative views concerning the effectiveness of ART may potentially hinder adherence behaviour.

- ***Illness-related factors:*** Rowell-Cunsolo and Hu (2020) argued that the primary concern of the patient does not necessarily revolve around the ailment. The patient's subjective viewpoint of their medical condition may potentially influence their level of adherence to prescribed treatment regimens. The illness can be perceived as an undesirable occurrence that holds less significance compared to other facets of life. In certain instances, individuals may engage in cognitive processes to conclude that their ailment is less severe than perceived, especially if they are asymptomatic and perhaps noncompliant with prescribed medicine. Patients who have not fully embraced their diagnosis or who ascribe their ailment to external factors may have challenges in adhering to the prescribed medication. The impact of a patient's unfavourable attitude to their illness on drug adherence can vary across different medical conditions (Jarab et al., 2018).

- ***Treatment-related factors:*** A positive association exists between suboptimal adherence and the complex nature of the pharmaceutical treatment regimen. The complexity encompasses factors such as the quantity of medication being prescribed, the frequency of daily doses, and the duration of the therapy. According to a study conducted by Kvarnström et al. (2021), patients may exhibit non-adherence to drug regimens when faced with challenges in integrating them into their daily routines and activities. Certain treatments necessitate the administration of multiple daily doses of medication, accompanied by certain requirements, limitations, or restrictions pertaining to dietary intake and engagement in specific activities. The intricate nature of the treatment, along with the challenges posed by toxicity and adverse effects, can have a substantial impact on an individual's motivation and ability to adhere to the prescribed medication (Chesney et al., 2000).

The prevalence of medication-related adverse effects poses a significant challenge to adherence to treatment regimens (Kvarnström et al., 2021). According to Krueger et al. (2005), individuals who hold the belief that they lack the ability to regulate or effectively handle the side effects associated with their prescription are more inclined to deviate from the prescribed regimen. Additionally, patients who have encountered more than two negative reactions to their medication are also less inclined to maintain their medication adherence. The use of ART may induce significant adverse events, encompassing temporary reactions such as dermal responses, headaches, weariness, nightmares, hallucinations, gastrointestinal distress, and vomiting. The occurrence of adverse events, including but not limited to nausea, depression, peripheral neuropathy, lipodystrophy, and metabolic abnormalities, is highly probable and can have prolonged consequences on individuals (Pau & George, 2014). Existing research on the adverse effect of ART suggests that individuals tend to exhibit greater adherence with treatments aimed at alleviating symptoms, as opposed to drugs that elicit undesirable side effects (Chesney, 2000; Max & Sherer, 2000; Stone, 2001).

- ***Sociocultural and community-related factors:*** The societal stigmatisation associated with HIV/AIDS surpasses that of any other illness. Stigma is a multifaceted social construct that follows a distinct trajectory: it initiates with the process of assigning labels, subsequently progresses to the experience of alienation and diminished social standing, and ultimately reaches its pinnacle in the form of discriminatory practises (Kontomanolis et al., 2017). Behaviours and attitudes such as discrimination, avoidance, ridicule, harassment, and the involuntary displacement from residences can all be categorised as stigmatising (Rao et al., 2007; UNAIDS 2006). Individuals who are diagnosed with HIV may feel obliged to conceal their HIV status from their family and the broader society due to apprehension surrounding the potential stigmatisation they may face. There are several ways in which this phenomenon might adversely affect adherence to ART regimens, such as non-adherence with prescribed medication regimens and concealing the act of medication intake.

There is a growing body of research that provides evidence for the significance of social support in facilitating treatment adherence among PLHIV (Wekesa, 2007). Various individuals, including spouses, children and acquaintances, have the capacity to offer diverse forms of social support. This intervention has the potential to enhance adherence behaviour by assuming a proactive role in reminding individuals who are living with HIV to stick to their recommended drug regimen. According to Alhomoud et al. (2015), patients who lack social support face a substantially increased likelihood of non-adherence to their prescribed medication regimen.

- ***Logistical and financial factors:*** Unstable living environments, characterised by substandard living conditions, restricted healthcare accessibility due to considerable geographic distances between patients and healthcare facilities, and inadequate financial resources, such as the inability to afford transportation costs to reach healthcare facilities, unemployment, poverty and inequality were consistently linked to reduced adherence rates.

Research publications have provided empirical evidence supporting the assertion that individuals belonging to a lower socio-economic position encounter obstacles when attempting to access ART. The primary obstacles identified in a study conducted by Chindedza et al. (2013) in Zimbabwe were the geographical distance of travel and economic considerations, both of which impacted adherence to ART. The study's findings revealed instances where individuals were unable to get ART at the designated time due to insufficient financial resources to cover transportation expenses. Chirambo et al. (2019) conducted research in Malawi, which yielded comparable findings. The study revealed that the combination of limited financial resources and the considerable distance clients had to travel to access healthcare facilities had a detrimental impact on adherence to ART. The findings of the likelihood ratio test done by Addo et al. (2022) in Ghana revealed an intriguing observation: individuals who required less than 30 minutes to travel to their ART site had a 59% reduced likelihood of adhering to ART. As a result of the social stigma associated with their condition, individuals in question exhibited a tendency to refrain from seeking medical treatment at nearby ART centres, hence diminishing the probability of adhering to their prescribed ART regimen. According to a study conducted by Dorcélus et al. (2021) in Haiti, individuals living in poverty and lacking access to basic necessities such as water and food may encounter barriers that impede their ability to adhere to treatment regimens as PLHIV. Individuals who lack sufficient resources for sustenance are more inclined to prioritise addressing this urgent need rather than prioritising the achievement of viral load suppression.

- ***Patient-provider relationship-related factors:*** There is an increasing understanding among scholars and researchers that the extent to which a patient adheres to their prescribed treatment regimen is significantly influenced by the quality of the relationship established between the patient and the healthcare professionals responsible for their care. A poor influence on patients' adherence to treatment regimens can be attributed to a paternalistic attitude and a dearth of support and empathy exhibited by healthcare practitioners (Bezabhe et al., 2014). Several factors were identified as contributing to the enhancement of the relationship between patients and their healthcare

providers. These factors include the perception of the provider's competence, the quality and clarity of communication, the display of compassion by the health provider, the involvement of the patient in treatment decision-making, and the convenience of the treatment regimen (Chesney, 2000). Thus, the primary obligation for educating patients on the appropriate utilisation of medication lies with healthcare practitioners. The significance of healthcare providers possessing accurate knowledge regarding medication adherence and medication regimens cannot be overstated, as patients must receive sufficient information about their treatment schedule and be educated on the importance of adhering to the prescribed regimen. Due to the physician's inadequate understanding of the patient's prescribed medication, it is possible that the patient's trust and confidence in the healthcare provider could be undermined. Consequently, this may lead to a deterioration in their relationship and perhaps result in the patient discontinuing their treatment.

Based on the research conducted by Gao et al. (2000), a prominent obstacle to medication adherence was identified as the challenge associated with comprehending and adhering to healthcare professionals' instructions. Non-adherence may also arise due to the healthcare provider's inadequate communication regarding the benefits, instructions for administration, and any negative consequences associated with the prescribed medication. Effective communication between healthcare professionals and patients is crucial for patients to openly share their medication-related concerns, including side effects and adherence issues (Lambert-Kerzner et al., 2015). Without a foundation of trust in the provider-patient relationship, patients may feel hesitant or unable to freely express their thoughts and experiences. Despite receiving proper instructions, individuals often struggle to adhere to their prescribed medication regimen as directed by their healthcare providers. In such cases, the healthcare professional may engage in collaborative efforts with the patient to establish a daily regimen that incorporates the prescribed medication regimen.

- **Healthcare system-related factors:** Healthcare institutions, particularly in poor nations, encounter a notable obstacle in the form of insufficient availability

of ART. Consequently, patients receiving ART are compelled to deviate from the prescribed treatment regimen, leading to suboptimal adherence rates. de Jager et al. (2018) established a positive association between heightened adherence to antiretroviral medication and the availability of a dependable primary health care system. There exist several characteristics inherent to a therapeutic environment that may exhibit a correlation with adherence, including factors such as transportation accessibility, waiting duration, appointment scheduling convenience, service integration, and the assurance of confidentiality (Jager et al., 2018).

2.2.4.5 Adherence to HIV care and treatment in Eswatini

One of the objectives of the ART plan in Eswatini is to mitigate the emergence and spread of HIV drug resistance. Patient adherence to treatment is a strategy commonly employed in the effort to combat the emergence of medication resistance in HIV. In the context of ART, adherence refers to the act of consistently following the prescribed drug regimen, adhering to the designated schedule, and complying with the essential dietary and lifestyle guidelines for the entirety of one's lifespan (Iacob et al., 2017). The adherence to antiretroviral medication is of utmost importance as it enables both patients and healthcare professionals to accomplish various objectives. These objectives encompass the prevention of opportunistic infections, the early detection of complications, the enhancement of treatment and care outcomes, the postponement of drug resistance, and the cultivation of positive patient-provider relationships (Zolnieriek & Dimatteo, 2009). Consequently, individuals diagnosed with HIV will experience increased longevity and enhanced quality of life.

In 2010, the nation of Eswatini introduced a National Comprehensive HIV Package of Care as a means of enhancing the existing national standards for providing structured and comprehensive treatment to those affected by HIV and AIDS. The International Centre for AIDS Care and Treatment Programmes (ICAP, 2010) stated that the primary objective of the Comprehensive HIV Package of Care is to offer a seamless provision of HIV care, spanning from pre-ART to ART, with the ultimate goal of enhancing the overall well-being of PLHIV. One of the primary objectives of the care package is to enhance patients' understanding and engagement with the care plan,

encompassing adherence to therapy and medication (ICAP, 2010). The Comprehensive HIV Package of Care comprises three components, namely clinical, psychosocial, and preventative treatment (ICAP, 2010).

According to ICAP (2010), individuals who have received a positive HIV diagnosis undergo a series of interventions aimed at promoting adherence to treatment. These interventions include preparation and assessment for adherence, ongoing counselling and support for adherence, step-up counselling for adherence, assessment of psychosocial factors, ongoing psychosocial support, counselling and support for disclosure, access to community support groups, and counselling on substance use and abuse as part of the psychosocial component. These interventions are integral components of the ART programme, aimed at promoting adherence to HIV care and treatment. They are implemented throughout all public healthcare facilities in Eswatini that provide ART services (ICAP, 2010). Irrespective of the criteria for ART eligibility, individuals in Eswatini who receive a positive HIV diagnosis are promptly enrolled in the ART programme for comprehensive care and treatment and are consistently subjected to regular monitoring (ICAP, 2010).

Despite the implementation of an intervention aimed at promoting adherence to HIV care and treatment in Eswatini, the incidence of new HIV infections increased from 4,800 in 2020 to 6,900 in 2021 (UNAIDS, 2021). In addition, the observed viral load suppression rate of 73.1% serves as evidence that the adherence to HIV care and treatment remains a persistent obstacle. This is particularly alarming considering the potential of continuous viral suppression to mitigate subsequent transmission of the virus (Chauke et al., 2020). In the context of a nation with limited geographical and demographic dimensions, such as Eswatini, the consequences of failing to adhere to prescribed regulations and guidelines can have profoundly detrimental impacts on the country.

2.2.4.6 Predicting adherence to HIV care and treatment

To date, there has been a scarcity of research conducted in the emerging domain of predicting adherence to HIV care and treatment. Several studies were undertaken in developing countries, with the majority of research conducted thus far focusing on

developed nations, specifically the United States and Europe (Bisson et al., 2006; Maskew et al., 2007; Zachariah et al., 2008; Do et al., 2010; Lubega et al., 2010; Cornell et al., 2010). Consequently, there exists a limited body of knowledge about the accurate prediction of adherence to HIV care and treatment in Africa, particularly in sub-Saharan Africa, where the HIV epidemic persists and exerts devastating consequences.

The prevailing body of research pertaining to adherence to HIV care and treatment predominantly focuses on individuals who are currently receiving ART. Nevertheless, some studies were undertaken on individuals who have not been included in ART programmes (Bisson et al., 2006; Parruti et al., 2006; Caluwaerts et al., 2009; Carrieri et al., 2006; Cornell et al., 2010; Zachariah et al., 2008). This has rendered the task of identifying individuals who are prone to non-adherence to therapy more challenging, as it can only be accomplished after the commencement of treatment. Several studies were conducted on specific populations, including injection drug users (Arnsten et al., 2007; Kerr et al., 2005; Turner & Hecht, 2003) and prisoners (Roberson et al., 2009). However, it remains uncertain how these findings can be generalised to the broader adult population, which consists of various transmission groups.

Several research studies have examined the prediction of adherence to HIV care and treatment. Notably, Corless et al. (2005) and Malcolm et al. (2003) employed theoretical frameworks to guide the identification of criteria for such investigation. Most research conducted thus far has focused on examining demographic, clinical, immunological, and virological factors (Bisson, et al., 2006; Cornell et al., 2010; Caluwaerts, et al., 2009; Zachariah et al., 2008; Dalal et al., 2008). However, there has been a notable absence or restricted inclusion of psychological and social assessments in these studies. The primary reason for this is likely due to the normal collection of demographics, clinical, and laboratory data in ART programmes, which makes them easily accessible. In contrast, the collection of psychological data would necessitate specific preparations, requiring additional work and expenditure. The assessment of cognitive abilities has been limited to a few research investigations, all of which were conducted exclusively within the United States (Albert et al., 1999; Hinkin et al., 2002; Hinkin et al., 2004; Waldrop-Valverde et al., 2006).

2.2.5 Viral suppression

The primary objective of HIV care and therapy is to minimise the probability and pace of medication resistance emergence while attaining viral suppression. Individuals with suppressed viral loads can experience a state of good health, and those with undetectable viral loads are unlikely to transmit the virus to others; this has been commonly referred to as U=U (undetectable equals untransmittable) (Eisinger et al., 2019). Viral suppression represents the final stage in the management of HIV. The WHO (2016) recommended the use of individual-level viral load as a measure of the effectiveness of ART and adherence to treatment. When an individual diagnosed with HIV initiates an ART regimen, there is a reduction in their viral load due to the primary objective of ART, which is to impede the replication of the HIV virus. According to Shoko and Chikobvu (2019), most individuals who adhere to their prescribed HIV medication regimen consistently will experience a reduction in viral load to an undetectable threshold within a period of six months or less. According to the WHO (2016), treatment effectiveness necessitates a viral load threshold of 1000 copies/mL. To maintain a state of HIV being undetectable, it is imperative to adhere to the prescribed regimen of antiretroviral therapy for HIV.

To attain viral suppression, it is imperative for an individual to progress effectively through the initial four stages of the treatment continuum. These stages encompass diagnosis, linkage to care, retention in care, initiation of ART, and adherence to ART. The achievement and sustenance of viral suppression are significantly contingent upon the successful completion of these preliminary stages. Consequently, any challenges faced during the preceding phases will adversely affect the capacity to attain and sustain viral suppression.

2.3 Conclusion

Given the absence of a cure for HIV/AIDS, it is imperative for those affected by this condition to consistently adhere to their healthcare regimen and therapeutic interventions. This chapter has provided evidence to support the notion that several factors can influence patients' non-adherence to HIV care and the prescribed treatment regimen, individually or collectively. Consequently, there is a growing

urgency to develop and implement strategies and interventions that effectively promote patient adherence to care and treatment programmes. This is essential in order to achieve and sustain the 95:95:95 milestone, which entails ensuring that 95% of all individuals living with HIV are aware of their HIV status, 95% of all diagnosed individuals receive appropriate treatment, and 95% of all individuals receiving ART achieve viral suppression (UNAIDS, 2015). Attaining this milestone is crucial for the ultimate goal of eradicating the AIDS epidemic as a public health threat.

This study aims to determine the characteristics of patients who are at a higher risk of non-adherence to HIV care and treatment before their introduction into care, in order to provide them with additional assistance and improve their chances of achieving and sustaining viral suppression.

CHAPTER THREE

THEORETICAL FRAMEWORK UNDERPINNING THE STUDY

3.1 Introduction

There is a contention that the foundation for effective behavioural observation lies in establishing measurements that are rooted in a strong theoretical framework, which is substantiated by ample data (Michie & Abraham, 2004). Facilitating understanding of the causal processes and mechanisms that explain observed behaviour can be achieved through the provision of an explanation on the functioning of theory-based measures. The utilisation of theories can offer valuable insights and contributions to the development of behaviour modification interventions across several domains including the comprehension of health behaviour, and can guide research endeavours, and facilitate the transferability of interventions across various health issues, geographic regions, and healthcare contexts (Munro et al., 2007).

Several theories were proposed to better understand human conduct and the underlying rationale for promoting behavioural change. Based on the results of a comprehensive scoping review undertaken by Davis et al. (2015), it was determined that there exists a total of 82 theories pertaining to behaviour and behaviour modification throughout the domains of social and behavioural sciences. Among them, four theories encompass a significant portion of the papers, constituting 63% of the literature. Consequently, these theories emerge as the most employed frameworks within the field of behaviour modification. The Transtheoretical Model of Change, the Theory of Planned Behavior, the Social Cognitive Theory, and the Information-Motivation-Behavioral-Skills Model are the four prominent theories that are ranked in ascending order based on their level of utilisation within the field.

This chapter will provide an overview of the four theories, followed by a shift in focus to the Theory of Planned Behavior - it is important to note that this inquiry is grounded in the theoretical framework of the Theory of Planned Behavior. This study will analyse both the merits and shortcomings of the theory, as well as its usefulness to the current study.

3.2 Theories of behavioural change

The challenges associated with the implementation and sustaining of behavioural modifications aimed at improving health outcomes are underscored by behaviour change theories and supported by evidence from relevant empirical studies. Theories in the field of behaviour change clearly mention several factors that can influence behaviour, including health beliefs, past behaviour, intention, social influences, perceived control, and the context in which the behaviour occurs. The use of recognised principles of behaviour change has the potential to yield benefits for numerous populations and medical conditions. By utilising these theoretical frameworks, we may identify and classify behaviours that promote well-being, while also generating empirical evidence for the most effective strategies for modifying certain behaviours. Once created, these best practises can be employed to ensure that healthcare personnel effectively aid patients in modifying their behaviour through the implementation of these strategies.

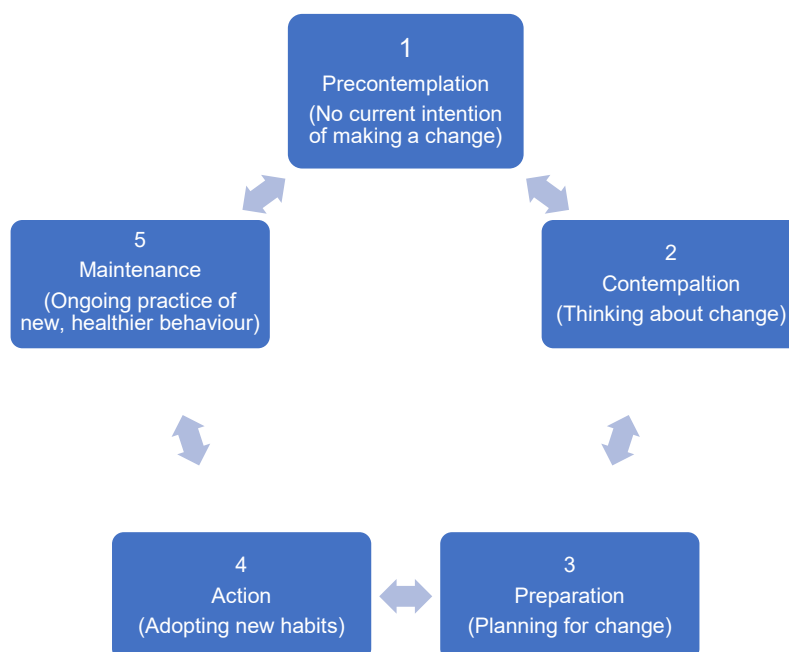
3.2.1 *The Transtheoretical Model of Change*

The Transtheoretical Model for Behaviour Change (TTM) as proposed by Prochaska and Diclemente (1977) is a prominent, comprehensive theoretical framework aimed at evaluating and explaining the process by which individuals are prepared to modify their own behaviour. The model prioritises the cognitive processes involved in individual decision-making (Han et al., 2017). The TTM was established with the primary objective of understanding the modifications in individuals' behaviour (Prochaska & DiClemente, 1983). Additionally, it seeks to clarify the dynamic progression of individuals as they transition across different phases of behavioural development.

The TTM operates on the assumption that individuals do not undergo abrupt and definitive changes in their behaviours. Instead, behavioural modifications, particularly those related to habits, occur gradually and continuously through a cyclical progression. Han et al. (2017) assert that the TTM establishes a continuum to gauge an individual's motivation and preparedness for change. Furthermore, the TTM offers

strategies to guide individuals through several stages of motivational readiness, enabling them to modify behaviours that impede their progress. Sustaining long-term changes in health behaviour necessitates the implementation of multiple actions and modifications over an extended period. The readiness to embrace change varies among individuals, with some individuals exhibiting a proactive inclination towards modifying their behaviour, while others may still be in the process of adapting. The notion of stages of change is a fundamental concept within the TTM and suggests that individuals exist at different degrees of preparedness when it comes to embracing healthy behaviours (Hashemzadeh et al., 2019).

Figure 3.1: Transtheoretical Model/Stages of Change (Prochaska & Clemente, 1982)



According to the TTM, which serves as a central framework for promoting positive health behaviour modifications, individuals undergoing health behaviour change may progress through various stages of readiness for change. These stages, as depicted in Figure 3.1, include precontemplation (characterised by a lack of intention to make changes or denial of the need for change), contemplation (involving serious consideration of making changes), preparation (involving the implementation of small changes), action, which involves actively engaging in the conduct for a period of less than six months, and maintenance, which refers to the continued practise of the new, healthier habit for a duration of six months or more (Green et al., 2020).

- **Precontemplation:** Individuals in the precontemplation stage exhibit a lack of intention to do any form of action within the foreseeable future, often within a time frame of six months (Siddharthan et al., 2021). One of the outcomes associated with being in the precontemplation stage is a lack of awareness regarding one's behaviours. During this phase, individuals will engage in self-justification and may exhibit defensive reactions when confronted with attempts to induce behavioural modification. The precontemplation stage is characterised by an individual's notable reluctance to recognise or modify a problematic behavioural pattern (Siddharthan et al., 2021). According to Lenio (2006), individuals must experience cognitive dissonance (i.e. hold conflicting beliefs, causing psychological discomfort), be in a negative emotional state, and acknowledge the existence of a problem in order to go through this particular stage.
- **Contemplation:** The individual demonstrates awareness of an existing issue and is engaging in contemplation regarding potential solutions. However, a definitive decision to act in order to address the situation has not been reached at this point (Norcross et al., 2011). At this point, the individual exhibits a heightened receptivity towards acquiring novel knowledge and demonstrates an awareness of the personal ramifications resulting from their actions. During this phase, individuals engage in a process of evaluating both the advantages and disadvantages associated with implementing the proposed change. Individuals who engage in contemplation struggle to reconcile their positive evaluations of their problematic conduct with the potential costs, efforts, and sacrifices that may be involved in successfully changing it (Norcross et al., 2011). An individual who has reached this stage in the process is evaluating the advantages and disadvantages of implementing a change compared to maintaining the current behaviour. In essence, they are engaged in the process of evaluating the necessity of resolving the problem and deliberating on the appropriateness of implementing the proposed modification (Siddharthan et al., 2021).

- **Preparation:** According to Siddharthan et al. (2021), individuals in the preparation stage demonstrate a heightened awareness of their problematic conduct and exhibit a strong commitment to initiating change within a month's time. Individuals who have reached this stage have commonly made endeavours to modify their conduct in some manner during the preceding year, although their endeavours have proven to be ineffective (Norcross et al., 2011). Currently, the individual possesses an awareness regarding the superiority of the positive parts of change over the negative ones. Consequently, they are engaged in a proactive pursuit of information that can aid them in their endeavours.
- **Action:** During the action stage of the change process, individuals engage in active efforts to modify their behaviours. Individuals are required to modify their behaviour, encounters, and/or environment to navigate the obstacles they face (Norcross et al., 2011). Individuals are classified as being in the action stage when they have actively endeavoured to modify their behaviour within the six months before the current time period (Siddharthan et al., 2021). Engaging in proactive measures requires individuals to make conspicuous modifications in their conduct, along with a substantial commitment of their time and effort (Norcross et al., 2011). Scholarly literature advises against conflating the observable endeavour to effect change with the actual process of transformation. The reason for this is that an individual's genuine transformation occurs only when specific criteria were fulfilled, which scientists and experts concur are enough for mitigating the risks linked with the problematic activity (Lenio, 2006).
- **Maintenance:** This stage is the fifth phase of the behaviour change process, wherein individuals actively strive to avoid reverting to previous habits and solidify the progress made during the action stage (Norcross et al., 2011). The duration of this stage can vary from a period of six months to an indeterminate length of time subsequent to the initial activity. According to the research conducted by Prochaska et al. (1992), individuals are classified as being in the maintenance stage based on specific criteria. These criteria encompass the individual's capacity to sustain freedom from the problem behaviour and

engage in new behaviours that are incompatible with the problem behaviour for a duration exceeding six months. Maintenance is not devoid of change; instead, it can be understood as a perpetuation of change (Siddharthan et al., 2021). Individuals who have progressed to the maintenance phase of their recovery have a diminished likelihood of relapse and an enhanced perception of their capacity to maintain the good changes they have implemented (Lenio, 2006).

The initial three stages are designed to evoke motivation for action, but the last two stages primarily focus on implementing and executing that action. Each stage represents a specific duration of time and a series of tasks that must be accomplished before progressing to the next stage. While the duration of each stage may vary for different individuals, it is generally thought that the required duties remain constant. The achievement of maximum success at each stage of the change process is facilitated by the strategic utilisation of a distinct amalgamation of change processes and relational situations. The sequential nature of the passage through the phases is widely acknowledged; nonetheless, individuals may not consistently traverse the stages of change in a strictly linear fashion. In contrast, it is common for individuals to engage in a cyclical process wherein they recycle and revisit specific phases. This phenomenon is exemplified by instances in which individuals experience a relapse and regress to a previous stage, a behaviour that is contingent upon their drive and self-efficacy, which in the context of the TTM refers to the individual's belief in their ability to effectively manage challenging situations and avoid reverting to problematic behaviours (Lenio, 2006). Furthermore, it should be noted that individuals may not consistently progress through the various stages of transformation in a predetermined sequence (Liu et al., 2018).

3.2.1.1 Review of the Transtheoretical Model of Change

The TTM has demonstrated efficacy in addressing a range of health behaviours, such as smoking, alcohol consumption, substance abuse, and physical activity (Hasriani et al., 2022; Han et al., 2017). While the TTM has been widely employed in numerous research endeavours that examine behavioural change, it is important to acknowledge the existence of certain limitations associated with the theory. These limitations should be carefully considered prior to its application within the domain of health psychology.

One of the main objections directed towards the theory pertains to the emphasis placed on the stages of change construct within the paradigm. There exists a contention that the categorization of human functioning into discrete stages is inadequate due to its inherent variability and complexity (Siddharthan et al., 2021). Bandura (1997, as cited in Lenio, 2006), posited that a genuine stage theory encompasses three distinct identifying characteristics: qualitative transitions that occur between different phases, a consistent and unchanging sequence of change, and the lack of reversibility. The TTM does not adhere to all its stipulated obligations. According to Siddharthan et al. (2021), the initial two phases of the model, namely precontemplation and contemplation, are distinguished primarily by the level of intention. However, the subsequent stages are characterised by variations in the frequency or duration of behavioural adoption rather than fundamental qualitative differences. This finding challenges the notion of qualitative transformations across stages, as proposed by Bandura (1997, as cited in Siddharthan et al., 2021). The absence of uniform starting points and the potential for individuals to bypass some stages within the model result in the lack of consistent patterns of change and irreversibility in the TMC (Siddharthan et al., 2021).

The determination of an individual's stage of transition lacks a universally applicable set of criteria, as the demarcations between these stages are occasionally subjective and lacking in precision (Siddharthan et al., 2021). The question of the duration of each stage lacks a solid solution, as does the inquiry into the maximum duration an individual can spend in a certain stage. In his work, Lenio (2006) referenced the research conducted by Kraft et al. (1999), whereby they found that both theoretical reasoning and empirical data do not support the notion that the six-month time frame employed by the TTM is appropriate for categorising stages. Furthermore, it should be noted that the model operates under the assumption that individuals engage in decision-making by constructing plans that are both coherent and rational. However, it is important to acknowledge that this assumption does not always align with the reality of human behaviour (Kraft et al., 1999, as cited in Siddharthan et al., 2021).

One of the primary criticisms directed towards the TTM is its failure to consider the social context within which change occurs. This is relevant to a particular demographic

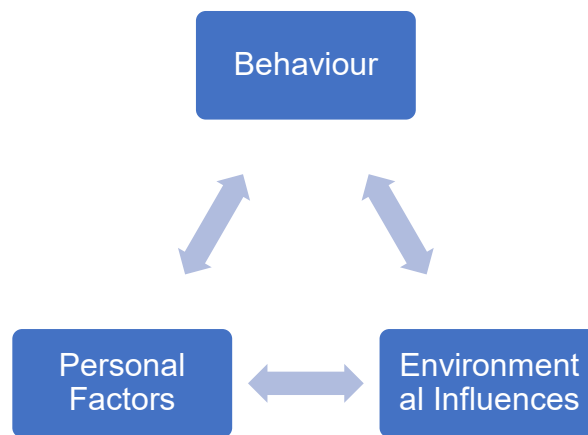
group (Lenio, 2006), characterised by their socioeconomic status and income level (Siddharthan et al., 2021). According to Walton et al. (2021), the change project should identify a specific behaviour that is achievable by all individuals within the targeted group.

The Transtheoretical Model of Change is a widely utilised model in the field of behavioural change. However, it was deemed unsuitable for implementation in this current study because the study's attention was centred on a behaviour that had not yet been enacted. The main aim of the current study was to assess the likelihood of treatment adherence among participants prior to the initiation of HIV care and treatment, specifically focusing on their compliance with the treatment plan advised by the ART programme. Thus, the application of the stages of the TTM and their associated timeframes in the investigation of attention behaviour was found to be unfeasible.

3.2.2 The Social Cognitive Theory

The Social Cognitive Theory (SCT) is a psychological framework that highlights the significant influence exerted by the social environment on various aspects of human functioning, such as motivation, learning, and self-regulation (Schunk & DiBenedetto, 2020). According to Ebede et al. (2020), the theory suggests that individuals should actively participate in self-reflection, self-regulation, and self-organisation as a means to attain their objectives. The SCT enables the comprehension of the factors that influence the initiation and maintenance of behaviour modification. According to Martin et al. (2014, p. 2), the “SCT estimates the ability of an individual to engage in a targeted behaviour, based on internal and external parameters and their interrelationships”. The SCT explains the influence of personal, contextual, and behavioural aspects on an individual's behaviour. Additionally, it highlights the reciprocal relationship between an individual's behaviour and the interaction of these elements, as depicted in Figure 3.2 (Ramirez et al., 2012).

Figure 3.2: Social Cognitive Theory (Bandura, 1986)



The adoption of a behaviour is influenced by **personal factors** such as knowledge, perceived self-efficacy, and outcome expectancies (Ramirez et al., 2012). Individual elements, such as an individual's ideas pertaining to their own level of efficacy, exert a substantial influence on the process of personal transformation. The aforementioned core belief functions as the fundamental basis upon which human drive and behaviour are constructed (Bandura, 2004). For an individual to partake in a specific activity, it is imperative that they possess the cognitive belief that this behaviour is within their sphere of influence and that they possess the capacity to effectuate alterations in their life. This construct aims to measure the perceived capacity of an individual to overcome challenges and deficiencies that may impact their behaviour (Ramirez et al., 2012). The perceptions an individual holds regarding the advantages and disadvantages of a certain conduct are strongly linked to their expectations of the outcomes associated with that behaviour. These outcome expectations, in turn, exert an influence on the individual's subsequent behaviour. According to Bandura (2004), individuals who possess a more optimistic perspective regarding the potential effects of their actions are more inclined to engage in the particular behaviour under consideration.

It is believed that **behavioural factors**, in turn, exert an influence on behaviour through affecting individuals' objectives or intents to engage in the behaviour, as well as their self-efficacy expectancies. The most effective technique for modifying habits involves the establishment of goals that are both short-term in nature and achievable.

The aforementioned idea refers to the strategies or aims that an individual constructs with the aim of participating in the behaviour in the near future (Bandura, 2004).

Lastly, it is worth noting that social support and barriers to behaviour adoption are illustrative instances of **environmental factors** that exert an influence on human conduct. Barriers in the environment encompass a wide spectrum of factors, including personal, social, and structural elements. These barriers serve as a means to quantitatively assess the impact of many hurdles that hinder individuals from participating in targeted behaviours (Ramirez et al., 2012). A negative correlation exists between the quantity of hurdles or impediments to change and the probability of persons engaging in the conduct under consideration. The concept of social support pertains to the manner in which individuals are facilitated and influenced by others to engage in specific activities, as well as the extent to which such facilitation and influence occurs. According to Greaney et al. (2018), social support plays a crucial role in the process of behaviour transformation. Receiving support from individuals can establish a favourable basis for several significant factors and indicators of behaviour, so fostering the process of personal growth and change. The formation of intentions to engage in specific behaviours is influenced by a confluence of environmental factors and the consideration of anticipated outcomes associated with those behaviours. The creation of behaviours is driven by individuals' intentions to engage in actions that are believed to effectively reduce perceived risks.

Within the framework of the SCT, the initiation of behaviour change and its ongoing maintenance regarding an individual's health behaviour can be categorised into six main components. Firstly, there is health knowledge, which pertains to an individual's understanding of the risks and benefits associated with their health. Secondly, perceived self-efficacy refers to the belief that one has the ability to control their own health behaviours. Thirdly, the expected costs and benefits of engaging in a particular behaviour are considered, as individuals may believe that certain actions will lead to specific outcomes. Fourthly, health goals play a role, encompassing both short-term and long-term intentions to engage in certain behaviours. Fifthly, perceived behaviour facilitators and social support are taken into account, as these factors can either enable or hinder the adoption of health behaviours. Lastly, barriers and obstacles to behaviour change are considered, including personal or environmental factors that

individuals perceive as hindrances to engaging in a behaviour (Stacey et al., 2015; Middleton et al., 2013).

Each of the primary components of the SCT has a significant role in facilitating individuals' behaviour modification processes. The comprehension of health hazards and advantages establishes the context for potentially modifying conduct; nevertheless, mere consciousness is inadequate to instigate behaviour modification in isolation (Stacey et al., 2015). Self-efficacy plays a crucial role in shaping anticipated behavioural outcomes, as well as identifying the obstacles or facilitators that may impede or enhance goal attainment. The fundamental emphasis of the SCT is in the construct of self-efficacy, as it exerts a direct as well as an indirect impact on human behaviour. The primary mechanism by which this occurs is through the conviction that individuals possess the capacity to proficiently utilise their skills in the presence of difficult situations. Young et al. (2014) argued that the influence of indirect factors on goals, result expectations, and barriers and facilitators is evident. The amount of an individual's self-efficacy plays a crucial role in determining the goals they establish, the level of commitment they exhibit towards attaining those objectives, and the anticipated outcomes they expect to accomplish via their endeavours (Stacey et al., 2015). Individuals who possess elevated degrees of self-efficacy demonstrate enhanced aptitude in acquiring new knowledge and enhancing their competencies. The relationship between self-efficacy and several psychological factors, such as individuals' expectations of positive results, their capacity to overcome difficulties, and their level of motivation and dedication to goals, is positively correlated. According to Ramirez et al. (2012) and Stacey et al. (2015), there is a positive correlation between the effectiveness of individuals in carrying out their intended actions and behaviours and the probability of them engaging in these acts on a habitual basis.

A positive association was observed between self-efficacy and adherence to prescribed treatment across a range of chronic health conditions. Based on the research conducted by Clark and Dodge (1999), it was observed that self-efficacy beliefs assessed at intervals of four and twelve months in advance were found to be significant in explaining various behaviours, including adherence to medication regimen, engagement in enough physical activity, proficient stress management, and adherence to food guidelines. The relationship between patients' adherence to blood

glucose testing, nutrition, and exercise and their self-efficacy was established in previous research (Williams & Bond, 2002). Similarly, in the case of people living with HIV (PLHIV) who are prescribed antiretroviral therapy (ART), adherence self-efficacy was identified as the most influential factor associated with adherence, with a medium to large effect size (SMD = 0.603) (Langebeek et al., 2014).

3.2.2.1 Review of the Social Cognitive Theory

The SCT provides a conceptual framework that can be employed to comprehend human conduct, formulate predictions regarding it, and facilitate its modification. The concept under consideration encompasses both the cognitive and motivational dimensions of self-regulated behaviour, as proposed by Bandura (1997, as referenced in McAuley et al., 2011). Additionally, it provides guidelines for effectively motivating individuals to enact constructive modifications in their behavioural patterns. The comprehensive scope of the SCT exhibits several resemblances and intersections with other frequently utilised models for predicting behaviour. The success of the application of grounded theoretical principles, which can be specifically addressed through treatments aimed at fostering healthy behaviours, may be attributed to this factor (Bandura, 1997 in Ramirez et al., 2012).

One advantage offered by the SCT is its ability to facilitate the understanding and application of concepts to real-life circumstances that individuals encounter in their daily lives. Furthermore, the theory possesses the capacity to be efficiently and effortlessly implemented, hence contributing to its remarkable track record in research (Nabavi, 2012). The SCT is an academic discipline that examines salient dimensions of human social conduct and cognition through a scientific lens. The foundation of this area of inquiry rests upon a series of empirical investigations employing many methodologies for observation, analysis, and measurement. The outcomes of these investigations are afterwards interpreted through the application of hypotheses and justifications (Schurz et al., 2021).

One of the theory's notable strengths is in its comprehensive scope and wide-ranging applicability. The theory comprehensively considers several aspects of human behaviour, cognition, and the surrounding environment (Nabavi, 2012). One notable

benefit of this approach is its comprehensive consideration of several factors, including positive and negative reinforcement, self-efficacy, motivation, and the strategies employed by individuals in pursuit of their goals (Alshobramy, 2019). Finally, the last strength of this approach is its emphasis on self-regulation and learning. This is based on the belief that individuals are goal-oriented and actively engage in constructing functional cognitive and behavioural patterns in response to environmental circumstances, all with the aim of achieving personal objectives (Williams, 2010).

When implementing the SCT, it is essential to acknowledge and address some limitations. The theory has faced criticism on several fronts, with the foremost concern being its excessive generality and lack of a unifying framework, rendering it impractical to fully operationalize the theory as a whole (Munro et al., 2007). As a result of this, most implementations of the SCT primarily emphasise one or two specific constructs, such as self-efficacy. The SCT identifies self-efficacy as the primary and most immediate predictor and precursor of human behaviour (Luszczynska & Schwarzer, 2005). The extent to which each aspect, namely person, behaviour, and environment, contributes to actual behaviour remains uncertain within the context of the theory, as it solely relies on the dynamic interplay among these factors. Furthermore, it is unclear which factor holds greater influence over the others (Nabavi, 2012). In addition, the SCT exhibits a disproportionate reliance on external factors while neglecting the significance of an individual's intrinsic traits. Notably, emotions are disregarded within this framework, resulting in a diminished understanding of personality (Nabavi, 2012). While it is true that external factors have a significant part in shaping human behaviour, it is crucial to acknowledge that internal motivations and emotions also exert influence and should not be disregarded. Moreover, it is worth noting that the SCT places an undue emphasis on cognitive traits and capacities, neglecting the crucial role of biological and hormonal factors. It is important to acknowledge that biological and hormonal processes have a substantial impact on decision-making, irrespective of an individual's prior experiences and cognitive ability (Nabavi, 2012). Decision-making processes have been identified to be affected, improved by, or controlled by genes, neurotransmitters, hormones, receptors, and enzymes (Sarmiento & Gouveia, 2021). One such example is dopamine, which is connected to learning and rewards and is typically associated with assessing decision outcomes.

In conclusion, the theory argues that changes in an individual's environment will inevitably lead to matching changes in their personal attributes, but this may not always be the case.

The SCT considers multiple levels of the social ecology model when addressing the matter of behaviour modification in individuals. Due to its dual focus on both the individual and the environment, the SCT has been extensively utilised in the discipline of health promotion. Nevertheless, the SCT was deemed unsuitable for use in the current study and the challenges in utilising all the constructs of the SCT for the purpose of developing a management framework to predict adherence to HIV care and treatment are twofold: Firstly, the complexity of incorporating all of the SCT constructs would have posed difficulties. Secondly, the study participants would have faced time constraints that hindered their ability to actively engage in cognitive and behavioural activities that are instrumental in facilitating behaviour change. This assertion holds special validity considering that the primary objective of the research was to develop reliable measures capable of accurately predicting adherence to HIV care and treatment prior to the commencement of ART.

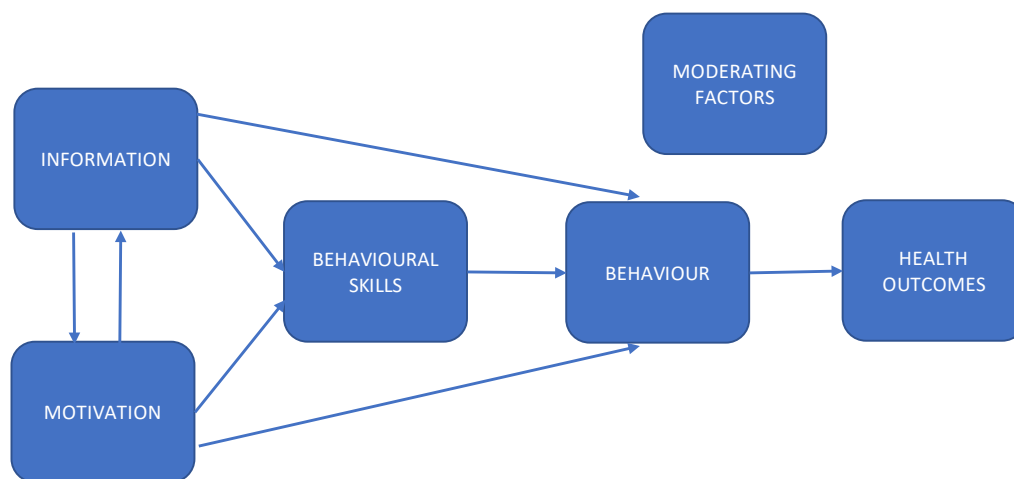
3.2.3 The Information-Motivation-Behavioral-Skills Model

The Information-Motivation-Behavioral Skills Model (IMB) was initially introduced by Fisher and Fisher (1992) as a theoretical framework that can be employed to facilitate the modification of high-risk behaviours related to HIV/AIDS and so the IMB model has been extensively utilised in the existing body of research on HIV/AIDS, demonstrating its efficacy in achieving the established objectives within this field of inquiry. Subsequent to that, the IMB model underwent special adaptations to facilitate the creation of interventions aimed at improving adherence to antiretroviral therapy (ART) (Munro et al., 2007). The IMB model is a comprehensive framework that utilises an evidence-based and theory-driven approach to comprehending adherence to medication. By integrating a substantial body of research, the model effectively identifies the precise factors that impact adherence to ART (Amico et al., 2009).

The IMB model consists of three fundamental structures (Figure 3.3) that are accountable for eliciting alterations in behaviour. According to Rongkavilit et al. (2010),

the factors that influence an individual's engagement in a particular behaviour include their motivation to do the behaviour, the skills required to carry out the behaviour, and their knowledge and understanding of the behaviour itself.

Figure 3.3: The Information Motivation and Behavioral Skills model (Fisher and Fisher, 1992)



According to Fisher et al. (2003), the IMB model posits that health-related information, motivation, and behavioural skills play significant roles in influencing the adoption and maintenance of healthy behaviours. The probability of individuals engaging in and sustaining health-promoting activities, as well as achieving beneficial health outcomes, is contingent upon their level of knowledge, motivation, and possession of requisite behavioural skills. Conversely, it can be argued that individuals are more likely to partake in health risk behaviours and encounter undesirable health consequences when they possess inadequate knowledge, lack the necessary motivation to take action, and are deficient in the behavioural skills necessary for effective intervention.

The IMB model posits that adherence to ART is influenced by adherence-related information and motivation, which in turn are associated with adherence-related behavioural skills. According to Amico et al. (2009), these skills directly predict adherence to ART. The information pertaining to adherence encompasses accurate details concerning an individual's specific ART regimen. This includes instructions on

the proper timing and method of administering doses, the necessary level of adherence, potential interactions and side effects of the drugs, as well as guidelines for making informed decisions regarding adherence. It is important to note that these guidelines may vary in terms of their accuracy (Dima et al., 2013). The amalgamation of personal motivation with social motivation constitutes adherence motivation. The concept of personal motivation pertains to an individual's internal thoughts towards the behaviour and beliefs regarding the outcomes of adherence and non-adherence. On the other hand, social motivation refers to the extent to which an individual perceives support for their adherence from significant persons in their social environment (Amico et al., 2009). Adherence behavioural skills encompass the specific abilities that individuals must employ to ensure continuous medication adherence in various locations and situations, together with their perceived efficacy in utilising these skills (Dima et al., 2013).

The IMB model proposes that the degree to which the model's constructs relate to adherence behaviour can be influenced by the presence and intensity of situational and individual moderating factors (Fisher et al., 2006). The level of moderation is determined by the moderator, with lower levels impacting adherence through the IMB model components and higher levels directly affecting adherence behaviour (Fisher et al., 2006).

3.2.3.1 Review of the Information-Motivation-Behavioral-Skills Model

For the components of knowledge, motivation, and behavioural skills within the IMB model to yield desired outcomes, it is imperative that they are well aligned with the specific behaviour that is intended to be modified. Furthermore, individuals are vulnerable to being influenced by several contextual circumstances, including their psychological well-being, fundamental need, and availability of healthcare resources. According to Munro et al. (2007), there is a belief that the combination of information and motivation can effectively stimulate the development of behavioural abilities. Consequently, this can lead to the reduction of risks, as well as the initiation and sustenance of behavioural changes. Previous studies have shown evidence of the model's ability to predict adherence to ART and suggest that it has achieved a

reasonable level of success in promoting behavioural changes (Amico et al., 2009; Fisher, 2005).

One advantage of utilising this model is its simplicity and cost-effectiveness. There exist a limited number of structures, and the process of operationalizing each of these constructs is not overly challenging. According to Kalichman et al. (2002), if the three constructs of the IMB model contain unique content that is specific to the target population, it is possible to make generalisations based on these constructs. An additional advantage of the model is in its validation through comprehensive research conducted on HIV-preventive behaviour (Walsh et al., 2011; Fisher, 2011). Moreover, the model has exhibited satisfactory predictability in relation to its utilisation in the context of ART adherence and has formed the basis for a range of diverse interventions aimed at promoting adherence (Rongkavilit et al., 2010; Simon et al., 2010).

Despite the widespread utilisation of the IMB model in the realm of treatments aimed at promoting adherence to ART, scholarly discourse has highlighted some limitations associated with its implementation. The predictive ability of the information construct in this model is shown to be inadequate and inconsistent, thereby highlighting one of the weaknesses of the model (Sharma, 2012). One could argue the contention that while information is a necessary component for the purpose of behaviour modification, it is insufficient in itself. The second limitation pertains to the absence of inherent contradiction between information and motivation. The interdependence between variables in this model has a detrimental impact on its testability (Tavani & Ghofranipour, 2014). In summary, the IMB, along with other models of risky behaviour, tends to primarily focus on individual-level variables (Mittal et al., 2012). The model fails to consider the significant influence of environmental and cultural factors, which are crucial for the accurate prediction and explanation of behaviours, as well as for enhancing the overall predictability of any given model (Sharma, 2012). Nevertheless, according to Kvarnstrom et al. (2021), the existing literature suggests that no single theoretical framework is sufficient in comprehensively explaining the determinants of medication adherence among patients. This is due to the presence of additional contextual factors within the patient's environment that are likely to exert influence on adherence behaviours.

The IMB model is a theoretical framework that aims to explain and predict health-related behaviours. However, the utilisation of the IMB model, a widely employed social behaviour model in the context of medication adherence among individuals with chronic illnesses, and its application to explain patients' behaviours pertaining to the rational use of medications, was deemed unsuitable for the present investigation. The rationale behind this is that the theoretical framework necessitates the provision of ample information regarding adherence, the cultivation of motivation to take action, and the acquisition of requisite behavioural skills for effective implementation. These prerequisites could not be fulfilled prior to enrolment into HIV care and treatment, as the objective of the study was to establish reliable measurements capable of accurately predicting adherence to HIV care and treatment prior to the commencement of the ART programme.

3.2.4 The Theory of Planned Behavior

3.2.4.1 Overview of the Theory of Planned Behavior

The current study is grounded on the theoretical framework of the Theory of Planned Behavior (hereafter referred to as TPB). The TPB provides a highly advantageous theoretical framework for the development of measures aimed at predicting adherence to HIV care and treatment. This assertion is supported by several compelling justifications. First and foremost, the theory presupposes the presence of discrete structures that are believed to facilitate the observed conduct. Furthermore, several studies employing the TPB have undergone meta-analytic assessments, providing empirical support for the TPB's predictive capacity across a range of activities (Armitage & Conner, 2001; Conner & Sparks, 2005). The TPB is a widely utilised social cognition model in the field of health psychology, as evidenced by its frequent application in research studies (Ajzen & Schmidt, 2020, Davis et al., 2015; Godin et al., 2005; Johnson et al., 2004; Ogden, 2003).

The definition of social cognition may exhibit variability, nevertheless, its fundamental principle posits that a comprehensive understanding of individuals' social behaviours necessitates an examination of their beliefs regarding their behaviour within a social

framework, as well as their social perceptions and representations (Rutter & Quine, 2002). The phrase 'social cognition models' is employed to denote theories that delineate the immediate social cognitive factors influencing behaviour (Sutton, 2010). Beliefs, attitudes, and knowledge are social cognitive elements that were included into several theoretical frameworks, such as the TPB (Conner & Norman, 2005). These elements have played a pivotal role in several models that aim to understand the factors influencing health behaviours. This is due to multiple reasons. Such elements are inherent traits possessed by individuals that influence their conduct and are developed via the process of socialisation (Conner & Norman, 2005). These authors argued that there exists variation among persons of similar backgrounds with regards to their inclination to engage in health-related behaviours. Furthermore, they argued that individuals who are receptive to change can serve to effectively impact the execution of health habits. The cognitive elements discussed here are the key components of several prevalent models of health behaviour, including the TPB. These models were referred to as social cognition models due to their use of many cognitive variables in the analysis of individual social behaviours, especially those related to health.

3.2.4.2 Origins of the Theory of Planned Behavior Model

The TPB was developed by Ajzen in 1988 as an extension of the Theory of Reasoned Action (TRA), which had been proposed earlier. The TRA was initially introduced by Martin Fishbein in 1967. The TRA under consideration emerged because of the author's prior theoretical endeavours in the field of attitude, which was originally referred to as Expectancy-value Theory during the period of research conducted by Ajzen and Fishbein (1975). The TRA posits that an individual's action is influenced by their behavioural intentions, which are shaped by their attitudes towards the behaviour and the subjective norms associated with its performance (Ajzen & Fishbein, 1980).

The individual's affective evaluation of participating in a specific conduct, whether it is positive or negative, is referred to as their attitude towards the behaviour (Ajzen & Fishbein, 1980). The determination is made through an examination of an individual's perspectives on the potential outcomes that would ensue from a particular behaviour, along with an evaluation of the desirability of these outcomes. According to Ajzen and

Fishbein (1980), it is possible to ascertain an individual's general attitude by computing the sum of their respective consequence and desirability ratings for each anticipated outcome resulting from their actions.

The construct referred to as subjective norm, as defined by Ajzen and Fishbein (1980), pertains to an individual's impression of the beliefs held by those who hold significance in their life regarding the performance of a particular behaviour. The anticipation that an individual would behave in alignment with the desires of a specific referent provides support for the significance of that referent's viewpoint. Consequently, the aggregate subjective norm can be represented as the summation of the individual evaluations of perception and motivation for all pertinent referents (Ajzen & Fishbein, 1980).

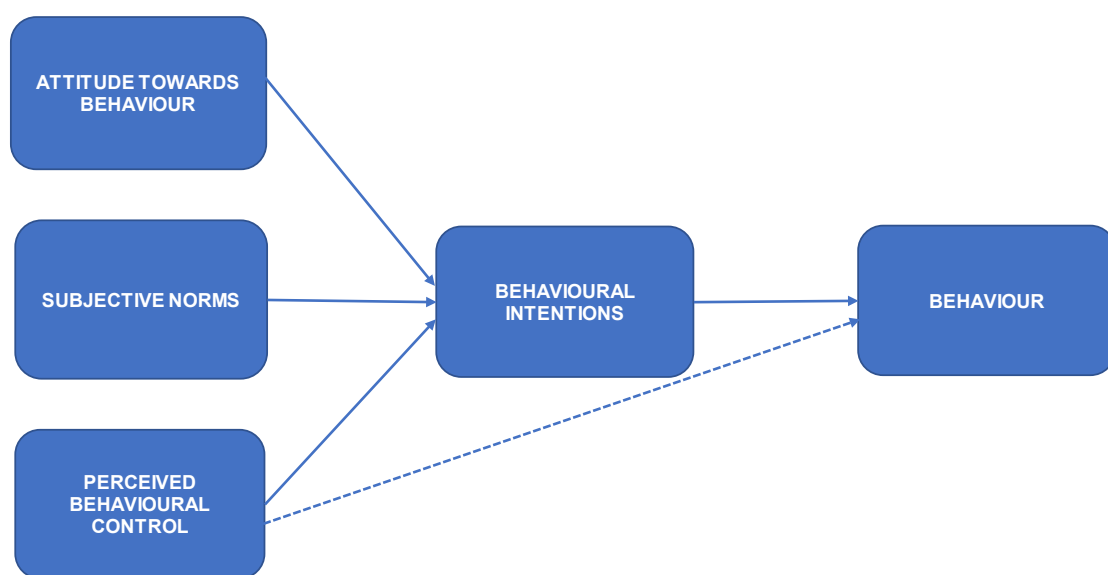
The TRA has demonstrated its effectiveness across various circumstances, as evidenced by the research conducted by Eagly and Chaiken (1993). Nonetheless, there exists apprehensions pertaining to the generalizability of its application to a broader demographic and the pertinence of specific factors in the equation. The model fails to provide an explanation for the findings of studies indicating that past behaviour is the most reliable indicator of future behaviour (Aiken, 2002; Ajzen, 2002; McEachan et al., 2016). Furthermore, the model fails to consider the extent to which individuals perceive their own level of behavioural control. To rectify this limitation, Ajzen (1988) proposed a revised iteration of the model, which he denoted as the Theory of Planned Behavior (TPB).

3.2.4.3 Description of the Theory of Planned Behavior Model

The theory proposes a model that enables the measurement of the guiding mechanisms underlying human behaviour. The ability to predict the manifestation of a specific behaviour is contingent upon the deliberate nature of the behaviour. According to Ajzen (2012), the TPB argues that behavioural intention is the primary determinant of volitional activity. Therefore, it can be inferred that the likelihood of an activity being successfully executed is directly proportional to the level of intention that an individual possesses to engage in this behaviour.

According to Ajzen (1991), the TPB consists of three distinct antecedents that contribute to the formation of behavioural intention. These antecedents include attitude towards the behaviour, subjective norms, and perceived amount of behavioural control (see Figure 3.4). Typically, the strength of an individual's intention to engage in a desired action is expected to be positively influenced by the favourability of their attitudes and subjective norms, as well as their perceived control over the environment.

Figure 3.4: The Theory of Planned Behavior (Ajzen, 1991)



The variable names utilised in the model correspond to psychological constructs, hence possessing inherent meaning within the theoretical framework. The variables will be explained in the following section.

The construct of behaviour. Interventions designed to modify individual behaviour are formulated within the domain of implementation research. Ajzen and Fishbein (1980, p. 29) claim that “behaviour is typically viewed as a given factor that requires no further elaboration”. Upon closer examination, it becomes evident that the phrase is more complex than it initially seems. Considering this, prior to initiating an inquiry grounded in the TPB, it is imperative to initially identify and evaluate the behaviour under scrutiny that is intended to be understood, anticipated, or potentially modified (Ajzen & Fishbein, 1980). Before utilising a tool to define activity, it is imperative to

consider four distinct facets of said behaviour. The components in question are commonly denoted as TACT, an acronym that represents target, action, context, and time, as proposed by Ajzen (1991).

The initial element of action is to acknowledge the distinct attributes of the activity under investigation. The second constituent pertains to the individual or entity that is the intended recipient of the behaviour, commonly known as the target. The third element of context pertains to the specific settings in which individuals partake in a certain behaviour, as well as the underlying motivations driving their engagement in this behaviour. The final aspect of time pertains to the temporal scope of observation, specifically whether the behaviour is to be observed at a singular moment or during a broader duration. This study primarily investigated the adherence to HIV care and treatment among people living with HIV/AIDS in Eswatini. The target population of the study comprised people living with HIV/AIDS. The study was conducted within the context of enhancing the overall health outcomes of this population. The observation period for data collection spanned over a duration exceeding one year.

The construct of behavioural intention. The notion of behavioural intention, as posited by Armitage and Conner (1998), serves as a representation of an individual's motivation or determination to engage in a specific behaviour. According to Ajzen (1991), intentions are seen as the key factors that encompass the motivating aspects behind activity. Additionally, intentions provide insights into the level of effort individuals are prepared to exert to execute the behaviour. Consequently, according to Ajzen (1991), the theory argues that an individual's intention of engaging in a behaviour serves as the principal motivating factor for that particular action. The theory contends that the prediction of behaviour becomes straightforward once a comprehensive understanding of intention is attained. The absence of a consistent correspondence between intention and behaviour should not be overlooked, as there are instances where it becomes necessary to assess the behaviour construct.

The correlation between behavioural intention and actual behaviour is seldom flawless but intention can serve as a proxy for behaviour. Consequently, the conceptualization of intention, a pivotal element within the TPB, was developed with the aim of

integrating all the motivational factors encompassed by the preceding three fundamental constructs. As a result, this facilitates the establishment of the construct of intention as a predictor of actual behaviour (Ajzen, 1991). Given the circumstances, despite the lack of a feasible method to investigate specific intended behaviours, the variables within this model can still be employed to evaluate the effectiveness of implementation techniques.

According to the theory, individuals are likely to align their actions with their objectives in the absence of unforeseen circumstances or obstacles, such as limited resources or unavailable opportunities. Nevertheless, this concept has sparked considerable discourse among the scholarly community over the extent to which intentions predict behaviour and the various elements that exert an influence on this phenomenon (Sheeran, 2002). Bhattacharjee and Sanford (2009) proposed that the phenomenon of individuals reporting favourable intentions towards a specific behaviour, known as the social desirability effect, can be attributed to a desire to avoid appearing in conflict with other participants. The idea of attitude strength, as discussed in the social psychology literature (Krosnick et al., 1993; Pomerantz et al., 1995; Verplanken & Holland, 2002), offers a potentially more persuasive theoretical account for the discrepancy between intention and behaviour. This proposition contends that individuals who possess robust attitudes have a more pronounced correlation between their attitudes and subsequent behaviours, whereas individuals with feeble attitudes demonstrate a comparatively diminished association.

Several studies have found that individuals who have positive intentions are more likely to exhibit inconsistency between their intentions and their actual behaviour, as compared to individuals with negative intentions (Sheeran & Orbell, 2000; Sutton et al., 1994; Stanton et al., 1996). These studies have reported that, on average, approximately 47% of individuals who intend to act fail to do so, while only 7% of individuals who intend to act actually follow through on their intentions. According to several studies (Sutton et al., 1994; Stanton et al., 1996; Sheeran & Orbell, 2000), the primary reason for the intention-behaviour gap is the failure of participants to act upon their positive intentions.

The construct of attitude towards the behaviour. An individual's overall evaluation of behaviour might be encapsulated by their attitude towards the behaviour. Beck and Ajzen (1991, p. 286) proposed that attitude towards behaviour can be defined as "the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question.". Consequently, the construct relies on an individual's comprehensive evaluation of the behaviour. The prevailing understanding posits that it comprises two fundamental elements of interaction: beliefs pertaining to the outcomes of the actions (behavioural beliefs), and the corresponding negative or positive assessment of these behavioural beliefs (outcome evaluations). It is postulated that these beliefs exhibit mutual interaction (Francis et al., 2004). According to Ajzen (2012), every behavioural belief forms an association between a specific behaviour and a particular consequence, and this outcome is accompanied by a certain level of subjectivity. It can be inferred that these ideas on behaviour and the assessment of its consequences interact to shape a comprehensive positive or negative disposition towards the behaviour. The assessment of an individual's attitude towards a specific behaviour might serve as an indicator of the extent to which they hold a negative or good opinion of their own performance in that activity. In order to provide greater precision, an individual's attitude is influenced by the subjective assessment or appraisal they assign to each feasible outcome, and this influence is directly proportional to the subjective assessment they assign to the probability that engaging in the behaviour will lead to the specific outcome being considered (Ajzen, 2012).

The construct of subjective norms. Individuals include the desires of influential social figures into their own evaluations of the possible consequences of a particular conduct. As per the TPB, the perceived expectations are referred to as normative beliefs. The formation of a subjective norm, as proposed by Ajzen (2012), is influenced by normative beliefs pertaining to different social referents, such as a spouse, close friend, co-worker, or doctor. These beliefs together contribute to the overall feeling of social pressure to engage in the action under consideration. Subjective norms refer to the perceptions held by individuals regarding the views and opinions of influential individuals in their social circles, pertaining to the appropriateness or desirability of their engagement in a particular behaviour. The likelihood of an individual engaging in particular behaviour is contingent, to some extent, upon their perception of the

opinions held by these influential persons. The term "subjective norm" refers to an individual's evaluation of the societal expectations and pressures associated with engaging in or abstaining from a particular behaviour, as defined by Ajzen and Fishbein (1980). According to the TPB, the notion of subjective norm pertains to an individual's perception of the expectations held by significant others towards their performance or non-performance. This perspective may or may not align with the beliefs of others, but the decision made by the individual will establish their personal standard (Ajzen & Fishbein, 1980).

Ajzen (2006) asserted that the subjective norm construct is comprised of two interconnected components: normative beliefs and motivation to comply. Normative beliefs refer to individuals' opinions regarding how significant others would prefer them to behave, while motivation to comply pertains to the individual's inclination to act in alignment with these normative beliefs. Based on an analysis of the comprehensive collection of readily available normative views regarding the anticipated behaviours of influential individuals or groups, it is thought that the prevailing subjective norm is established. According to Ajzen (2012), the desire of an individual to conform to a certain reference is multiplied by each normative belief, and the sum of these products is calculated for all readily accessible referents.

The restricted extent of the construct may explain the comparatively weak support for subjective norms in the TPB. Numerous studies have demonstrated that the subjective norm exhibits limited predictive power in determining behavioural intentions (Ajzen, 1991; Terry & Hogg, 1996). Multiple studies have provided evidence to support the notion that subjective norms play a crucial role in explaining behaviour and can effectively predict it (Schultz et al., 2007; Goldstein et al., 2008). The argument being presented suggests that individuals are likely to react to normative behaviours only if they value their group identity and that these reactions are relevant only in specific situations (Christensen et al., Matz, 2004).

The construct of perceived behavioural control. There are multiple internal and external elements that might either impede or enable the enactment of a specific behaviour. The capacity of individuals to carry out their intentions is dependent on their possession of the necessary information, intelligence, skills, abilities, and other

internal factors required to execute the behaviour. Additionally, their ability to overcome any external obstacles that may hinder behavioural performance is also crucial. Ajzen (1991) established the theoretical construct of perceived behavioural control as a means of explaining behaviours that may lie outside an individual's direct control. The aforementioned construct encompasses the subjective perspective regarding the amount of effort necessary to execute one's intended activities (Ajzen, 1988; Ajzen 1991; Ajzen 2006). The primary focus of the concept of perceived behavioural control lies in the discrepancy between an individual's intention and their subsequent behaviour. This concept acknowledges that possessing favourable intentions does not necessarily result in the execution of corresponding actions. To provide greater clarity, the concept of perceived behavioural control refers to an individual's subjective assessment of their capacity to do a specific behaviour, as conceptualised by Ajzen (2006). Hence, the elements that constitute the concept of perceived behavioural control encompass inhibitory variables, which embrace both environmental and psychological influences that can potentially influence an individual's intention towards a specific conduct (Chang, 2013).

The advancement of the construct of perceived behavioural control inside the TPB has been significantly shaped by the scholarly investigations carried out by Bandura (1997) on the concept of self-efficacy. According to this author, the Social Cognitive Theory (SCT) suggests that individuals' conceptions of their capacity to exert control over events that affect their lives play a crucial role in shaping human motivation and action. The concept of perceived behavioural control within the TPB revolves around individuals' beliefs of their capacity to engage in a specific behaviour and the extent of control they have over it. The concept presented exhibits a notable similarity to Bandura's self-efficacy construct as described by Ajzen (2012).

The incorporation of the perceived behavioural control component into the TPB framework has been observed in both the Health Belief Model (Armitage & Conner, 2000) and the Protection Motivation Theory (Conner & Norman, 1996). These have attracted considerable interest within the realm of health behavioural prediction. Perceived behavioural control is a noteworthy predictor variable due to its comprehensive coverage of both perceived and real constraints on engaging in a certain behaviour. According to the research conducted by Armitage and Conner

(2001), the construct of perceived behavioural control can function as an independent predictor of behaviour, especially in contexts where individuals face significant problems in exercising self-control. The concept of perceived behavioural control is significant due to its ability to predict intention and, in specific circumstances, directly predict behaviour (Ajzen, 1991).

The TPB has garnered significant popularity in academic literature. Nevertheless, scholarly discussions have emerged over the notion of perceived behavioural control, as highlighted by Kraft et al. (2005) and Trafimow et al. (2002). Rhodes and Courneya (2003) observed that an indication of the dispute surrounding this issue is the lack of consistency in the labelling of the components of perceived behavioural control. Therefore, the importance of perceived behavioural control demonstrates variation depending on the situational context of the study. In specific cases, the desired behaviour may be straightforward, and the probability of encountering obstacles, whether real or perceived, may be minimal or non-existent. According to Ajzen's (1991) research, the construct of perceived behavioural control is considered to have minimal validity in such a scenario.

In conclusion, it can be asserted that the probability of an individual participating in a specific behaviour is dependent on the intensity of their intention, which is impacted by their attitude towards the behaviour, the subjective norm linked to it, and their perceived self-efficacy in controlling their behaviour. According to the TPB, modifying the core beliefs related to behaviour, the beliefs about what others think, and the beliefs about control in the desired direction might increase the likelihood of changing behaviour by increasing the intention to change. This phenomenon can be attributed to the positive correlation between the intention to modify one's behaviour and the likelihood of actually doing so.

3.2.4.4 Development and modification of the theory

Recently, researchers have integrated more elements derived from behavioural theories into the TPB framework. This integration aimed to fulfil the requirement for more self-governing constructs inside the framework. The incorporation of additional elements into the TPB framework has led to the development of a more

comprehensive model, which can effectively explain a wider range of variations in human conduct.

The following examples indicate the elements that were included. According to the research conducted by Chan and Bishop (2013), it was determined that moral norms can function as a supplementary indicator of behaviour. The study revealed that moral obligation played a significant role in predicting intention. The study conducted by Brewer et al. (2016) provided evidence of a robust association between anticipated regret and both intentions and health behaviour. According to a study conducted by Banas et al. (2017), the key predictor of adherence was shown to be self-regulatory processes. Furthermore, the study conducted by Ries et al. (2012) yielded findings that indicate the significance of self-identity as a predictive element in human behaviour. The inclusion of additional variables, which are typically obtained from different theories, has the potential to enhance the explanatory capacity of the model and aid in the understanding of the observed behaviours.

The inclusion of the concept of past behaviour in the theory serves as an additional example of an independent construct that has been integrated. According to a study conducted by Hagger et al. (2000), it was discovered that past behaviour accounted for 19% of the variance in predicting physical activity. Furthermore, it was found that past behaviour has a substantial detrimental effect on the associations between attitude and intention, as well as between intention and behaviour. This assertion is substantiated by the outcomes of a meta-analysis of the TPB, which was undertaken by McEachan et al. (2011) and used within the context of health-related behaviours. The researchers found that past behaviour contributed an additional 10.9% of variability to the prediction of future behaviour and an additional 5% of variability to the variance in intention. Despite the indisputable reality that past behaviour plays a crucial role in enhancing the precision of prognostications regarding future conduct, the current study did not consider previous behaviour as a variable. This omission was deliberate, as the study aimed to predict participants' intentions to engage in behaviours that were previously unexplored by them.

3.2.4.5 Fields of use

The TPB has been successfully applied to comprehending and predicting a range of health-related behaviours, including engaging in physical exercise, adhering to a low-fat diet, practising safe sex through condom use for HIV prevention, addressing substance abuse, quitting smoking, moderating alcohol consumption, utilising health services, promoting breastfeeding, donating blood, and wearing safety helmets, among other examples (Blue, 1995; Hagger et al., 2002; White et al., 2010; Ajzen & Fishbein, 2005; Jing et al., 2009; McMillan & Conner, 2003; Glassman et al., 2010; Norman, 2011; Tickner et al., 2010; McMillan et al., 2009; Armitage & Conner, 2001; Sutton, 2002).

The use of the TPB has promise in supporting the formulation of efficacious interventions intended to promote the uptake of health-promoting behaviours among individuals. Furthermore, it can be regarded as a beneficial instrument for healthcare practitioners who aim to improve their compliance with specified norms. One of the key advantages of the model is in its capacity to be applied to a wide array of behaviours within different contexts. The TPB possesses a significant benefit due to its ability to remain independent from external influences, such as affect or mood. According to Ajzen and Fishbein (2005), the use of external variables for explanatory purposes is limited due to the requirement of employing different types of variables to address specific behavioural domains.

Godin and Kok (1996) examined the utilisation of the TPB in the context of health behaviours. The study in question critically analysed a total of 58 cases in which the TPB was applied to a range of health behaviour domains. These domains encompassed a wide array of topics, such as HIV/AIDS-related behaviour, addiction, clinical screening, driving behaviour, dietary habits, physical exercise, and oral hygiene. It is important to note that this list is not exhaustive, as other health behaviour categories were also considered. The results of the investigation indicated that the TPB had a significant level of effectiveness in explaining the construct of intention. The variables pertaining to attitude towards the behaviour and perceived behavioural control were consistently identified as major determinants in determining intention. Based on the analysis conducted by Godin and Kok (1996), it was determined that

intention remained the dominant determinant of behaviour. However, it was seen that perceived behavioural control emerged as a noteworthy factor in predicting behaviour in 50% of the studies examined. The TPB model exhibited a noteworthy level of efficacy in elucidating intention, wherein perceived behavioural control held similar significance to attitude in the context of diverse health-related behaviour categories.

In their study, Armitage and Conner (2001) conducted a comprehensive analysis of 185 distinct studies, employing a meta-analytic approach. Their findings provided substantial support for the applicability of the TPB in accurately predicting both intention and behaviour. The findings of the researchers' investigation indicated a notable association between intention and perceived behavioural control in connection to behaviour. Furthermore, it was noted that the perceived capacity to control one's behaviour had a discernible influence on the expectation of behaviour, hence underscoring the efficacy of the perceived behavioural control construct. Moreover, a robust correlation between intention and behaviour was identified, aligning with the research conducted by Godin and Kok (1996). Further support for the efficacy of the TPB was provided by the multitude of relationships observed between attitude, subjective norm, perceived behavioural control, and intention. The incorporation of perceived behavioural control into the prediction of intention revealed an additional impact that surpassed the influence of attitude and subjective norm.

3.2.4.6 Strengths of the Theory of Planned Behavior

While there were some studies expressing concerns, the meta-analytic results offer support for the overall predictive effectiveness of the TPB model in respect to both intention and social conduct (Armitage & Conner, 2001), as well as health behaviour (Hagger et al., 2002).

The fundamental advantage of the TPB is its usage of the elicitation study to produce questions that are used to examine the predictor variables of the theory within a specific population (Ajzen, 2012). The elicitation study offers researchers the chance to discern the distinct beliefs held by the community being examined, as it is commonly recognised that beliefs differ within societies and are shaped by behaviour. This approach places emphasis on the fundamental beliefs that are crucial for instigating

transformation among a specific population in a unique setting. Furthermore, it facilitates the development of belief-focused therapies that are appropriate for the specific context. As a result, the TPB possesses the capacity to be used in a wide range of behavioural settings and across different environmental circumstances.

Armitage and Conner (2001) provided empirical data to support the notion that there is a significant degree of predictability in individuals' intentions to engage in various types of behaviours. By including the distinctive beliefs held by the specific population in the predictor variables of the model, the reliability of predicting intentions and behaviours is improved, thus solidifying the TPB as an effective framework for predicting human behaviour.

The TPB has been widely adopted by researchers as a reliable tool for predicting behavioural intention, mostly due to its accessibility and practicality in implementation. In the previous ten years, the theory has been used in various contexts, resulting in the publication of more than 1,000 research articles. There exists a favourable correlation between the frequency of application and grasp of a theory, and its adoption among the scientific community. In the study conducted by Gieseler et al. (2019), it was posited that for a theory to be considered solid, it must meet six distinct criteria. The TPB framework encompasses several key aspects: First, consistency is a crucial criterion that evaluates the theory's capacity to align with empirical observations. Second, precision is another important criterion that assesses the theory's utilisation of clearly defined concepts and operationalization. Third, parsimony is a criterion that evaluates the theory's ability to provide explanations that are concise and efficient, allowing it to explain more phenomena with fewer assumptions. Fourth, generality is a criterion that examines the theory's capacity to offer a broader explanatory scope, encompassing a wider range of phenomena. Fifth, falsifiability is a criterion that assesses the theory's formulation of assumptions and its ability to generate observations that could potentially contradict or challenge the theory. Finally, progress is a criterion that evaluates the theory's ability to stimulate new research endeavours, facilitate discoveries, and contribute to the advancement of theoretical knowledge. After conducting a comprehensive analysis of the existing literature that has utilised the TPB, it was noted that the theory successfully meets the previously described standard, which relates to its overall strength and resilience.

3.2.4.7 Criticisms of Theory of Planned Behavior

The TPB has undergone significant scholarly investigation, resulting in the identification of its efficacy in discerning the determinants that impact health-related behaviours. However, the TPB has also faced criticism. The accompanying discussion provides further elaboration on the main criticisms of the idea.

Concerns were raised by critics regarding the extent to which the constructs within the TPB may be considered universally influential elements. The authors propose the inclusion of further independent constructs that are analogous to the original predictor variables, to enhance the determination of intention. The empirical data from the study done by Armitage and Conner (1998) offered evidence for the extension of the TPB through the incorporation of six more variables. The study incorporated several supplementary variables, including belief salience, past behaviour or habit, the comparison between perceived behavioural control and self-efficacy, moral standards, self-identity, and affective beliefs. Thus, these authors proposed the incorporation of supplementary factors into the TPB but expressed concerns about the potential increase in complexity that would arise from the simultaneous integration of all these variables.

Moreover, the TPB has faced criticism regarding its alleged omission of important factors, including personality, culture, demographics, environment, and economics, which could potentially influence an individual's propensity to engage in a specific behaviour (Sharma, 2007). Ajzen (2020) expanded upon the TPB by integrating background variables, as they were found to exert a substantial influence on behavioural intentions and subsequent behaviour through shaping behavioural, normative, and control beliefs. This highlights the significance of these variables within the TPB framework.

Furthermore, the TPB has faced criticism due to its disproportionate focus on rationality, while neglecting to sufficiently consider cognitive and affective processes (Barber, 2011). According to Ajzen (2011, p. 1116), the TPB primarily focuses on behaviours that are “goal-oriented and steered by conscious self-regulatory

processes". Ajzen (2011) posited that the TPB does not align with the notion that individuals develop their behavioural, normative, and control beliefs through a rational process. In contrast, it is commonly understood that beliefs serve as a manifestation of an individual's knowledge pertaining to the execution of a specific conduct.

Despite the various critiques that were levied against the TPB, it continues to hold significant value as a model within the realm of applied health behaviour settings.

3.2.4.8 Applicability of the Theory of Planned Behavior in the HIV sector

As stated earlier, the TPB is a widely recognised theoretical framework employed in the field of health psychology. It has shown itself to possess the capacity to predict a wide range of behaviours but the application of the TPB framework in the domain of medicine adherence is limited (Holmes et al., 2014), and there is a dearth of research that specifically focus on predicting adherence to ART. The prevailing focus of research efforts investigating the use of TPB to predict adherence to ART has primarily involved patients who were already undergoing ART (Saal & Kagge, 2012; Vissman et al., 2013; Banas et al., 2017). This suggests that the investigations conducted on patients already undergoing ART are reactive in character, with the objective of addressing the problem of non-adherence that has already occurred. Non-compliance with prescribed treatment regimens presents a substantial hazard in terms of treatment ineffectiveness and the development of drug resistance (UNAIDS, 2016). Therefore, it is imperative to employ a proactive strategy and develop methodologies that can anticipate adherence to HIV care and treatment prior to the commencement of ART. This approach facilitates the identification of patients who have a heightened propensity for non-adherence, hence allowing for the provision of tailored assistance from the initial stages of treatment - the primary objective of the current study.

3.2.5 Determinants of the Theory of Planned Behavior constructs in the field of HIV

Prior research has established the direct relevance of the TPB in the context of adherence to HIV care and treatment. Clough and Casey (2011, p. 700) asserted that the TPB posits that a person's intentions can effectively predict their adherence with

treatment, under the condition that the individual maintains "volitional control" over the behaviour related to the treatment. These authors propose that this holds significant implications for healthcare providers who aim to enhance treatment adherence by their patients. The promotion of an individual's adherence to HIV care and treatment can be accomplished by assessing their beliefs pertaining to attitudes towards their behaviour, subjective norms, and perceived behavioural control.

In a study conducted by Saal and Kagge (2012) to assess the applicability of the TPB in predicting adherence to ART within a sample of individuals from South Africa, study results indicated that the constructs of the TPB, namely attitudes towards the behaviour, subjective norms, and perceived behavioural control, were successful in elucidating a significant percentage of the variability in behavioural intention. Consequently, the research findings indicated that the TPB can be effectively employed to understand individuals' intentions to adhere to HIV care and treatment. In addition, these authors found that while the variables of the TPB can be employed to understand individuals' intentions to adhere to HIV care and treatment, they fail to consider the influence of social, cultural, economic, and political factors on health behaviour. One example of this phenomena is to the impact of society disapproval on the level of adherence with a specific activity or treatment. Previous research has shown that both the perception and reality of social stigma can have negative effects on the continuation of HIV care and treatment (Weiser et al., 2003; Nachega et al., 2006). The study conducted by Saal and Kagge (2012) produced equivocal findings about the correlation between stigma and behavioural intention and posited that it is possible that the sample may be provided with psychosocial support, which in turn may have equipped them with the requisite abilities to effectively manage and navigate the challenges associated with stigma. Alternatively, it can be argued that the "rational construct such as intentions was non-orthogonally related with perceived stigma", leading to the observed consequence (Saal & Kagge, 2012, p. 367).

The TPB and similar social cognitive theoretical models have faced criticism for their limited applicability in developing nations. These nations often face socio-economic challenges, such as restricted access to healthcare facilities, high transportation costs, long waiting times at clinics, insufficient human resources, unsatisfactory interactions with healthcare personnel, and social stigma (Saal & Kagge, 2012; Coetzee et al.,

2011). These issues have the potential to act as additional obstacles to adherence that go beyond what the TPB can explain, as the TPB focuses primarily on individual factors.

In their study, Banas et al. (2017) examined the adherence to ART in Tanzania, employing the TPB as a theoretical framework. The results of the study indicated that the perceived ability to control behaviour had a significant role in explaining around 60% of the differences in intentions to adhere to ART. This underscores the importance of perceived behavioural control as the principal determinant of adherence intentions, in contrast to the intention to adhere. Previous research on adherence to chronic medication has examined the relationship between perceived behavioural control and adherence (Abraham et al., 1999; Saal & Kagee, 2012). According to Abraham et al. (1999), the construct of perceived behavioural control was found to account for a significant proportion, up to 70%, of the variance observed in individuals' intention.

The findings presented in this study align with the concept that perceived behavioural control covers an individual's assessment of the level of ease or difficulty involved with engaging in a specific behaviour (Ajzen, 1988; Ajzen, 1991; Ajzen, 2006). Therefore, it is conceivable that individuals who express a desire to adhere to HIV care and treatment may not always manifest this intention as tangible actions due to socio-economic barriers, particularly within the framework of developing countries.

The statement above implies that when assessing approaches designed to enhance adherence to HIV care and treatment, it may be crucial to consider constructs from the TPB, including attitudes, subjective norms, and perceived behavioural control. However, it is imperative to consider the contextual elements that influence adherence behaviour in order to ensure the efficacy of these treatments.

3.2.5.1 Application of the Theory of Planned Behavior model in the current study

Ajzen and Fishbein (1980) and Ajzen (2006) provided recommendations for the appropriate methodology for employing the TPB in the development of metrics and the

prediction of behaviour. According to the existing body of literature, in order to predict human behaviour, it is necessary to establish a causal pathway starting from the proximate determinant, namely intention, and extending to the fundamental determinants of belief, which serve as the ultimate determinants. The proximate factors influencing an individual's intention are their attitude, subjective norm, and perceived behavioural control, whereas the underlying determinants are the beliefs that form the basis for these factors (Sutton, 2002; Ajzen, 2006). According to the theoretical framework described by Ajzen (2006), an individual's decision to engage in a specific behaviour is mostly influenced by their consequential beliefs.

The aim of the current study was to develop a management framework grounded in the TPB that may be utilised in predicting adherence to HIV care and treatment in Eswatini before individuals commence the ART programme. The TPB has been previously established as an effective framework for predicting individuals' intentions and subsequent behaviours. This study builds upon this foundation by adopting the TPB as its theoretical method. In contrast to recent research efforts that have utilised the TPB for predicting patients' adherence to HIV care and treatment after initiating ART, the objective of this study is to predict adherence to ART prior to its introduction.

Research commenced with an elicitation study aimed at extracting readily accessible behavioural, normative, and control beliefs from the participants included in the investigation. The prevailing beliefs were selected and employed in the development of a TPB survey instrument. Following this, a preliminary investigation was conducted to assess the effectiveness of the questionnaire items that were developed using the beliefs identified during the elicitation study. The aim was to determine their ability to measure the anticipatory constructs of attitude towards their behaviour, subjective norm, and perceived behavioural control. The study did not directly assess the participants' behavioural intention as it was not possible to mandate enrolment into the ART treatment. Consequently, the inclusion of the study participants in the ART programme was regarded as an indication of their behavioural inclination to adhere with the HIV care and treatment obligations outlined by the ART programme. Following that, the TPB questionnaire was administered to the participants of the study. This questionnaire employed a seven-point Likert scale and was constructed utilising items derived from the elicitation research. Lastly, the monitoring of adherence

to HIV care and treatment involved assessing visit adherence and tablet use over a period of 12 months. The evaluation of adherence to HIV care and treatment behaviour was achieved by examining the treatment effectiveness of study participants through the analysis of their HIV monitoring data, specifically by assessing their CD4 count and viral load measurements.

3.3 Conclusion

The scholarly literature repeatedly demonstrates the efficacy of the TPB in accurately predicting individuals' intentions to engage in a certain behaviour across diverse research contexts. The effectiveness of this methodology has shown notable benefits in the field of health behaviour, particularly in relation to adherence to long-term drug consumption, such as ART. The TPB has been utilised as a theoretical framework for predicting adherence to ART. However, the application of this methodology in predicting adherence to HIV care and treatment prior to commencing is limited. The inclusion of a theoretical framework and literature analysis in this study was crucial for contextualising the research within a broader academic viewpoint. Additionally, these components provided a solid foundation for comprehending the factors that contribute to the prediction of adherence to HIV care and treatment.

The following chapter focuses on the research strategy and techniques employed to operationalize the TPB in the current study.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter provides a comprehensive account of the methodology employed in conducting the study. This section provides an overview of the study's paradigm, research methodology, and the design and technique employed to accomplish the study's objectives. Subsequently, the current study encompasses the examination of the research setting, population, and sampling, which will offer essential enlightenment regarding the methodology employed for sampling, the size of the sample, as well as the sampling method and technique employed. The subsequent section of the chapter delves into the development of the research instruments, the procedures employed for data collection and analysis, the ethical considerations adhered to throughout the process, and the methodological constraints encountered in the study.

4.2 Design of the study

4.2.1 Research paradigm

A research paradigm refers to the underlying philosophical framework upon which a certain research study is grounded. This posits that it provides a framework of convictions and comprehensions that serve as the basis for the theories and methodologies employed in the research endeavour (Brown & Dueñas, 2019). A paradigm is comprised of several essential elements, including ontology, epistemology, methodology, and methods (Scotland, 2012). Ontology pertains to the study of existence, while epistemology focuses on the nature and types of knowledge. Methodology refers to the underlying plan or approach guiding the selection and utilisation of specific methods. Lastly, methods encompass the distinct techniques and procedures employed for data collection and analysis (Scotland, 2012). According to Creswell (2012), there are three primary research paradigms that have a significant impact on the methodology of research. The three different ways of thinking are known as post-positivism, social constructivism/interpretivism, and pragmatism.

The **postpositivist** assumptions have always been prevalent in research, particularly in the context of quantitative research (Creswell, 2012). The rationale behind post-positivists' pursuit of research is in their quest to uncover universal principles that can be applied broadly and regulate the entirety of the universe. Their primary objective is to comprehend and clarify causal relationships (Brown & Dueñas, 2019; Scotland, 2012). Post-positivists maintain an ontological stance that posits the existence of a singular, objective reality. However, due to the inherent presence of error in scientific observations, the understanding of reality in the context of studying behaviour and human activity can only be attained with imperfections (Creswell, 2012). According to Brown and Dueñas (2019), the epistemological premise argues that the acquisition of knowledge is susceptible to human fallibility. Hence, it might be argued that human knowledge is inherently flawed, leading to the establishment of only "probable" truths (Brown & Dueñas, 2019, p. 5). Post-positivist scholars employ several methodologies to attain information, including experiments, surveys, and observational studies. These methodologies involve the utilisation of specific methods such as measurements, observations, structured questionnaires, and interviews (Brown & Dueñas, 2019).

Social constructivism, sometimes combined with **interpretivism**, is widely recognised as a philosophical framework utilised in qualitative research (Creswell, 2012). The constructivists and interpretivists strive to understand and communicate the fundamental characteristics of human nature. Creswell (2009) posited that social constructivists hold the notion that individuals possess an inherent propensity to acquire knowledge and understanding of their surroundings and professional engagements. Individuals engage in the process of constructing subjective interpretations of their experiences, with a particular focus on certain objects or things. Constructivism is defined by an ontology that embraces relativism, wherein the notion of "realities" is conceptualised as a collection of intangible mental constructions that are rooted in human experience (Mittwede, 2012, p. 27). Constructivists uphold an epistemological premise that considers knowledge as subjective and produced at the individual level (Brown & Dueñas, 2019). Constructivists gather this information through utilising several methodologies that promote interaction with individuals, including case studies, focus groups, in-depth interviews, grounded theory, and phenomenology (Brown & Dueñas, 2019). Constructivists utilise qualitative methods

for data collection, including the use of open-ended questions and the recording of observations and impressions, in order to acquire this knowledge (Brown & Dueñas, 2019).

Pragmatism serves as a philosophical foundation for the utilisation of mixed methods in research. It directs its focus towards the study problem within the realm of social science research, employing diverse methodologies to attain a comprehensive understanding of the problem at hand (Creswell, 2009). According to this author, it is derived from acts, situations, and outcomes rather than preceding circumstances. Pragmatism prioritises the practical implications of research findings and hence does not assign significance to the examination of either epistemological or ontological aspects (Brown & Dueñas, 2019). Rather than prioritising methodologies, scholars place emphasis on the research problem itself and employ a comprehensive range of approaches to gain a thorough understanding of the problem at hand. Pragmatists place their reliance on the methodologies that demonstrate the most effective outcomes in practical application for addressing specific research inquiries. Their primary emphasis lies on the practical aspects of the selected methodology, rather than solely adhering to paradigmatic alignment (Brown & Dueñas, 2019).

In summary, each paradigm is characterised by and predominantly influenced by a specific methodology. Post-positivism is commonly linked to the use of quantitative research methodologies, whilst constructivism or interpretivism is typically associated with qualitative research approaches. Pragmatism, on the other hand, is commonly tied with the utilisation of mixed methods.

To ensure the comprehensive execution of this study, data were gathered from both an objective and subjective perspective. The objective of the study was to delve into a more elevated and theoretical framework, while also providing insights into the practical implications of the issue within the real-world environment. In order to ensure adherence to HIV care and treatment among the participants, it was imperative to comprehend the subjective interpretations of the individuals, while considering the unique circumstances in which they resided and operated. It was also essential to understand the interpretations that the individuals attributed to the concept of adherence to HIV care and treatment. Furthermore, it was necessary to employ a

scientific approach to assess and validate the effectiveness of the Theory of Planned Behavior (TPB) in predicting adherence to HIV care and treatment before individuals enrol in the antiretroviral therapy (ART) programme. Consequently, the pragmatism paradigm was utilised as the foundational philosophical framework for the investigation.

According to Ajzen (2012), an effective implementation of the TPB needs the use of an elicitation study to determine the specific beliefs that are held by the community that is the focus of the investigation. This approach emphasises the fundamental beliefs required for bringing about change within a specific set of individuals inside a specific context. Subsequently, these beliefs were employed in the formulation of belief-focused scientific instruments that were tailored to the specific situation and amenable to examination within a broader demographic. Consequently, the pragmatic paradigm was clearly established as the best suitable philosophical framework for this inquiry.

4.3 Research methodology

The relationship between paradigm and methodology is of great significance due to the extensive methodological implications resulting from the selection of a paradigm. These implications extend to various aspects of the research process, including the formulation of research questions, the selection of participants, the choice of data collecting instruments and procedures, and the subsequent analysis of the collected data (Kivunja & Kuyini, 2017). According to Brown and Dueñas (2019), the research methodology refers to the strategic approach or comprehensive plan employed to obtain knowledge. The methodology is primarily concerned with the rationale, scope, sources, timing, and techniques employed in the collection and analysis of data (Scotland, 2012). The research philosophy influences the choice of research procedures. As mentioned earlier, post-positivism is often associated with the utilisation of quantitative research methods, whereas constructivism or interpretivism is usually tied to qualitative research approaches. In contrast, pragmatism is frequently associated with the application of mixed techniques.

Qualitative research methodology proves to be advantageous in cases when the research is centred around intricate matters, such as the examination of human behaviour. The primary objective of qualitative research is to facilitate comprehension of social events through the incorporation of diverse perspectives and experiences from all persons involved. According to Creswell (2009), qualitative research is a method used to investigate and comprehend the significance that individuals or groups attribute to a social or human problem. The research process entails the formulation of inquiries and the development of methodologies. Data are commonly gathered within the natural environment of the participants and afterwards subjected to an inductive analysis approach; wherein specific observations are used as a foundation for identifying overarching themes (Creswell, 2009). The researcher engages in the process of interpreting the significance of the gathered data. The qualitative research approach investigates and provides insights into the factors influencing an individual's actions and attitudes towards a certain subject, addressing questions pertaining to the manner, location, nature, timing, and rationale behind such behaviours. The qualitative methodology's emphasis on depth and detail justifies the use of a limited number of participants as a valid source of information (Oun & Bach, 2014) as long as data saturation is reached.

Quantitative research methodology is characterised by its formal, objective, rigorous, logical approach, and methodical strategy with the purpose of creating and refining information in order to address problems (Mohajan, 2020). In the context of quantitative research technique, the most effective approach to addressing the problem is to have a comprehensive grasp of the elements or variables that exert influence on a given outcome. According to Creswell (2009), quantitative research is a methodology employed to evaluate objective theories by analysing the relationships between variables. Phenomena are elucidated through the systematic collection of precise numerical data, which are subsequently subjected to rigorous mathematical analysis, particularly employing statistical techniques. This approach facilitates the exploration of inquiries pertaining to the individuals involved, the nature of the phenomena, the timing, location, quantities, and modalities associated with them. Thus, it encompasses numerical data, logical reasoning, and an impartial perspective. Original research involves the researcher's autonomy in selecting the subject of study, formulating a precise and focused inquiry, gathering measurable data from

participants, employing statistical analysis to interpret these numerical findings, and conducting the investigation in an impartial and objective manner (Creswell, 2012). The use of qualitative methodology is employed to address inquiries pertaining to the relationships among quantifiable variables, with the aim of understanding, predicting, and controlling a particular phenomenon (Mohajan, 2020).

The ***mixed methods*** research methodology is positioned inside the research continuum since it integrates components from both qualitative and quantitative methodologies (Östlund et al., 2011). This phenomenon encompasses conceptual underpinnings, the utilisation of qualitative and quantitative methodologies, and the integration of these methodologies within a research investigation. Therefore, the process goes beyond the collection and analysis of both types of data. It entails the simultaneous use of qualitative and quantitative procedures, resulting in a study that possesses a higher level of robustness compared to relying solely on either qualitative or quantitative research methods (Creswell & Clark, 2007). By leveraging the respective strengths and perspectives of each approach and compensating for their respective limitations, the mixed methods methodology acknowledges the presence and significance of the physical, natural world, while also recognising the significance of reality and the impact of human experience (Johnson & Onquegbuzie, 2004).

The current study employed a comprehensive approach by including both qualitative and quantitative approaches to achieve a comprehensive understanding of adherence to HIV care and treatment. This approach aimed to provide a thorough exploration of the topic, encompassing both a broad overview and in-depth analysis. Consequently, the approach employed in the current study is categorised as a mixed methods methodology. Given the predominant research focus on predicting adherence to ART using the TPB among patients already receiving ART (Saal & Kagge, 2012; Vissman et al., 2013; Banas, et al., 2017), limited attention has been given to studying HIV-positive individuals prior to initiating ART. Therefore, it was necessary to gain insight into the beliefs regarding adherence to HIV care and treatment held by people living with HIV (PLHIV) prior to their enrolment into the ART programme. To achieve this, a qualitative research methodology was employed. The findings obtained through the utilisation of qualitative methodology served as the basis for, and provided a framework for understanding, the development of scientific instruments rooted in the

TPB to predict adherence to HIV care and treatment before initiation. These instruments were subsequently assessed for their efficacy through the application of quantitative research methodology.

4.3.1 Research design

According to Sileyew (2019), the purpose of the research design is to establish a suitable structure for conducting a study. One of the most crucial decisions in the research design process involves selecting a research approach, as it dictates the manner in which pertinent information for a study will be acquired. The mixed methods technique encompasses three primary research designs, namely sequential explanatory mixed methods, sequential exploratory mixed methods, and concurrent embedded mixed methods.

The sequential **explanatory research design** is distinguished by its approach of first collecting and analysing quantitative data, followed by the collection and analysis of qualitative data in a subsequent phase. This design is based on the premise that the qualitative data collection and analysis phase builds upon the findings obtained from the initial quantitative phase (Shorten & Smith, 2017). This method often prioritises quantitative data and incorporates a blending of data by utilising initial quantitative results to guide further qualitative data collection (Creswell, 2009). Hence, the two types of data are distinct yet interrelated. The sequential explanatory design is commonly employed to elucidate and interpret quantitative findings through the collection and analysis of subsequent qualitative data. The utilisation of qualitative data collecting can prove to be particularly advantageous in instances where a quantitative study yields unanticipated findings (Creswell, 2009). In such scenarios, the subsequent qualitative analysis can be employed to thoroughly investigate these unexpected results.

The sequential **exploratory research design** bears resemblance to the explanatory sequential technique, however with a reversal in the order of its phases. The design of this study encompasses two distinct phases: an initial phase focused on the collecting and analysis of qualitative data, and a subsequent phase centred on the collection and analysis of quantitative data. The second phase is designed to build

upon the findings obtained from the first qualitative phase (Shorten & Smith, 2017). Significant emphasis is typically focused on the initial phase, whereby the qualitative data analysis and quantitative data collecting are interconnected, resulting in a blend of mixed data (Creswell, 2009). Unlike the sequential explanatory approach, which is better suited to describing and interpreting relationships, the major aim of this paradigm is to initially study a phenomenon. This design is deemed suitable for the purpose of evaluating components of a theory that has emerged from the qualitative phase. Additionally, it can be employed to extend the applicability of qualitative findings to various samples, as stated by Creswell (2009).

The concurrent ***embedded research design*** involves the integration of quantitative and qualitative data collection and analysis inside a typical quantitative or qualitative research design (Creswell & Clark, 2010). The acquisition and examination of the supplementary dataset can take place prior to, during, and/or subsequent to the execution of the data gathering and analysis methods conventionally linked to the broader framework. According to Creswell (2009), a concurrent embedded design involves a primary method that serves as the guiding framework for the project, while a secondary database plays a supporting function in the various procedures. The secondary method, whether quantitative or qualitative, is incorporated inside the primary method, which may be either qualitative or quantitative, but is given lower emphasis (Creswell, 2009). The integration of data from two methodologies is frequently employed to amalgamate information and facilitate a comparative analysis between the two data sources. However, it is also possible for the facts to be juxtaposed rather than contrasted, existing as two distinct images that collectively offer a comprehensive evaluation of the issue (Creswell, 2009). Frequently, this strategy is employed to enable researchers to obtain a more comprehensive understanding by employing multiple methodologies, rather than relying solely on a single dominant method (Creswell, 2009).

The primary objective of the current study was to develop a management framework for predicting adherence to HIV care and treatment. Thus, the research design employed a two-phase, sequential exploratory mixed methods approach. The initial stage of the study involved conducting a qualitative investigation into the comprehension of adherence to HIV care and treatment among individuals living with

HIV/AIDS (PLHIV). This was accomplished by gathering qualitative data on the beliefs held by recently diagnosed HIV-positive patients regarding adherence to HIV care and treatment. The data collection took place at the LaMvelase HIV Clinic in Manzini, Eswatini. The results obtained from the qualitative phase of the study were subsequently utilised to create and systematically evaluate measures based on the TPB. These measures were designed to assess their effectiveness in predicting adherence behaviour to HIV care and treatment prior to the initiation of ART. The objective was to ascertain the utility of the TPB in predicting adherence to HIV care and treatment among individuals who have not yet commenced ART. The initial collection of qualitative data was motivated by the absence of a standardised TPB questionnaire (Ajzen, 2013). Consequently, prior to the development of said questionnaire, a qualitative elicitation study was undertaken, resulting in the creation of a questionnaire specifically designed for the collection of quantitative data relevant for this study.

The research design is depicted in Table 4.1 below.

Table 4.1: Research design

Phase 1 – Elicitation Study	Phase 2 – Pilot Study	Phase 3 – Main Study
<u>Time 1</u> Qualitative interviews to elicit salient behavioural, normative and control beliefs Sample: 19 new ART initiates	<u>Time 2</u> TPB adherence prediction questionnaire design and pilot Sample: 30 new ART initiates	<u>Time 3</u> Quantitative data collection (TPB adherence prediction questionnaire) and baseline review of patient clinic records Sample: 152 new ART initiates (study cohort)
		<u>Time 4</u> Collection of endline adherence data (clinic visit, pill count, immunological and virological data) Sample: 152 new ART initiates (study cohort)

The study took place in three phases:

Phase 1 – Elicitation Study

The initial stage involved conducting an elicitation study to identify the behavioural, normative, and control beliefs that PLHIV hold on adherence to HIV care and treatment, in accordance with the TPB. Beliefs occupy a pivotal position within the TPB. It is commonly

hypothesised that these factors are responsible for establishing the cognitive and affective underpinnings of attitudes, subjective norms, and feelings of behavioural control. According to Ajzen (2013), behavioural beliefs contribute to the formation of either a positive or negative attitude towards a particular behaviour within its respective aggregates. Normative beliefs, on the other hand, lead to the perception of social pressure or subjective norms. Lastly, control beliefs are responsible for the development of perceived behavioural control. The amalgamation of attitude towards the behaviour, subjective norm, and perception of behavioural control results in the development of a behavioural intention. Beliefs pertaining to a specific behaviour exhibit inherent uniqueness within the population under investigation. Consequently, prior to conducting this study grounded in the TPB, it was imperative to undertake a qualitative study aimed at eliciting salient behavioural, normative, and control beliefs. These beliefs were subsequently utilised to construct the appropriate TPB instruments that were employed in the primary study.

Phase 2 – Pilot Study

During the process of conducting the elicitation study, the researcher collected data that facilitated the development of a preliminary TPB questionnaire. This questionnaire was intended to serve as a tool for predicting the level of adherence to HIV care and treatment. Prior to its implementation on a larger scale, it was necessary to assess the validity of this questionnaire. Consequently, a preliminary study was conducted involving individuals from the target population, excluding those who would be included in the final sample for the study. The pilot study was conducted to establish and assess the suitability of the TPB questionnaire employed in the primary study, evaluate the efficacy of the data collection procedure, determine the effect size to determine the appropriate sample size, and acquire pertinent information that might enhance the overall success of the research project.

Phase 3 – Main Study

Phase 3 constituted the primary investigation. The primary investigation was the administration of the TPB instrument, which had been finalised, to the selected participants in order to collect data that could be used to predict the level of adherence

to HIV care and treatment before the commencement of ART. The study participants constituted a cohort that underwent observation for a duration of 12 months. Throughout the course of 12 months, adherence data were collected at various intervals from the study population in order to assess the predictive capability of the TPB measure, which was administered at the onset of the primary study, in relation to adherence to HIV care and treatment.

4.3.2 Research approach

The overall strategy and process for carrying out a study is known as the research approach. In general, the research approach can be classified as either deductive or inductive. It is sometimes confused with the research methodology, with quantitative research being associated with deductive approaches and qualitative research with inductive approaches (Young et al., 2020).

According to Malhotra (2017), the primary aim of the **inductive** technique is to generate specific generalisations regarding the distribution and patterns of association among observed or measured attributes of individuals and social processes. The inductive approach to research involves deriving general conclusions from specific and limited facts, such as observations of isolated instances. The discourse commences with an individual or claim and culminates with a broad or universal notion. Creswell and Clark (2007) proposed that inductive researchers commence their investigations from a foundational level and progressively ascend, leveraging the insights provided by participants to develop overarching themes and formulate a hypothesis that establishes connections across various topics.

On the other hand, the **deductive** approach commences by formulating a provisional hypothesis or a group of hypotheses that constitute a theoretical framework capable of offering a potential solution or elucidation for a specific problem. Subsequently, the technique employs observations to systematically evaluate the hypotheses in a rigorous manner (Malhotra, 2017). The deductive argument proceeds from premises, wherein at least one of them is a broad or universal assertion, to a conclusion that is a single statement (Okoli, 2022). Deductive assertions exhibit a hierarchical structure, ranging from theoretical to observational and from abstract to concrete. The deductive

researcher acknowledges that the process of observation is influenced and assumed by the underlying hypothesis. According to Creswell and Clark (2007), the deductive researcher follows a top-down approach, wherein they begin with a theory and subsequently develop hypotheses. These hypotheses are then tested using evidence, with the aim of either supporting or refuting the underlying theory.

The current study employed a hybrid approach that integrated both inductive and deductive reasoning. According to Proudfoot (2022), this methodology involves the use of pre-established themes, which are derived from an explicit theoretical framework built through an extensive review of relevant literature. This deductive aspect is complemented by the inductive process of generating themes from the collected data. According to Proudfoot (2022), the utilisation of a hybrid strategy may be of interest to researchers who aim to apply established theoretical frameworks. However, this approach is particularly valuable in the context of theory generation rather than confirmation. Additionally, it can be advantageous when current theory provides a partially suitable solution to a specific research topic. The aforementioned scenario was seen within the context of this particular study, whereby the researcher employed the TPB as the underlying theoretical framework. It is worth noting that TPB is an established theory within the field.

The study employed a qualitative research approach to ascertain the salient beliefs associated with the constructs of the TPB (attitude towards the behaviour, subjective norm, and perception of behavioural control) among individuals who were recently diagnosed with HIV. The qualitative data were systematically categorised according to the elements of the TPB, and the findings were subsequently utilised to design a questionnaire based on the TPB. The TPB questionnaire was presented to a larger sample to gather data that were then utilised in the development of a management framework for predicting adherence to HIV care and treatment. The emergence of the management framework led to the generation of new insights, prompting modifications to the TPB in two specific contexts: adherence to ART within the HIV/AIDS scenario, and its use in low- and middle-income countries.

The TPB has been widely utilised in numerous studies, although its application in predicting adherence to HIV care and treatment prior to the initiation of ART has been

limited. The investigation of adherence in patients who have not commenced medication is a relatively recent area of research, as the bulk of existing studies have mostly concentrated on adherence post-treatment initiation. Therefore, it was imperative to conduct the qualitative phase as a preliminary step to develop a quantitative instrument that would be suitable for the research's objectives. Given the necessity of employing a comprehensive study design that adequately addresses the research objectives, relying solely on a single methodology, be it qualitative or quantitative research, would have been inadequate for the purposes of this study.

4.4 Population and sampling

4.4.1 Research setting

The current study was carried out in Eswatini within communities with a low-income. Such environments necessitated further investigation due to the socio-economic difficulties encountered by, in general, poor individuals who were potential participants in the study. Global patterns of infection have demonstrated variation based on the social and economic circumstances of the affected country. Poverty plays a substantial role as a social determinant in the transmission of HIV/AIDS and the dissemination of the virus, as well as in the accessibility and adherence to ART treatment (Reda & Biadgilign, 2012). According to a report released by Isbell and Shubert (2014), it was acknowledged that although significant advancements had been made in the global HIV response, the persistence of economic inequality, social marginalisation, and structural factors remained influential in perpetuating the HIV epidemic. As the worldwide response to HIV/AIDS progresses, there is a growing emphasis on the implementation of combination prevention and care strategies that integrate social and structural interventions. These interventions encompass both HIV-specific measures and non-HIV-specific initiatives typically associated with development objectives (Isbell & Shubert, 2014).

Eswatini serves as an illustration of a lower-middle-income nation characterised by a high prevalence of HIV/AIDS (UNAIDS, 2021). As reported by the United Nations Development Programme (UNDP), with a placement of 138th out of 189 nations in the 2019 Human Development Index, the nation exhibits the 10th most pronounced income disparity globally, standing at 49% (UNDP, 2019). The World Food

Programme (hereafter referred to as WFP), reported some alarming facts about poverty, HIV, malnutrition and farming in Eswatini (WFP, 2022). The country continues to face a significant poverty challenge, with a substantial proportion (69%) of its rural population living below the national poverty line - defined as subsisting on less than US\$1.9 per day, so that a quarter (25%) of this population is classified as extremely poor. Eswatini exhibits the highest global prevalence of HIV, affecting over 26% of its adult population that contributes to a very low life expectancy of 49 years in the country. Thus, a significant proportion of Eswatini's children, approximately 45%, face the challenges of being orphaned or vulnerable. Disturbingly, around 59% of these children have experienced the loss of their parents due to HIV/AIDS-related fatalities. In addition, the prevalence of chronic malnutrition in Eswatini is a significant issue, with approximately 26% of children under the age of five experiencing stunting. Part of the reason for this is that Eswatini exhibits susceptibility to drought conditions in its southeastern region. Smallholder agriculture continues to serve as the fundamental pillar of rural livelihoods within the nation, as indicated by the fact that more than 70% of the country's overall population, of which 60% are women, depend on subsistence farming (WFP, 2022).

Given the persistent influence of poverty and inequality on the proliferation of the HIV pandemic (Isbell & Shubert, 2014), particularly in sub-Saharan Africa where the crisis is most pronounced (UNAIDS, 2021), and with Eswatini emerging as the nation with the highest prevalence of HIV/AIDS, it is apparent that further efforts are necessary in these regions to prioritise the development and assessment of interventions aimed at identifying individuals at heightened risk of non-adherence to HIV care and treatment. Consequently, diligent monitoring and evaluation of interventions aimed at improving adherence to ART programmes should be prioritised, thereby potentially exerting a substantial influence on the decline of mortality linked to AIDS.

4.4.2 Target population and unit of analysis

Target population

Eswatini is home to a population of approximately 1.1 million individuals, distributed over four regions: Hhohho, Lubombo, Manzini, and Shiselweni (refer to Figure 4.1).

eSwatini
(Changed from Swaziland in 2018)

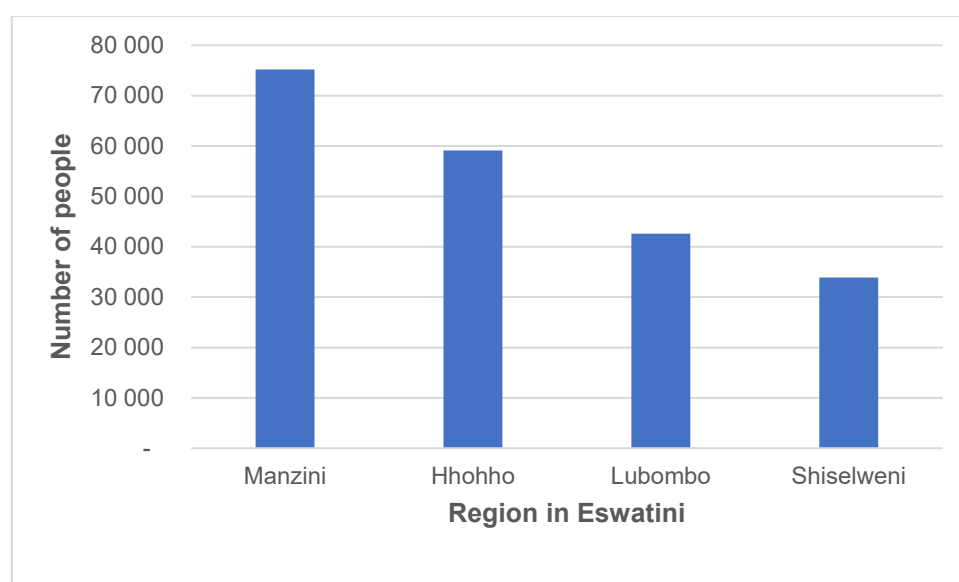
- International Boundary
- Regional Boundary
- Road
- River
- National Capital
- Regional Capital
- City or Town

0 20 KM
0 20 Miles
© 2018 Geology.com

The current study focused on individuals who were diagnosed with HIV/AIDS and who resided in the Manzini region of Eswatini, a region with the highest population density in Eswatini. The Manzini region encompasses an industrial corridor that attracts a

significant influx of individuals, particularly young men and women, from many other regions who are in search of economic opportunities. Hence, it is unsurprising that the Manzini region exhibits the highest estimated prevalence of PLHIV, as evidenced by the figure presented below, which is derived from recent statistics provided by NERCHA (2021). Figure 4.2 depicts the projected count of PLHIV who are 15 years old and older, categorised by region, for the year 2020 (NERCHA, 2021). At a figure of 75,200, Manzini had the highest number of PLHIV, with Hhohho following closely with 59,100 PLHIV, Lubombo at 42,600, and Shiselweni at 33,900.

Figure 4.2: Estimated number of PLHIV by region in 2020 aged 15+ years (NERCHA, 2021)

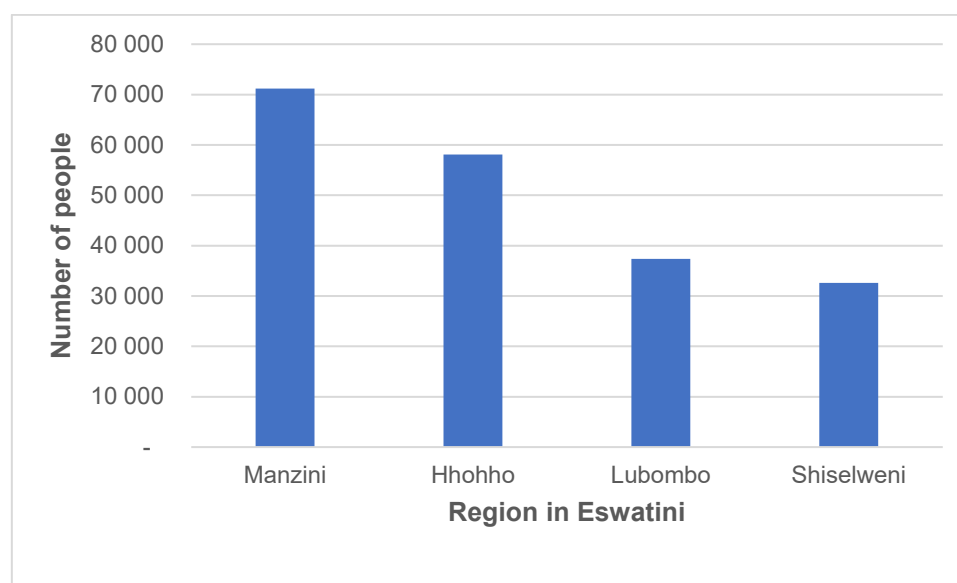


As stated by the NERCHA (2021), the ART coverage for individuals living with HIV aged 15 years and above in Eswatini was reported to be 199,300 in the year 2020. The concept of ART coverage is described as the ratio of individuals currently receiving ART to the estimated population of PLHIV at a specific moment in time (NERCHA, 2021).

According to the NERCHA (2021), the number of PLHIV aged 15 years and above receiving ART in Manzini was approximately 71,200 making Manzini the region with the highest number of individuals (refer to Figure 4.3). The Manzini region has consistently exhibited the greatest rate of ART initiation in comparison to the other

three regions due to its sustained prevalence of new HIV infections (NERCHA, 2018b; NERCHA, 2019; NERCHA, 2021). Furthermore, it should be noted that Manzini boasts the highest number of facilities offering ART services, as indicated by a comprehensive report from the Eswatini Ministry of Health (SMoH, 2015), which identifies a total of 60 such sites in the region.

Figure 4.3: Total ART coverage by region in 2020 aged 15+ years (NERCHA, 2021)



The LaMvelase HIV Clinic is also located in Manzini and holds the distinction of being the largest facility dedicated to HIV care and treatment in the country (Dube, personal communication, 2017). The LaMvelase HIV Clinic is operated by the AIDS Healthcare Foundation (AHF), an international non-profit organisation that offers advanced HIV medication and advocacy services to over 1.7 million individuals across 45 nations (AHF, n.d.). According to a recent report by Business Wire (2023), the LaMvelase HIV Clinic in Eswatini is currently providing medicine and preventative services, distributing condoms, and conducting confidential HIV testing to an estimated population of 15,000 individuals, including men, women, and children. The present investigation was carried out within the premises of this medical facility.

Unit of analysis

Zikmund et al. (2013) claimed that the unit of analysis has the potential to encompass several entities, such as individuals, groups or organisations, and communities. The unit of analysis in this research was individuals who were recently diagnosed with HIV

at the time of the study. The study recruited patients who met the eligibility criteria and sought treatment at the clinic. Nevertheless, for the study to collect data that can predict adherence to therapy before patients begin treatment, it was necessary for participants to meet the following criteria: be 18 years of age or older, test positive for HIV, and be enrolled in the ART programme. Furthermore, to ensure the validity of the collected data, study participants must have been prescribed and received ART on the same day that they were recruited into the study. Upon the patients' departure from the healthcare institution and subsequent initiation of treatment at home, they enter a state of being "on treatment." It is important to note that non-adherence to the prescribed treatment regimen may occur as early as the first day of treatment. The primary objective of this study was to predict adherence to HIV care and treatment before the commencement of ART. Consequently, patients who had recently commenced ART were enrolled in the study, and preliminary data were gathered on the same day. The study excluded those who were assessed and deemed by the clinic's healthcare workers as experiencing both medical illness and psychological distress.

4.4.3 Sample size

Typically, research investigations are conducted on a subset of individuals possessing a specific attribute, rather than including the entire populations. This selected subset, known as the sample, is subsequently utilised to make generalisations and draw conclusions about the broader population under investigation (Banerjee & Chaudhury, 2010). Hence, the calculation of sample size holds significant importance in the research design as it directly influences the interpretation and final results. According to Vishwakarma (2020), research endeavours that employ sample sizes that are either excessively small or excessively large are deemed ethically, scientifically, and commercially unwarranted. Consequently, the determination of an appropriate sample size is important in establishing the optimal number of participants necessary to obtain ethically and scientifically sound results. The study consisted of three distinct research phases and the following sections indicate the sample sizes used for each phase.

Phase 1 – Elicitation Study

The initial stage of the research involved an elicitation study, which employed qualitative methods to determine the behavioural, normative, and control beliefs held by the target population. These findings were subsequently utilised in the construction of the TPB questionnaire for the quantitative component of the study. As noted by Epton et al. (2015), the determination of an optimal sample size for elicitation experiments remains inconclusive, however, in the context of conducting an elicitation study, previous research has suggested that a small convenience sample size of around 25 individuals is appropriate (Godin & Kok, 1996; Francis et al., 2004). It is important to note that this sample should be selected from the same population from which the respondents for the final questionnaire will be chosen, ensuring that a comprehensive range of salient beliefs is captured. According to Francis et al. (2004), the sample size can be adjusted based on qualitative research methodologies, such as the sampling method and technique. Additionally, Francis et al. (2004) proposed that the sample size can be determined by reaching data saturation, when collecting additional data does not contribute significantly to the information obtained.

The elicitation study utilised a small number of participants to gather data on readily accessible behavioural outcomes, normative referents, and control factors. The participants included in the study sample were representative and shared similar features, namely being 18 years or older, being HIV positive, and being enrolled in the ART programme. Additionally, all participants had commenced ART on the day of recruitment. Obtaining an adequate sample size for the formative research proved to be a challenging task due to a lower than anticipated number of individuals being initiated onto ART at the clinic daily. Furthermore, there were instances where no patients were initiated at all during certain days.

The intended sample size for the elicitation study was 30 participants. However, due to a smaller number of patients initiating ART daily, the data collection period, initially planned for two months, extended to four months. At the conclusion of the fourth month, the sample size had increased to encompass a total of 19 participants. A thorough analysis of saturation, which will be extensively discussed in Chapter Five, was performed. Salience, often referred to as cultural or cognitive salience, can be quantified through the assessment of item occurrence frequency (prevalence) or the

sequence of mention (ranking in individual lists) (Thompson & Juan, 2006). The examination of saturation revealed that salience had already reached a point of saturation with the participation of 19 respondents. This was not surprising, given the cultural homogeneity of the Eswatini population, which has led to sharing of similar beliefs.

The qualitative study proceeded with a sample size of 19 participants based on the findings from the saturation analysis. It was determined that extending the data collection time to reach the recommended sample size of 30 or the suggested sample size of 25 (Francis et al., 2004) would not result in the emergence of new themes or the acquisition of more data.

In order to achieve data saturation, it was recommended in prior studies that qualitative research should include a minimum sample size of 12 participants (Clarke & Braun, 2013; Fugard & Potts, 2014; Guest et al., 2006). Saunders et al. (2016) suggested that for the purpose of upholding the credibility of a qualitative study, it is recommended to include a sample size that falls within the range of 5 to 25 participants. This aligns with proposed figures suggested by Mason (2010), wherein it was suggested that an optimal sample size for this research should be 20 participants. Consequently, the sample size of the qualitative study consisted of 19 individuals, aligning with the required standards, thereby safeguarding the credibility of the sample.

Phase 2 – Pilot Study

The pilot study utilised 30 participants to assess the TPB questionnaire, which was created based on data gathered in the elicitation study. The participants in this study differed from those in the Phase 1 study, but they were selected to be representative of the overall study sample. They shared similar characteristics, including being 18 years or older, being HIV positive, and being enrolled in the ART programme. Additionally, they were required to have initiated ART on the day of recruitment. Hertzog (2008) suggested sample sizes contingent upon the specific objectives of the pilot project. The suggested number of participants for the development of an instrument was between 25 and 40. According to Johanson and Brooks (2010), it is advisable to include a minimum of 30 representative participants from the target

population in a pilot study that aims to conduct a preliminary survey or construct a scale.

Phase 3 – Main Study

A post-hoc G-Power analysis was performed to assess the adequacy of the sample to draw conclusions on the outcomes of the quantitative empirical data. The purpose of this analysis was to ascertain if a minimal sample size was obtained to reduce the likelihood of both Type I and Type II errors, hence reaching a high statistical power (Faul et al., 2013). Based on an alpha (α) value of 0.05 and the sample size ($n=152$), the study suggests that the statistical power exceeded 99.9% ($1-\beta$ err prob = 0.999). The fact that it exceeds the 80% criteria confirms that a sample size of 152 is sufficient.

4.4.4 Sampling method and technique

Sampling method

The most prevalent sampling methodologies can be classified into two distinct categories: probability sampling and non-probability sampling. **Probability sampling** refers to the systematic method of selecting samples from a population by randomization, ensuring that each element of the population has a non-zero probability of being included in the sample (Winiowski et al., 2020). According to Pace (2021), the use of this measure guarantees fairness and impartiality among those who are considered as potential participants in research studies. Probability sampling is distinguished by the methodology of selecting samples from a given population through a random selection procedure. The theoretical underpinning of probability sampling is rooted in design-based inference, which allows for unbiased estimation of the population mean together with quantifiable sampling error (Winiowski et al., 2020). The primary factor contributing to the widespread adoption of probability sampling is its core rationale. Nevertheless, it is important to acknowledge that achieving unbiased estimation in the actual world may not always be feasible due to the occurrence of relatively low response rates in probability surveys. In accordance with the findings of Winiowski et al. (2020), a notable challenge linked to probability sampling is the necessity of large sample sizes to attain precise estimations.

In contrast, ***non-probability sampling*** entails the selection of sample elements in a subjective manner. Due to these circumstances, the determination of inclusion probabilities becomes unattainable, perhaps resulting in a probability of zero for specific elements within the population (Winiowski et al., 2020). As a result, nonprobability sampling methods do not allow for the establishment of statistical inferences about population characteristics, so impeding the ability to address research inquiries or achieve objectives that need such inferences (Saunders et al., 2016). According to the research conducted by Winiowski et al. (2020), one of the primary advantages of nonprobability sampling, as compared to probability sampling, is its cost-effectiveness. There exist a variety of cost-effective procedures that can be implemented to obtain nonprobability samples. However, the utilisation of nonprobability sampling is subject to some limitations. The lack of an established mathematical framework similar to probability sampling poses challenges in terms of achieving accuracy and quantifying the degree of uncertainty (sampling error) in estimates derived from non-probability samples (Winiowski et al., 2020). The issues arise due to the lack of a mathematical foundation similar to that in probability sampling.

The current study employed a non-probability sampling approach. There were two primary justifications to substantiate the adoption of this specific sample method. During the initial phase of the investigation, qualitative research methodologies were employed, with particular attention given to a small sample size. The objective of this phase was to ascertain the factors that can serve as predictors for the probability of HIV patients adhering to their HIV care and treatment prior to the commencement of ART. The aim was not to establish generalizability, but rather to explore the transferability of findings. The concept of transferability refers to the extent to which the findings of qualitative research can be applied to different contexts or settings with different participants (Korstjen & Moser, 2018). In the quantitative phase, the study encountered a lack of a pre-existing database for participant selection. Consequently, the study had to rely on the availability of patients at the health facility throughout the period of the study. Therefore, the non-probability sampling method was employed for both phases.

Sampling techniques

According to Sharma (2017), researchers have identified five distinct non-probability sampling approaches that can be employed in the process of sample selection for research purposes. These techniques include self-selection sampling, quota sampling, convenience sampling, snowball sampling, and purposive sampling. Although there were several non-probability sampling techniques available for selection of the sample in this study, the specific non-probability sampling techniques employed were purposive sampling for the qualitative phase and convenience sampling for the quantitative phase.

Purposive sampling is a sampling technique wherein the researcher possesses prior knowledge on the specific aspects that need to be included in the sample. Consequently, the researcher deliberately picks participants who possess these elements, since they are deemed to be the most likely sources of valuable information that aligns with the study's objectives (Rosenthal & Rosnow, 2007). Purposive sampling offers the advantage of concentrating the investigation just on a population that is of particular interest, hence ensuring sample homogeneity (Andrade, 2021).

The utilisation of purposive sampling as a sampling technique was advantageous in this study due to its ability to concentrate on specific attributes within a population that were deemed significant and would most effectively facilitate the exploration of the research inquiries at hand. Additionally, the utilisation of this method resulted in time and cost savings for the researcher, as it enabled the inclusion inside the sample of all patients who were introduced onto ART on the specific data collection days. Incorporating all individuals who commenced ART within the designated data collecting period afforded the researcher a more comprehensive overview of the collective sentiments and perspectives within the population, since the dataset encompassed a diverse range of viewpoints. The utilisation of purposive sampling facilitated the prompt validation of information, as it ensured the inclusion of all relevant individuals in the sampling procedure. Furthermore, the utilisation of purposive sampling facilitated the researcher in attaining a reduced margin of error for the gathered data, as they were directly obtained from the primary source. Everyone included in the sample possessed discernible characteristics that categorised them within the same demographic, thereby enabling the researcher to work with a

homogeneous group of individuals who exhibited similar patterns of thinking and behaviour in relation to adherence to HIV care and treatment.

While conducting this specific study, it was determined that the utilisation of purposive sampling was the most suitable sample method. However, it is crucial to recognise the inherent limitations associated with this strategy. A significant limitation associated with the utilisation of non-probability, deliberate sampling is the lack of generalizability of study findings to a wider population. This limitation arises from the existence of a considerable number of inaccurate inferential statistical methods in the data (Sharma, 2017). The potential inferences that can be derived from data collected by purposive sampling are constrained to the population being investigated, owing to the inherent intricacy of the method. Sharma (2017) asserts that purposive samples are prone to researcher bias due to their formation being contingent upon the researcher's judgement. However, the evaluative and subjective nature of purpose sampling might be regarded as a notable limitation, especially in instances where these opinions are incorrect or well-reasoned. This phenomenon arises when assessments are devoid of a solid basis in clearly delineated criteria. Sharma (2017) asserted that the application of purposive sampling in unit selection is marked by subjectivity and non-probability, hence presenting difficulties in determining the sample's representativeness. As a result, it becomes challenging to convince readers about the soundness of the decision made in choosing the units for analysis.

The researchers employed the **convenience sampling** technique during the quantitative phase of the investigation. Convenience sampling is a method employed by researchers wherein participants are chosen based on their immediate accessibility and willingness to participate in the study (Creswell, 2012). Convenience sampling methods prioritise the aspect of generalizability, which aims to ensure that the knowledge acquired is representative of the population from which the sample was selected (Etikan et al., 2016). According to these authors, the statistical power of a convenience sample increases as the sample size increases. If the findings of a study based on a convenience sample are deemed reliable, then it is possible for the study to possess a high level of internal validity. The feasibility of this scenario is contingent upon adherence to rigorous research methodologies and the accurate and thorough analysis of the collected data (Andrade, 2021).

In this investigation, the researchers determined the appropriate sample size for the quantitative phase using a G-Power analysis. Patients who were present at the clinic on the designated data collecting days and satisfied the established inclusion and exclusion criteria were invited to participate in the study. The process of selecting the sample was continued until the desired sample size was achieved.

Despite its widespread use, convenience sampling is susceptible to bias and external effects that are beyond the researcher's control. This is because the cases included in the sample are selected based on their ease of accessibility rather than being representative of the entire population (Sauders, 2016). The equitable distribution of participation opportunities among all eligible individuals in the target group is not ensured, thereby limiting the generalizability of the study findings to the broader population (Etikan et al., 2016). Andrade (2021) posited that the external validity of a study done on a convenience sample is likely to be constrained. The reason for this limitation is that the conclusions derived from the study cannot be readily applied to populations that possess distinct features from the group that was conveniently available and served as the source of the sample (Andrade, 2021).

In order to adhere to the prescribed sampling method and technique and minimise potential biases that could compromise the validity of the sample, individuals who visited the clinic during the data collection period and fulfilled the study inclusion criteria were invited to participate in the study. These individuals were then requested to participate in a survey over a designated period.

4.5 Data collection

4.5.1 Study instruments

Two instruments were developed for the purpose of data collection in this study. The initial instrument was devised for the purpose of conducting a qualitative investigation, while the subsequent instrument was designed to facilitate a quantitative study. The development of the second instrument was informed by the outcomes of the elicitation study completed during the qualitative phase.

Qualitative instrument

In the qualitative phase of the study, the interview guide emerged as the most effective tool for facilitating semi-structured interviews. The interview guide (see Appendix 4) consisted of a total of nine questions and were divided into four specific sections. The first section of the interview was an introduction that offered background for the conversation with the researcher and detailed what participants could anticipate from it. This component was very important because it was used to determine whether the process of purposive sampling was carried out correctly and whether or not the persons who were recruited were people who had the required knowledge and experience in terms of what information was expected from the sample.

Sections two, three, and four of the interview guide consisted of questions aimed at eliciting salient beliefs regarding behavioural outcomes, normative referents, and control factors. Behavioural outcomes refer to the consequences that arise as a result of engaging in a particular behaviour. Normative referents pertain to individuals who possess the capacity to influence whether a behaviour is enacted. Control factors encompass the diverse factors or circumstances that may influence the likelihood of engaging in a behaviour. The interview guide included questions designed to explore the understanding of adherence to HIV care and treatment among PLHIV, particularly those who had not yet initiated their ART. This served as the first objective of the study.

In order to enhance the depth and quality of the data, participants were prompted with follow-up and probing questions for each question, thereby eliciting additional details and information deemed essential for the overall richness of the dataset. At the termination of each interview, the study participants were asked whether they had any further information they wished to contribute. This measure was implemented to facilitate the exploration and examination of any potential new insights associated with the salient beliefs, should they arise. The complete interview guide can be found in Appendix 4. The data obtained from these questions were utilised to identify individual salient beliefs, specifically, the distinct beliefs held by each participant in the study. Furthermore, a comprehensive examination of the participants' responses yielded a compilation of modal salient beliefs, which refers to the prevailing beliefs held by the individuals comprising the research sample. The compilation of modal salient beliefs

served as the foundation for developing the TPB questionnaire employed in the primary investigation.

Quantitative instrument – Primary Data

The absence of a universally accepted TPB questionnaire (Ajzen, 2013) necessitated the development of items for assessing the constructs of the TPB (attitude, subjective norm, perceived behavioural control, and intention) in this study. These items were primarily derived from the findings of the qualitative elicitation study conducted during the preliminary phase, as well as from established scales (Ajzen, 2006, 2013; Francis et al., 2004) that had been previously developed and empirically validated by other scholars. To enhance the efficiency of the questionnaire, a pilot study was undertaken. The purpose of the pilot study was to evaluate the face validity of the questionnaire by examining its clarity, comprehensibility, and suitability for the target population, specifically individuals living with HIV. A draft questionnaire was distributed to a pilot group of 30 participants from the study site to assess the clarity and relevance of the questions. This initial step was crucial for gathering insights before the full-scale study, helping to identify ambiguities and ensure the questions aligned with research objectives. Feedback from the pilot group allowed researchers to refine the questionnaire, enhancing clarity and relevance. This iterative process improved data quality by addressing potential issues early, reducing the risk of unreliable data in the main study. Additionally, this approach fostered a better understanding of participants' perspectives, ensuring questions resonate with the target population.

The data produced from the preliminary investigation were examined and subsequently integrated into the final primary study TPB questionnaire. The outcomes of the pilot study facilitated the assessment of the efficacy of several measures to be potentially incorporated into the final questionnaire. Subsequently, the final version of the TPB questionnaire intended for utilisation in the main study was created.

The questionnaire utilised in the final TPB study included a seven-point bipolar adjective Likert scale. This scale consisted of a range from 1 to 7, with opposite adjectives positioned at each end of the scale. For further details, please refer to Appendix 6. The questionnaire encompassed the following components: According to Francis et al. (2004), one aspect of behaviour that can be examined is the individual's

behavioural beliefs and outcome evaluations. This refers to the individual's views about the consequences of their behaviour and the subsequent positive or negative appraisal of these beliefs. In relation to each significant behavioural outcome, items were developed to evaluate the intensity of behavioural beliefs and the assessment of the outcome. This study examines the relationship between injunctive normative beliefs and motivation to comply. Injunctive normative beliefs refer to an individual's perception of what an authoritative figure, such as a doctor, expects from them. The motivation to comply refers to the individual's willingness to adhere to these expectations. To measure the strength of injunctive normative beliefs and motivation to comply, items were developed for each salient normative referent, assessing the individual's perception of the injunctive normative belief and their motivation to comply with the expectations set by that specific individual or group. This study examines the influence of descriptive normative beliefs and identification with referent individuals or groups on participants' behaviour. Specifically, we assessed the strength of participants' beliefs about what people in their social circles, such as friends or relatives, have done in similar situations, as well as the extent to which participants identify with those individuals or groups. To measure these constructs, we developed items that capture the intensity of participants' descriptive normative beliefs and their level of identification with the referent individual or group actors: The section on control beliefs and influence of control examined the factors that could enable individuals to engage in a particular behaviour and the potential impact of these factors on behaviour performance. For each relevant control factor, items were developed to assess the probability of its presence and its ability to either facilitate or hinder behaviour performance. Direct measures were created during the elicitation study and pilot phase in order to evaluate attitudes, perceived norms, perceived behavioural control, and intents. In addition, the final study questionnaire encompassed measures of demographic characteristics and other background elements that were derived from the elicitation study and phase and retained for inclusion in the study.

Quantitative instrument – Secondary Data

In order to assess the level of adherence to HIV care and treatment, secondary data were gathered (see Appendix 7). The data provided us with the means to ascertain the extent to which the study participants adhered to their HIV care and treatment, thereby addressing the question regarding the efficacy of TPB-based measurements

in predicting adherence. The measurement of adherence to HIV care and treatment among patients newly initiated on ART in Eswatini employs four techniques. These techniques include compliance with clinic visits/appointments, pill count, immunological monitoring, and virological monitoring. Prior to the COVID-19 pandemic, clinic visits/appointments and pill count were conducted monthly. However, due to the pandemic, these measurements were adjusted to occur quarterly. Immunological monitoring involves CD4 counts conducted at three months after initiation, followed by six-month intervals. Virological monitoring, when available, entails viral load counts performed at three or six-month intervals. Viral load monitoring in Eswatini is limited. The data were collected from the records of patients, including patient files, clinic cards, and the facility's patient database. Furthermore, during the examination of patient records, pertinent medical data that were accessible was extracted, encompassing retrospective information pertaining to the patient's background, such as the date of HIV positive diagnosis and the rationale behind the testing, the stage of HIV disease according to the World Health Organization, the most recent level of HIV-1 RNA, the most recent count of CD4 cells, and the prescribed ART regimen.

4.5.2 Data collection approach

Prior to commencing the study at LaMvelase HIV Clinic and gaining access to patient data, official authorisation was acquired from the Ministry of Health in Eswatini (see Appendix 2) and the AIDS Health Foundation Eswatini Country Programme Manager, who oversees the management of LaMvelase Clinic (see Appendix 3). Following the acquisition of formal authorization, the researcher proceeded to obtain verbal approval for conducting the study at the LaMvelase HIV Clinic. This involved seeking agreement from both the clinic's operational manager and the professional nurses employed at the facility. The remaining members of the clinic staff, such as clerks and lay counsellors, were also provided with a comprehensive overview of the study. This was done to ensure that all staff members at the clinic were informed and supportive of the study's objectives. Throughout the course of this study, the researcher sought the collaboration of healthcare professionals working in the clinic to aid in the identification of patients who had newly initiated ART as part of the data collection procedure.

Participants who satisfied the specified inclusion criteria were recruited to take part in the study during the recruitment phases of the elicitation research, pilot study, and main study at the clinic. Participants who were at least 18 years old and tested positive for HIV were included in the study. They were required to have enrolled in the ART programme and had to have initiated ART on the same day they were recruited. The clinic healthcare personnel initially provided a brief explanation of the study to patients who were newly initiated onto ART on the recruitment days. Subsequently, the patients were introduced to the researcher and/or research assistants. The researcher or research assistant thereafter provided the patients with a comprehensive overview of the study, including the specific phase (Phase 1, 2, or 3) for which they were being recruited, and extended an invitation for their participation in the study. Informed consent was acquired from the participants who provided their agreement to participate in the research, and subsequently, they underwent interviews at the clinic on the day of their treatment initiation.

The researcher collected data for Phases 1 and 2, whereas main data for Phase 3 were collected by the researcher with the aid of a single, trained research assistant. The research assistant was selected from a pool of lay counsellors employed at the clinic and provided with a two-day training session on data collection conducted by the researcher. The researcher closely observed the lay counsellor's data collecting activities for one week to ensure the effectiveness and efficiency of the process. After this first monitoring phase, the lay counsellor was entrusted to independently carry out data collection for a duration of seventeen months. During this time frame, the researcher performed regular site visits monthly. These trips had the purpose of monitoring the data collection process and gathering the completed questionnaires. The study participants were handed questionnaires in their preferred language, which was either English or Siswati.

The researcher collected the secondary data for Phase 3 on a quarterly basis during the site visits. The LaMvelase HIV Clinic maintains a comprehensive patient database that includes various personal details of individuals seeking medical care. These details encompass the patient's name, surname, gender, age, address, contact number, date of HIV test, outcome of HIV test, CD4 count, viral load, enrolment onto the ART programme, initiation and management of ART, diagnosis and treatment of

opportunistic infections, as well as the scheduled date of the patient's next visit. The researcher utilised the clinic's patient database, patient file, and patient clinic card to gather secondary data from the participants involved in this study. Subsequently, the researcher proceeded to input these patient data into a Microsoft Excel spreadsheet.

The data obtained through the utilisation of the semi-structured interview guide were documented by means of a tape recorder and subsequently preserved utilising digital audio recording on a laptop. Furthermore, comprehensive interview notes were diligently recorded for each interview session, and subsequently transcribed using Microsoft Word software. The interviews, conducted in both English and Siswati, were transcribed and in those cases where the interviews were conducted in Siswati, they were then translated into English. All transcripts are stored in the Microsoft Word format. The collection of data for the semi-structured interviews was conducted by the researcher, who possesses fluency in both English and Siswati, the primary language utilised in Eswatini. The interview transcripts underwent coding and analysis, as described in detail in Chapter Five.

The quantitative data obtained from the survey was input in real time using the TPB questionnaire on Mobenzi Researcher, a mobile data collecting tool, throughout both Phase 2 and Phase 3. According to Singh et al. (2019), Mobenzi Researcher is a system that is designed to facilitate data collecting, monitoring, and supervision of field-based data collectors. It is known for its user-friendly interface and its ability to assure the safe and secure transmission and storage of data throughout these processes. The Mobenzi Researcher system was developed with the aim to seamlessly incorporate the tasks of data collectors into a web-based interface, which was activated upon the recruitment of a participant (Singh et al., 2019). The Mobenzi Researcher programme was deployed on a mobile device, enabling the collection of data that were subsequently uploaded onto a web-based platform with safe access and password protection. This process occurred in real time, allowing for immediate data transfer. Furthermore, the obtained data were transferred to the IMB Statistical Package for the Social Sciences (SPSS), Version 28 software application for subsequent analysis. The data obtained from physical facility registers and patient clinic files were recorded using Microsoft Excel and subsequently inputted into the IBM SPSS software application for analysis.

The researcher assumed the role of overseeing all aspects of data entry, management, and data cleaning during the study, so assuming responsibility for ensuring overall quality assurance. The researcher ensured the quality of the data by regular monitoring. The researcher, who possesses fluency in Siswati, ensured the quality of translations by cross-referencing them with the original audio or notes.

Regular backups of electronic data were conducted on both the Mobenzi Researcher online cloud platform and the researcher's internet server. Due to the presence of sensitivities associated with certain acquired data, the researcher implemented a data protection system during the processing phase encompassing the use of passwords and secure backup hardware.

The study's data collection was originally planned to span a duration of around 19 months. Phase 1 and Phase 2 were estimated to require around two months each to finish, while Phase 3 was anticipated to take approximately 15 months. However, this was not the case, since difficulties were encountered in obtaining sufficient sample sizes for each of the research phases, leading to a longer duration for the study than originally expected. The recruitment of the main study participants was originally planned to span a duration of three months. However, due to a lower daily rate of patients initiating ART and the reluctance of potential participants to enrol in the study, the recruitment process extended to a period of 17 months.

The COVID-19 pandemic and the travel and movement limitations implemented by the government to mitigate the transmission of COVID-19 posed an additional obstacle in the collecting of data, particularly secondary data. The commencement of gathering secondary data occurred shortly prior to the implementation of Lockdown Level 5. Consequently, once Lockdown Level 5 was imposed in March 2020, the researcher's ability to enter the healthcare facility was impeded due to limitations on movement exclusively for essential personnel and individuals requiring medical attention. The researcher was granted access to the health facility solely during Lockdown Level 1, a phase characterised by the relaxation of numerous restrictions. This necessitated an amendment to the data collection plan and consequently a recertification from the ethic committee for the amended data collection plan.

During the period of data collection, the monitoring of adherence among patients who had recently started the use of ART was conducted for one year or 12 months, with defined intervals, at LaMvelase HIV Clinic. This information was obtained from personal discussion with the Medical Director, in 2017. The aforementioned data collecting procedure aligns with the proposed methodology for Phase 3. Initial data were gathered on the day of enrolment of the study participants, while adherence data were obtained at various times over the approximately 12-month adherence monitoring period. The examination of patient files and clinic cards occurred at the initiation of data collection, as well as during site visits and upon completion of data collection.

4.6 Data analysis

4.6.1 Qualitative data analysis

The data obtained during the elicitation study conducted in Phase 1 underwent thematic analysis. Thematic analysis is a systematic approach used to find, organise, and provide insight into patterns of meaning, known as themes, within a given dataset (Braun & Clarke, 2012). Thematic analysis is a research approach that enables the researcher to discern and comprehend collective or shared meanings and experiences within a dataset. Consequently, this method serves as a means of identifying the prevalent patterns in the discourse or written content pertaining to a particular topic, and subsequently making sense of these patterns (Braun & Clarke, 2012). According to these authors, the identification of patterns of meaning using thematic analysis should be considered significant in respect to the specific topic and research question under investigation. Across each given dataset, there are a multitude of patterns that can be discerned. The primary objective of conducting an analysis is to find those patterns that are pertinent to addressing a certain research question.

Thematic analysis was employed as a method for qualitative data analysis, enabling the researcher to systematically examine the data to discern, comprehend, and classify significant themes. This approach facilitated the identification of patterns within the data and the exploration of their interrelationships. Utilising an inductive approach,

wherein data were systematically categorised without the imposition of a preconceived coding framework or the researcher's preexisting notions (Braun & Clarke, 2006), distinct codes were identified, leading to the emergence of overarching themes encompassing shared information pertaining to the identification of the most salient beliefs associated with each construct within the TPB model, namely behavioural outcomes, normative referents, and control factors. Subsequently, these data were employed to formulate the components that would be incorporated into the final questionnaire. A detailed discussion of the qualitative data analysis is provided in Chapter Five of this research report.

4.6.2 Quantitative data analysis

The survey questionnaire was used to collect empirical data, which were gathered via the Mobenzi Researcher mobile data collecting tool and then exported to Microsoft Excel. Thereafter, the data were sent to the IBM SPSS, Version 28 software tool for analysis. To maintain the accuracy and reliability of the data, steps were taken to remove any distortion caused by missing values or extreme outliers. These outliers were identified using a threshold that was set at three times the interquartile range (Tukey, 1977; Hoaglin et al., 1986). The obtained dataset was subsequently used to analyse the demographic, descriptive, and inferential data.

The demographic features of the respondents were analysed using frequency (n) and percentage frequency (%). The descriptive statistics evaluated the central tendency using the mean and median, while simultaneously analysing dispersion using the standard deviation. This research yielded insights into the mean, median, and dispersion of the values derived from the Likert scale statements. In addition, various descriptive statistical tests, such as calculating the minimum, maximum, and percentiles, were used to analyse the clinical data.

The determination of statement importance in the survey was based on the analysis of the highest and lowest scores of the Relative Importance Index (hereafter referred to as RII). The RII is an analytical technique which is mostly used to figure out the relevance attached to various issues in a research study (Johnson & Lebreton, 2004). It is broadly employed in survey research to assess the importance of different

variables or attributes being investigated. Through the examination of the RII scores at their highest and lowest points, the researchers were able to pinpoint the crucial elements or statements that exert the most significant influence on the survey outcomes.

A three-way cross-tabulation study was conducted to examine the relationship between the categorical variables. This analysis was essential for understanding how these variables interact with each other. Following that, a Chi-square analysis was performed to determine the association between the socio-economic parameters and clinical data, such as pill usage, CD4 count, and viral load. The Chi-square test is a commonly employed statistical technique to assess the association between categorical variables (Agresti, 2018). By computing a Chi-square statistic and comparing it to a critical value derived from the Chi-square distribution, researchers can ascertain the significance of their results (Field, 2013). Given that the Chi-square test is regarded as an omnibus test, the extent of the relationship was assessed using Cramér's V (McHugh, 2013).

The Wilcoxon Signed Rank test was employed as a statistical approach for doing paired sample analysis, comparing two sets of related data (Coleman, 2018) in particular, the clinical data of the patients. The baseline data, which were acquired at the beginning of the trial, were compared with the data obtained after 12 months of treatment with ART. The primary aim of this comparative investigation was to evaluate the efficacy of ART on the patients. By juxtaposing the initial data with the data collected after a span of 12 months, researchers were able to ascertain whether there were any significant changes or improvements in the patients' clinical results, thereby indicating their compliance with HIV care and treatment.

The tests were employed to accomplish the goals of the quantitative data analysis.

4.7 Research quality

This research study ensured the achievement of rigorous research standards by implementing a strong methodological framework. It also guaranteed that the methods used for gathering and analysing data met the necessary standards of rigour and

credibility. To do this, a mixed-method approach was adopted. This approach is especially beneficial in social science research as it amalgamates the strengths of qualitative and quantitative research designs.

It is essential for academics, health professionals, policy makers, and the public to be familiar with and understand the importance and validity of research. Building trustworthiness is a vital factor for researchers to persuade both themselves and their readers of the credibility and significance of their study findings (Lincoln & Guba, 1985). The assessment of a research's reliability often hinges on four criteria: credibility, dependability, confirmability, and transferability. While the term trustworthiness is more commonly associated with qualitative research, it is equally important in quantitative research, where it encompasses several key components such as validity, reliability, appropriate sampling, rigorous data collection and sound statistical analysis. The aforementioned elements are deliberated below in conjunction with the trustworthiness standards employed in qualitative research methods.

Credibility, in the context of quantitative research, is closely associated with the notion of validity, particularly internal validity. According to Stahl and King (2020), credibility refers to the degree of alignment between study findings and reality. Lincoln and Guba (1985) argued that ensuring credibility is crucial for establishing trustworthiness. In order to ensure the reliability of qualitative data, it is important to incorporate a wide range of perspectives during the data collection process. This methodology guarantees that the acquired data are relevant and foster confidence in the authenticity, reliability, and plausibility of the outcomes as seen by the participants. Various techniques were employed in this study to establish trustworthiness. Initially, pilot interviews were carried out to evaluate the efficacy of the study tools. This was conducted for both the qualitative and quantitative phases of the study. In order to conduct the qualitative study, a small group of specialists, including the supervisor, were asked to assess the interview guide. Additionally, 30 questionnaires were distributed to the pilot sample to test the effectiveness of the instrument for the quantitative study. This was done to get face validity. In addition, the data collection instruments were translated into Siswati by retired high school Siswati teachers to cater to participants who preferred responding in either English or Siswati.

The interviews were conducted by a researcher who had the requisite competence and research skills. To guarantee precision, the interviews were meticulously recorded and transcribed word-for-word by a skilled transcriber. The data from the quantitative questionnaire responses were collected using the mobile phone-assisted personal interviewing (MPAPI) survey platform called the Mobenzi Researcher. This platform offers comprehensive survey features, such as the ability to create different types of questions, designate mandatory fields, and effectively handle survey branching. After installation, the software successfully established communication with the Mobenzi server, utilising either Wi-Fi or a cellular data connection. The Mobenzi server received, saved, and consolidated the surveys completed on the device for retrieval as a comma-separated file. In the event that there was no data connection during the survey, the response was stored on the mobile device until a connection was restored.

Moreover, a specific criterion was utilised to guarantee the recruitment of suitable persons for the study. Gutterman (2015) contended that the credibility of the sample should be assessed based on its relevance and appropriateness. This author underscored the need to choose individuals who are pertinent to the subject matter. It is crucial to include this component to bolster the study's credibility by guaranteeing the sample's relevance. For this study, it was imperative that participants met specific criteria for both qualitative and quantitative analysis. These requirements included being 18 years of age or older, testing positive for HIV on the day of recruitment, and thereupon being enrolled in the ART programme. The study established the adequacy of the qualitative sample by conducting interviews with 19 participants, which was considered sufficient according to Saunders et al. (2016). Ultimately, a saturation or data sufficiency analysis was conducted to verify that enough data was gathered in order to thoroughly address the study issue. The sample size of 152 respondents for the quantitative study was considered sufficient based on the minimum need for previous studies (Francis et al., 2004; Saal & Kagge, 2012), and this was further validated by the G-Power analysis.

According to Stenfors et al. (2020), **dependability** refers to the degree to which a research study may be reproduced under similar conditions. To attain dependability, Nowell et al. (2017) recommended that researchers take measures to guarantee that the research process is characterised by logicity, traceability, and comprehensive

documentation. It is imperative to ensure the provision of adequate information in order to enable another researcher to replicate the procedural steps, potentially leading to divergent findings. To enhance the replicability of the findings in this investigation, it was imperative to provide a comprehensive account of the study's qualitative and quantitative methodologies and establish an audit trail. This entailed creating a meticulous record of the data collection instrument development, data collection process, documenting the researcher's decisions and choices concerning theoretical and methodological aspects throughout the study, and maintaining records of the original data, field notes, transcripts and data analysis outputs.

To ensure the overall trustworthiness and accuracy of the quantitative findings, the research assessed the reliability of the first-order variables by examining the indicators that were directly measured in the study, which reflected the participants' responses. This was done to validate the accuracy and consistency of the measurement tool, identify potential errors, enhance construct validity, assist in data analysis and guide instrument development.

Confirmability refers to the process of ensuring that the researcher's interpretations and findings are directly derived from the data. This entails the researcher's responsibility to demonstrate the steps taken to arrive at conclusions and interpretations (Nowell et al., 2017). It is imperative to establish a coherent connection or correlation between the collected data and the resultant findings. According to Shenton (2004), it is recommended that measures be implemented to maximise the likelihood that the conclusions of a study are derived from the perspectives and insights of the participants, rather than being influenced by the researcher's personal qualities and biases. In order to establish confirmability in this study, the researcher demonstrated the process of generating findings by providing comprehensive descriptions and incorporating verbatim excerpts from interviews with participants, as obtained via the transcription. For the quantitative data, statistical analysis was tested at a 95% confidence level to determine if the relationship or the comparison was statistically significant or not.

Transferability refers to the extent to which the findings can be extrapolated or used to different situations or environments (Ferero et al., 2018). However, due to the limited

scope of a qualitative study, the generalizability of its findings and conclusions to broader contexts and people cannot be established (Shenton, 2004). Stenfors et al. (2020) argued that in order to ensure the transferability of research findings, it is essential to provide a comprehensive account of the specific environment in which the research was conducted, including the location, context, or group involved, and how these factors influenced the outcomes. According to Shenton (2004), researchers may establish a connection between the findings of a study and their own circumstances if they perceive their conditions to be comparable. To enhance the generalizability of the findings in this study, a comprehensive depiction of the contextual background was provided. Additionally, a purposive sampling technique was employed and an analysis of data saturation was performed. Based on the limited locations of the study (data collected from one site) and sampling using convenience sampling, the ideal situation of generalizability was not achieved in this quantitative study. However, the extent of collection of data over a period should contribute to some level of generalising the outcome to similar settings. This was adequate for the purpose of this study.

4.8 Research reflexivity

Qualitative research typically involves subjectivity, making it important for researchers to practice reflexivity to critically examine their own biases and assumptions during the research process. Reflexivity was demonstrated by the researcher through engaging in a process of self-examination and critical reflection. The researcher was able to develop a more open understanding of the data by acknowledging their own perceptions, prejudices and how their Swati origin and extensive experience in HIV research has influenced them. This included keeping journals about thoughts and feelings related to the research context through which potential biases as well as assumptions that may affect interpretation of results could be identified. To minimise the influence of the researcher's personal views on the results, the researcher utilised the TPB as the guiding principle when analysing the data. Additionally, the researcher engaged the health care professionals at the HIV clinic where the data was gathered along with the research assistant who took notes during all the in-depth interviews, in order to receive feedback. Peers and mentors were also consulted, thus fostering a dialogue that enriched the analysis process. Ultimately, this reflective methodology

enhanced the authenticity of the participants' interactions with the researcher, resulting in narratives that more accurately represented their experiences.

4.9 Ethical considerations

The researcher duly recognised the ethical obligation to mitigate potential risks and optimise potential benefits, and thus conducted the study in accordance with this principle. The researcher diligently followed ethical norms pertaining to the execution of study involving human subjects and took necessary measures to assure the following:

- The safety of participants was regarded as the foremost priority in all study decisions by the researcher. The recruitment of study participants took place in a health facility after their consultation with a healthcare practitioner. Following that, the interviews were carried out in a designated private area within the premises of the health facility.
- The design of the study was characterised by methodological rigour and drew upon the researcher's expertise as well as insights gained from previous research in the field of HIV/AIDS.
- The protection of participant identity and data confidentiality was prioritised in order to ensure the safety of participants and maintain the integrity of the data collected.
- The researcher possessed experience in the field of HIV/AIDS research and had received comprehensive training in research ethics. Furthermore, the selection process for other team members was conducted with great care, ensuring that they received specialised training on the protocol and continuing assistance.
- The design incorporated several measures with the intention of mitigating any potential distress experienced by the participants during the trial. The aforementioned actions encompassed:
 - Participants were provided with reassurances that they had the autonomy to withdraw from the research study at any point if they experienced discomfort. Additionally, they were informed that they were under no obligation to respond to any questions if they chose not to do so.

- Participants were consistently reminded of the strict confidentiality of their responses during the in-depth interview and questionnaire administration.
- Participants were given the contact information of the researcher to address any inquiries they may have had.
- Participants were sent to a professional therapist in instances where they exhibited signs of distress or explicitly requested counselling during the interview.
- Referring participants to appropriate HIV/AIDS services when participants requested such a services.
- The research team also took measures to assure the availability of comprehensive information regarding the care and treatment of HIV/AIDS at the designated research site.

4.8.1 Risk and risk management

The study participants showed minimal signs of physical or emotional trauma during the study. Nevertheless, individuals who experienced discomfort when asked specific questions were given the option to refuse to answer. The researcher, as well as the participant information sheet (Appendix 8) and consent form (Appendix 9), underscored the voluntary nature of answering questions for the study participants.

4.8.2 Confidentiality, anonymity, and privacy

The confidentiality of all collected data was ensured. In order to preserve the privacy of participants, the names of individuals were omitted from the interview write-ups and reports. The reports included quotations from participants, which were attributed using their research participant number and gender, to maintain maximum confidentiality. Furthermore, to protect anonymity, the interview or questionnaire data did not include the consent form. The data were securely stored, and access to these was limited exclusively to the researcher and her supervisor.

4.8.3 Benefits

The participants did not receive any form of direct financial or material incentives for their involvement in the study. The researcher provided an explanation of this to the participants, as well as included it in the informed consent form. The study's results were anticipated to provide insights for the development of measures based on the Theory of Planned Behavior (TPB), which could then be utilised to predict adherence to HIV care and treatment among PLHIV.

4.8.4 Informed consent

Prior to enrolment, study participants were requested to provide their signature on two informed consent forms. The first form (Appendix 9) pertained to their agreeing to participate in the study, while the second form (Appendix 10) granted the researcher permission to access their clinic data. To preserve the confidentiality of participants, the consent forms were deliberately kept separate from the interview data and the completed questionnaires. The researcher ensured that consent documents were gathered from each participant. Only participants who were willing to participate filled out the surveys and gave permission for their clinic data to be evaluated.

4.8.5 Ethical and research clearance

The research was conducted after obtaining ethical approval from the Wits Human Research Ethics Committee (certificates number M160615 & M210371; see Appendix 1) and the Eswatini National Health Research Review Board (see Appendix 2).

4.9 Methodological limitations

The study was subject to methodological restrictions due to the impact of the COVID-19 epidemic. The initial study design required the regular collection from study participants on a quarterly basis of HIV monitoring data, specifically their CD4 count and viral load. Due to the global outbreak of the COVID-19 pandemic and the subsequent implementation of movement restrictions to mitigate its spread, modifications were made to the treatment protocol. Consequently, the collection of HIV

monitoring data was limited to two time points: baseline and the conclusion of the 12-month period. Consequently, the study ceased to be a continuous longitudinal study.

4.10 Conclusion

The current chapter provides an in-depth discussion of the research methods employed in the current study. The chapter details the study objectives and a fitting approach to accomplish such objectives. To mitigate errors in data collecting and analysis, it was imperative to employ a rigorous study approach. As a result of this, a variety of approaches were used for the purpose of data collection. This chapter contains a comprehensive overview of the research design, sample procedure, instrumentation developed for the study, data gathering methods, and data analysis techniques employed.

The main aim of this study was to develop a management framework grounded in the TPB that could objectively predict adherence to HIV care and treatment prior to initiating ART in Eswatini.

The research methodology employed in this study encompassed an elicitation study aimed at identifying the behavioural, normative, and control beliefs held by individuals living with HIV in relation to adherence to HIV care and treatment. These beliefs were subsequently utilised in the development of a questionnaire based on the TPB which was administered during the study.

Furthermore, the pilot testing of the TPB questionnaire, which was designed in the conceptual phase of the project, was conducted. Finally, the TPB questionnaire, after being finalised, was administered to the study sample comprising a cohort of patients who were then followed for a duration of 12 months. The purpose of this follow-up was to collect data regarding the patients' adherence to HIV care and treatment.

The analysis of the data obtained from the cohort of patients yielded a comprehensive management framework for the provision of care and treatment for individuals with HIV/AIDS. This framework can be utilised by healthcare practitioners to predict the likelihood of adherence to HIV care and treatment prior to the initiation of ART,

extending to the verification of adherence behaviour in relation to HIV care and treatment.

The subsequent two chapters, namely Chapters Five and Six, provide a thorough presentation of the comprehensive findings derived from both the qualitative and quantitative components of the research study.

CHAPTER FIVE

FINDINGS FROM THE ELICITATION STUDY

5.1 Introduction

The application of the Theory of Planned Behavior (TPB) to a new target behaviour and new population of interest requires formative research to identify accessible behavioural, normative and control beliefs; this is known as the elicitation study. Herath (2010) asserted that the elicitation study is a critical stage in the creation of a TPB questionnaire, as the TPB's predictive ability is wholly reliant on the identification of salient beliefs through elicitation. In this study, it served to identify the factors that could either facilitate or impede modifications in the constructs that underlie the formation of intentions to comply with HIV care and treatment. The process of elicitation enabled the researcher to identify the behavioural, normative, and control factors of the population under study. Furthermore, it illustrated the presence of diversity in individuals' attitudes towards compliance with HIV care and therapy.

According to the TPB, an individual's fundamental psychological causes of behaviour are represented by their salient beliefs, which operate through the constructs of TPB. As stated by Sutton (2002), the manipulation of beliefs can lead to a change in attitude and subsequent alteration in behaviour. According to Ajzen (2012) and Ajzen and Fishbein (1980), conducting an elicitation study is imperative for identifying and validating belief constructs held by the target population. To ensure the success of an elicitation study, it is crucial to employ open-ended questions to evaluate the population's behavioural, normative, and control beliefs. The data collected from the study must be analysed using thematic analysis to prioritise the beliefs and determine the top 5-10 most salient beliefs for each construct. It is likely that this will include some of the beliefs expressed by each participant in the sample (Ajzen, 2012; Ajzen & Fishbein, 1980). The systematic identification of prominent beliefs is crucial, as these beliefs form the underlying cognitive structure that influences an individual's intentions and subsequent behaviours. Ajzen and Fishbein (1980) noted that the TPB lacks a universally accepted questionnaire, and it is recommended that a questionnaire be tailored to the specific context of the research.

The elicitation study proved to be of immense value in terms of the insights it provided into the attitudes, cognitions, and emotions of the subjects regarding their adherence to HIV care and treatment. The outcomes of the elicitation study were utilised to create the indirect belief-based measures for the predictor constructs, namely outcome evaluations, subjective norms, and perceived behavioural control, in the TPB questionnaire.

5.2 Instrument design

One elicitation study was utilised to formulate the indirect measures for each of the predictor constructs within the TPB framework. The study utilised open-ended questions as a means of extracting the salient beliefs held by the participants. These inquiries were structured in the form of an interview guide. In the current phase of the research, the utilisation of open-ended questions was recommended as they fostered interactive dialogue and facilitated comprehensive and detailed responses. This approach was conducive to gathering of pertinent data and the discernment of the most significant aspects of the research topic. The interview guide utilised in the study on adherence to HIV care and treatment was derived from the TPB questionnaire development manual (Francis et al., 2004) and modified to align with the study's context. The interview guide was structured to closely mirror the salient TPB belief elicitation procedure, as recommended in various publications (Ajzen & Fishbein, 1980; Ajzen, 1991; Ajzen, 2012; Francis et al., 2004).

The questions were divided into three distinct categories, as outlined in Table 5.1, which include behavioural outcomes, normative referents, and control factors. Behavioural outcomes refer to the consequences that arise from the execution of a specific behaviour, while normative referents pertain to individuals who possess the ability to influence whether a behaviour is performed. Lastly, control factors encompass the various factors or circumstances that may impact the likelihood of a behaviour being performed. The utilisation of open-ended questions was a crucial aspect in the development of the survey instrument items, and their pertinence to the population and context. Additional probe questions were employed to acquire

comprehensive and intricate data; the complete interview guide can be found in Appendix 4.

Table 5.1: Interview guide questions (Adapted from Ajzen, 2006)

TPB component	Elicited beliefs	Question
Behavioural beliefs	Advantages	What do you see as the advantages of you adhering to HIV care and treatment on a daily basis for the rest of your life?
	Disadvantages	What do you see as the disadvantages of you adhering to HIV care and treatment on a daily basis for the rest of your life?
Normative beliefs	Normative approval	Please list the individuals or groups who would approve or think you should adhere to HIV care and treatment on a daily basis for the rest of your life.
	Normative disapproval	Please list the individuals or groups who would disapprove or think you should not adhere to HIV care and treatment on a daily basis for the rest of your life.
	Examples of people who would perform behaviour	Please list the individuals or groups who, after being initiated on ART, are most likely to adhere to HIV care and treatment on a daily basis for the rest of their life.
	Examples of people who would not perform behaviour	Please list the individuals or groups who, after being initiated on ART, are least likely to adhere to HIV care and treatment daily for the rest of their life.
Control beliefs	Enablers	Please list any factors or circumstances that would make it easy or enable you to adhere to HIV care and treatment daily for the rest of your life.
	Inhibitors	Please list any factors or circumstances that would make it difficult or prevent you from adhering to HIV care and treatment daily for the rest of your life.

Traditionally, open-ended questions aimed at eliciting significant beliefs within the TPB have followed a consistent sequence, beginning with behavioural outcomes, followed by normative referents, and concluding with control factors. One could argue that the sequence in which questions are posed may lead to modifications in the observed patterns of elicited beliefs. This is due to the commonly observed

phenomenon that a greater number of behavioural beliefs are elicited in comparison to normative and control beliefs (Sutton et al., 2003). Altering the order of the questions to commence with the control factors may potentially impact the type and quantity of beliefs elicited. Armitage and Conner (1999) conducted a study which revealed that the structure of the TPB elicitation study interview guide had negligible influence on the correlations between the TPB's constituent components, namely the behavioural outcome, normative referent, and control factor components. According to Ajzen and Fishbein (2004), it is essential to elicit behavioural, normative, and control beliefs in a free response format. They argue that if this is done appropriately, the likelihood of the assessment influencing the relevant cognitions will be reduced. Consequently, the conventional sequence of open-ended questions (comprising behavioural, normative, and control questions) was employed for the purpose of this elicitation investigation.

The current study aimed to predict adherence to HIV care and treatment prior to commencing antiretroviral therapy (ART). To achieve this objective, the elicitation study utilised instrumental open-ended questions instead of affective questions. According to Breckler and Wiggins (1989), the instrumental component of attitude pertains to a cognitive evaluation of the potential benefits that may arise from engaging in a specific behaviour. The aforementioned statement presents a distinction between the cognitive component and the affective component of attitude. The cognitive component pertains to an individual's beliefs and thoughts regarding the likelihood of engaging in a specific behaviour. On the other hand, the affective component of attitude pertains to the emotional and motivational aspects that are evoked by the prospect of performing a particular behaviour, as posited by Breckler and Wiggins (1989). In this study, participants were enrolled immediately following a positive HIV test result, without prior counselling regarding the potential implications of their diagnosis on their future well-being though they would have received pre-test counselling. The rationale behind recruiting study participants at this particular juncture was due to the fact that counselling following a positive HIV test outcome constitutes an integral component of the HIV Care and Treatment Programme in Eswatini. Subsequent to enrolment into the programme, adherence is closely monitored and tracked. Consequently, it was deemed more appropriate for this study to elicit beliefs pertaining to the outcomes of adhering to HIV care and treatment, rather than eliciting

beliefs pertaining to the emotions and motivations associated with the prospect of adhering to HIV care and treatment.

Ajzen and Fishbein (1980), the scholars who developed the TPB, have offered explicit instructions on how to elicit behavioural beliefs. Participants in the study are requested to provide their perceptions regarding the possible positive and negative aspects associated with engaging in the targeted behaviour, as well as their beliefs regarding the individuals or groups who would express approval or disapproval of such behaviour. Additionally, participants are asked to identify factors that may facilitate or hinder the execution of the behaviour in question. The questions utilised in this investigation were derived from the suggestions put forth by Ajzen and Fishbein (1980).

The interview guide's introductory section provided an explanation of the concept of adherence to HIV care and treatment. This involves the consistent intake of medication, timely attendance of clinic appointments, adherence to a prescribed diet, and implementation of lifestyle modifications as advised by the healthcare provider. The study's participants were prompted to provide a list of their immediate thoughts in response to open-ended questions designed to elicit their salient beliefs regarding the feasibility of adhering to HIV care and treatment daily for the remainder of their lives.

5.3 Overview of the sample

The study's participants comprised 19 individuals (see Table 5.2) who had undergone medical treatment at the LaMvelase HIV Clinic situated in Manzini, Eswatini.

The sample size in question adhered to the recommended standards for ensuring the credibility of the sample, as outlined by Saunders et al. (2016). These authors advised that a qualitative study should have a sample size ranging from 5 to 25 participants. The aforementioned statement is consistent with the suggestion by Mason (2010) that a sample size of 20 participants is optimal for studies of this nature. Guest et al. (2006) proposed that in order to ensure the adequacy of the sample size, it is necessary to consider not only the sample size determined by the research design, as outlined by

Saunders et al. (2016) and Mason (2010), but also the concepts of saturation and sample power.

The study conducted a saturation analysis, which will be covered in more detail later in the chapter. The attainment of sample power was due to the adherence to the guidelines for qualitative research and the manual for TPB elicitation studies, as outlined by Francis et al. (2004), which ensured that the number of study participants was appropriate. Previous elicitation studies have reported varying sample sizes, ranging from 13 (Etika et al., 2021) to 25 (Piras et al., 2017). Therefore, the sample size of 19 in the current study can be considered acceptable.

Table 5.2: Gender of elicitation study participants

Participant	Code	Gender
1	Phase 1_001	Female
2	Phase 1_002	Male
3	Phase 1_003	Female
4	Phase 1_004	Female
5	Phase 1_005	Female
6	Phase 1_006	Male
7	Phase 1_007	Female
8	Phase 1_008	Female
9	Phase 1_009	Female
10	Phase 1_010	Female
11	Phase 1_011	Female
12	Phase 1_012	Female
13	Phase 1_013	Male
14	Phase 1_014	Male
15	Phase 1_015	Female
16	Phase 1_016	Female
17	Phase 1_017	Female
18	Phase 1_018	Female
19	Phase 1_019	Female

In the elicitation study, a total of 30 individuals were approached to participate, however, 11 individuals declined to join the study. The reasons for their refusal were categorised as follows: (1) experiencing heightened emotional distress due to an unexpected HIV-positive result, (2) insufficient time, (3) the urgency to attend work or school, and (4) a lack of interest.

The study utilised a purposive sampling methodology, which involved selecting participants based on specific criteria such as age (above 18 years of age), HIV status (newly diagnosed as being HIV-positive), enrolment onto the antiretroviral therapy (ART) programme, and initiation on ART on the day of recruitment and interview.

Table 5.3 shows that out of the total sample size of 19 participants who were involved in the elicitation study, the majority, comprising 78.9%, were identified as female, while the remaining 21.1% were identified as male.

Table 5.3: Gender of elicitation study participants

Gender	n	%
Female	15	78.9
Male	4	21.1
Total	19	100.0

As per prior research conducted both in Eswatini (NERCHA, 2019) and worldwide (UNAIDS, 2019), it was anticipated that women, rather than men, would have a higher coverage of ART among individuals aged 15 years and above who are living with HIV. Multiple research studies have indicated that compared to females, males exhibit lower rates of HIV testing, initiation of HIV treatment, and adherence to HIV treatment (Mills et al., 2012; Conserve et al., 2019; Jobson et al., 2019; Peters, 2019). This disparity in healthcare utilisation leads to unfavourable outcomes for males, including an increased likelihood of mortality due to AIDS-related causes (Mills et al., 2012; Conserve et al., 2019; Jobson et al., 2019; Peters, 2019).

The underutilization of HIV services by men can be attributed to prevalent patterns of male health-seeking behaviour, which are influenced by factors such as prevailing norms of masculinity, stigma, opportunity, costs associated with attending health facilities, and inadequately designed services. This observation is in line with the findings of UNAIDS (2019) while according to Orr et al. (2017, p. 72), during focus group discussions held in South Africa, male participants expressed reduced engagement in HIV testing due to concerns regarding the potential harm to their reputation as a "real man," loss of their sense of strength and masculine pride,

apprehension of stigmatisation and rejection by their community, and the psychological burden of living with HIV.

5.4 Procedure

Healthcare workers at the LaMvelase HIV Clinic who were responsible for performing HIV tests were asked to immediately refer clients who had received an HIV-positive test result to the researcher before they were given formal information about ART or initiated into the HIV care and treatment programme. Prior to the elicitation study, their understanding of ART was solely based on previously acquired knowledge. The researcher conducted one-on-one meetings with each participant to provide them with an overview of the research and to solicit their involvement. The clients who agreed to take part in the study were taken through the participant information sheet of the study that explained the purpose of the research study and requirements, risks involved, confidentiality of information gathered, voluntary participation in the study, and other relevant information on their participation and / or non-participation in the study. The researcher employed the Siswati-translated version of the participant information sheet to guarantee that the subjects comprehended the ethical ramifications of their involvement in the research. Upon ensuring that the participants had a comprehensive understanding of their options to either opt-in or opt-out of the study, the researcher proceeded to request those who opted-in to provide their signature on an informed consent document as a confirmation of their willingness to participate in the study.

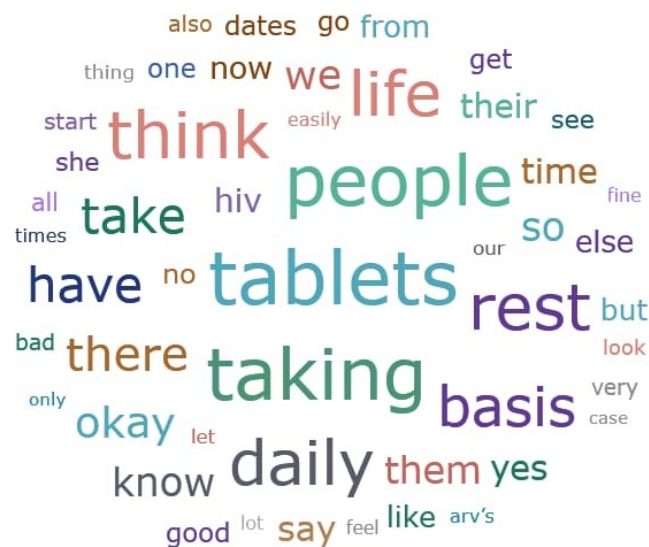
To facilitate the interview discussion, the researcher elected to administer the questions orally in either English or Siswati, depending on the participant's language preference. The responses were then captured using a tape recorder. The utilisation of an open-ended interview questions facilitated the acquisition of unstructured feedback from the research participants. Additionally, the implementation of this method allowed for the inclusion of participants who may have experienced apprehension towards written communication, thereby mitigating any potential bias in the responses provided. The study participants were requested to provide written consent for the recording of their interview responses. The complete and verbatim transcription of the interview recordings was carried out, followed by their translation

into English for analytical purposes by a professional transcriber who had no affiliation with the clinic.

5.5 Empirical data analysis

The empirical data collected from the interviews was analysed using ATLAS.ti Version 23 to determine its relevance and alignment with the study objectives. The word cloud was utilised to emphasise the most prominent words found in the empirical data (Figure 5.1).

Figure 5.1: Word cloud summary of empirical data



The word cloud provides a concise summary of the empirical data gathered from all the in-depth interviews. In a word cloud, the prominence of a word is shown through its size and boldness; therefore, a larger and bolder word indicates that it appears more often in the text and carries greater importance. According to the word cloud, the participants primarily underlined the importance of consistently taking the tablets for the duration of their lives. This implies that the interviews were centred around the objective of the qualitative study, which aimed to investigate the comprehension of adherence to HIV care and treatment among people living with HIV/AIDS (PLHIV) before starting ART. Consequently, the appropriate questions were posed, and appropriate responses were obtained.

In accordance with the guidelines outlined by the TPB as proposed by Francis et al. (2004), the data obtained from the interviews conducted as part of the elicitation study were subjected to analysis employing thematic analysis, descriptive analysis, and percentages. Thematic analysis is a research approach that involves the identification, analysis, and reporting of patterns, commonly referred to as themes, within a given dataset (Braun & Clarke, 2006, 2012). The primary objective of the thematic analysis conducted in this study was to ascertain prominent and comprehensive themes, rather than engaging in an in-depth exploration of the underlying significance of the data. The study employed an inductive approach to thematic analysis, as described by Braun and Clarke (2006). This approach entails coding the data without imposing a preexisting coding framework or the researcher's preconceived notions. The analysis process included categorising the themes, arranging them based on their frequency, prioritising the beliefs, and identifying the 5-10 most salient beliefs for each construct within the TPB model (Francis et al., 2004). The examination of the data resulted in the identification of noteworthy themes and patterns, which were subsequently incorporated into the design of the survey instrument used for data gathering in the primary investigation.

The study's theoretical framework was operationalized through thematic analysis, which enabled the identification of several items that were deemed to be relevant. During the initial stages of data analysis, general descriptive categories were established based on the transcribed data. These categories were subsequently refined and developed into more specific themes. The researcher developed the themes by utilising the verbatim expressions or phrases of the participants that were frequently referenced, in conjunction with the researcher's comprehension of the connotations and implications of specific terms or words. For example, the belief of "living longer" emerged in participant feedback, including statements such as "reduces the number of orphans" and "helps you live longer." The analysis undertaken encompassed not only the frequency of occurrence of a particular matter but also the extent to which the respondents had expounded on the subject matter during the interviews. This process continued in such a way that data were repeatedly coded and recoded to fit new and developing themes until there were no more new themes that emerged.

Subsequently, the polished themes were categorised according to the TPB constructs, namely, behavioural, normative, and control. A quantitative analysis technique, namely frequency counting, was employed to determine the frequency of responses for each category.

Additional factors such as places of employment were identified through the process of thematic analysis, however, they were not found to align with the constructs of the TPB. Any items that did not conform to the constructs under investigation were deemed to be outside the purview of the present research. The objective of the elicitation study was to determine the accessible behavioural, normative, and control beliefs that PLHIV hold concerning adherence to HIV care and treatment, in accordance with the TPB. Consequently, salient beliefs that did not align with the study's focus were excluded.

At various stages during the analytical process, my research supervisors performed independent evaluations of the data analysis. Their evaluations involved a thorough examination of the coding framework, the themes that emerged from the data, and the overall interpretation of the results. By providing constructive feedback and alternative perspectives, they helped to refine the analysis and enhance the credibility of the conclusions drawn from the research. This collaborative approach not only strengthened the quality of the analysis but also fostered a deeper understanding of the nuances within the qualitative data.

5.6 Findings

The findings derived from the elicitation study exhibited a high level of consistency across all conducted interviews. These findings were systematically categorised based on the primary topic areas that were employed as a framework for the interview guide (see Table 5.4). The following findings present a concise overview of the primary themes discussed, along with the frequency at which each theme was mentioned. The salient themes are organised according to their frequency of mention, regardless of whether a theme was reiterated by the same participant.

Table 5.4: Descriptive statistics for identified beliefs from open ended questions

Type of belief	Total beliefs	Mean belief per participant
Advantages	38	2
Disadvantages	24	1.26
Approve	35	1.84
Disapprove	17	0.89
Likely to do	28	1.47
Least likely to do	25	1.32
Enablers	29	1.53
Inhibitors	30	1.58

The beliefs expressed by study participants were found to be distributed across the various belief categories (behavioural, normative and control) in a random manner. This random distribution suggests that participants did not show a consistent pattern or preference for one category over another, indicating a diverse range of perspectives and influences that shape their beliefs. The thematic analysis resulted in the identification of 226 initial beliefs, as shown in Appendix 11. This initial set of 226 beliefs was subsequently categorised into three overarching TPB conceptual antecedents that are known to influence behavioural intention. These categories include 62 beliefs related to behavioural outcomes, 105 beliefs related to normative referents, and 59 beliefs related to control factors. The belief groups were subsequently condensed into 100 unique codes and then into 45 themes through a systematic process, which will be elaborated upon in the subsequent section of this chapter, in order to determine the final set of salient beliefs.

5.6.1 Saturation analysis

Utilising the 226 beliefs, a total of 100 unique codes were derived for the purpose of calculating saturation. Saturation denotes the stage in data analysis where incoming data points (interviews) yield minimal or negligible novel and / or valuable information in relation to the study objectives following the methodology outlined by Guest et al. (2020). The calculation of saturation involved three key components: the base size, which represents the minimum number of interviews needed to determine the amount of information obtained so far; the run length, which refers to the number of interviews in which we search for and compute new information; and the new information

threshold, which measures the proportion of incoming new information, with values equal to or less than 5% indicating acceptable levels of new information, and 0% indicating no new information (Guest et al., 2020).

Based on the premise that saturation can be attained within a limited range of 9-17 interviews (Hennink & Kaiser, 2022), a base size of nine interviews was employed, with a run length of three interviews (except for the last one), and a threshold of $\leq 5\%$ for new information. Based on the retrospective examination of the dataset, the saturation study revealed that 90% saturation was achieved after 9 interviews, with only 3.9% new information obtained by the end of interview 19. This satisfies the criterion proposed by Guest et al. (2020) that new information comprises less than or equal to 5% of the data, indicating that data saturation was achieved in the qualitative investigation. As a multi-method study, the quantitative investigation was undertaken following the qualitative study to enable data triangulation.

5.6.2 Behavioural outcomes

Table 5.5 displays eight elicited behavioural beliefs pertaining to the benefits of adhering to HIV care and treatment plus one unclassified. The participants identified "living longer" as the most prominent benefit of adhering to HIV care and treatment. This prominent belief was cited 11 times, accounting for 57.89% per participant. "Boosting the immune system" and "preventing opportunistic diseases" were widely acknowledged. "Get[ting] used to taking the treatment" was the least frequently cited advantage, with only one respondent mentioning it (5.26% per respondent). One response, accounting for 5.26% of the total respondents, could not be categorised under any specific category.

Table 5.5: Findings of the advantages questions

Advantage beliefs	Number	% per participant	Rank
Live longer	11	57.89	1
Boost immune system	6	31.58	2
Prevents opportunistic diseases	6	31.58	2
Healthier life	5	26.32	4
Prevents virus from multiplying	4	21.05	5
Know how you are responding to treatment	2	10.53	6
Protects others from infection	2	10.53	6
Get used to taking treatment	1	5.26	8
Unclassified	1	5.26	

Based on the interviews conducted, it was found that the participants possessed a comprehension of the significance and benefits associated with adhering to HIV care and treatment. The participants' insights highlight the perceived benefits of adhering to ART for HIV treatment and this is reflected in the comments by one of the study participants:

“I would say that that makes us live for a long time and protecting others from getting the same disease”. (Participant 001_Female)

Longevity: The participant has the belief that the measure contributes to an extended lifespan. This may be attributed to the treatment's efficacy in managing a persistent ailment or the treatment's capacity to avert a sickness.

Protection for Others: The participant also perceives the measure as a means of safeguarding others from acquiring the same illness.

This observation highlights the double advantages of certain health interventions - improving individual health and lifespan, while also playing a role in public health by avoiding the transmission of diseases such as HIV. This was indicated in a comment from another participant, as follows:

“It [ART] helps to contain the virus and it also helps to prevent other opportunistic diseases from attacking you.” (Participant 002_Male)

Enhancement of the Immune System: Participant 002_Male recognises that the use of ART effectively controls the virus and reduces the risk of opportunistic illnesses. The main objective of ART is to inhibit the replication of the HIV virus and so strengthen the immune system.

These observations emphasise the significance of adhering to ART in the management of HIV. Their emphasis underscores the necessity of ongoing patient education regarding the advantages of adhering to ART, both in terms of individual health outcomes and public health. Furthermore, it underscores the need of healthcare practitioners in reinforcing these advantages to promote compliance.

Three disadvantages associated with adherence to HIV care and treatment were identified. The most cited disadvantage, as reported by five participants, was the concept of "lifelong commitment," which accounted for 26.32% of the participants' responses. The second highest mentioned disadvantage, as reported by four respondents (26.32% per participants), was "side effects," while the least mentioned disadvantage was "stigma" (see Table 5.6).

Table 5.6: Results of the disadvantages questions

Disadvantage beliefs	Number	% per participant	Rank
No disadvantages	13	68.42	1
Lifelong commitment	5	26.32	2
Side effects	4	21.05	3
Stigma	2	10.53	4

Out of the total sample size, 13 participants (constituting 68.42% of respondents) expressed the absence of any disadvantage, thereby suggesting that the benefits of adhering to HIV care and treatment outweighed any potential disadvantages.

Enrolment in the HIV care and treatment programme necessitates a lifelong dedication, as the efficacy of the treatment regimen is contingent upon daily adherence

for the entirety of an individual's lifespan. Some participants perceived this as a disadvantage.

“It is kind of scary that you have to take this [treatment] for the rest of your life, but then, I have to accept this situation”. (Participant 009_Female).

Fear and Anxiety: The participant characterises the treatment as “kind of scary,” indicating the presence of dread or anxiety. This may be attributed to the potential adverse effects of the medication, the consequences of relying on it, or the ambiguity around its long-term efficacy.

Acceptance of Chronic Condition: The participant recognises the necessity of “accept[ing] this situation,” implying a difficulty in coming to terms with the actuality of enduring a chronic ailment. Acceptance might present difficulties and may entail mourning for compromised well-being or adapting to a different lifestyle.

This finding is significant as it emphasises the emotional and psychological difficulties associated with HIV management, in addition to the medical components. It emphasises the significance of including psychological support and counselling into treatment strategies.

When undergoing medical treatment, individuals may experience adverse effects. The response to ART can vary among individuals, as is the case with other forms of treatment. This phenomenon is exemplified in the following example.

“As people we are different, for some if they take these tablets on daily basis, they could be affected in some form, for some, it could be a big tummy, and some get swollen, and some gain weight and people would think that person is well or living well when it is not the case”. (Participant 014_Male)

Individual Differences: The participant recognises that individuals possess distinct characteristics, suggesting that their reactions to treatment can differ considerably. This is a fundamental concept in medicine known as pharmacogenomics (Aneesh et al., 2009).

Side Effects: The participant mentions specific side effects such as abdominal swelling ("big tummy"), oedema ("get swollen"), and weight gain. These side effects are frequently observed in several drugs, including ART (Pau & George, 2014).

Misinterpretation of Health Status: The participant highlights a prevalent fallacy that associates weight growth and physical fullness with unequivocal indicators of good health. These symptoms could potentially be adverse reactions to medicine and may not accurately indicate the individual's true state of health.

Perception vs Reality: A participant underscores the fact that outward appearances can be misleading. An individual's outward appearance of being "well or living well" may be attributed to the physiological effects of medication, although this may not always reflect their actual condition.

This observation highlights the significance of personalised medical care, comprehending potential adverse reactions, and refraining from making presumptions about an individual's well-being only based on their outward appearance. This highlights the intricacy of understanding and assessing health and wellbeing, especially when it comes to managing chronic diseases.

5.6.3 Normative referents

The normative referent questions, consisting of "approve," "disapprove," "most likely to adhere," and "least likely to approve," were employed to ascertain the salient subjective norm beliefs held by PLHIV. Subjective norms pertain to the individual's perception of the social pressure exerted upon them to engage in a specific behaviour.

Table 5.7: Results of the approve questions

Approve norm	Number	% per participant	Rank
Parents	10	52.63	1
Siblings	7	36.84	2
Partner	6	31.58	3
Friends	5	26.32	4
Children	2	10.53	5
Unspecified family members	2	10.53	5
Grandparents	1	5.26	7
Counsellor	1	5.26	7
Cannot say	1	5.26	7

The participants primarily identified various categories of family members (Table 5.7) as the individuals who would express approval of their adherence to HIV care and treatment, considering the potential consequences that their illness and mortality would impose on their families.

“They would be happy that I am taking the tablets at the same time all the time and that I will not be bedridden because once you get to that stage of being bedridden, many things cross everyone’s mind. There are cost implications as well because there will be a need to get cars to take me to the hospital” (Participant 014_Male)

The belief of "parents" was identified as the most prominent theme, as indicated by 10 out of the total number of responses, accounting for 52.63% of the participants. Additional sources of support included individuals such as siblings, partners, friends, children, grandparents, unspecified family members, and a counsellor.

A subset of the participants reported having relatives and acquaintances who were already undergoing ART and diligently following their HIV care and treatment. Consequently, these participants expressed the belief that their family members and friends would support their own adherence to HIV care and treatment.

“My husband would be happy because he is already taking them [ART], and I can see he is back to health again”. (Participant 019_Female).

“My mom at home because she has already started taking them [ART]. She has been telling me that I should go to the clinic”. (Participant 013_Male).

The aforementioned perspectives from various participants emphasise the impact of family members on the management of health issues, particularly in the context of ART for HIV treatment:

Positive Health Outcomes: Participant 019_Female witnessed a noticeable improvement in her husband's health subsequent to the administration of ART. This observation not only elicits satisfaction but also strengthens the efficacy of the treatment, potentially promoting compliance with the medication regimen.

Family Encouragement: The second participant (013_Male) recounts how their mother, who is also undergoing ART, motivates them to pursue medical treatment. This emphasises the significance of family in fostering health-seeking behaviours and the crucial role of support systems in treating chronic illnesses such as HIV.

These observations emphasise the crucial role that family plays in health management, encompassing emotional support and the ability to shape health-related habits. It underscores the need of healthcare providers taking into account patients' familial dynamics when formulating treatment regimens.

Table 5.8: Results of the disapprove questions

Disapprove norm	Number	% per participant	Rank
No one	6	31.58	1
Partner	3	15.79	2
Friends	2	10.53	3
Colleagues	2	10.53	3
Parent	1	5.26	5
Mistress	1	5.26	5
Sibling	1	5.26	5
Less educated about diseases	1	5.26	5

Most of the participants, specifically 31.58% (n=6), did not provide any salient referents when asked about their disapproval (Table 5.8). Based on the premise that individuals are inclined to mention individuals they feel compelled to whom they should conform, the results of the inquiries pertaining to approval and disapproval indicate that, on average, the respondents held favourable subjective norms regarding adherence to HIV care and treatment.

Table 5.9: Results of the likely to adhere questions

Likely to adhere norm	Number	% per participant	Rank
Those who want to live longer	11	57.89	1
Trustworthy people	5	26.32	2
Those with responsibilities	3	15.79	3
Those who believe that the medication will work	3	15.79	3
Females	2	10.53	6
Those able to make to the clinic	1	5.26	7
Unclassified	3	15.79	

When faced with uncertainty regarding the appropriate course of action, individuals often rely on observational learning by observing the behaviour of others and emulating their actions. The salient belief that emerged frequently in response to the question of which individuals are most likely to comply with HIV care and treatment as seen in Table 5.9 was "those who want to live longer" (57.89% per participant).

"I would say they are people who love life, who want to live again". (Participant 003_Female)

The participant's statement, in the context of observational learning, suggests that they are observing people who are undergoing a certain treatment or health intervention. There are two important observations:

Love for Life: The participant views these individuals as "people who love life," indicating that the observed individuals demonstrate a resilient desire to survive and an optimistic outlook on life.

Desire to Live Again: The phrase "who want to live again" suggests that the individuals being studied may have previously experienced a period of reduced quality of life or health, and because of the treatment, they now have a revitalised desire to fully engage in their lives.

This observation highlights the significant influence of observational learning in healthcare settings. Observing the favourable outcomes that others have had with a certain treatment might serve as a catalyst for individuals to comply with comparable health interventions, fostering inspiration and motivation. Furthermore, it underscores the significance of hope and a positive perspective in the process of recuperating and controlling one's health.

The list also included notable beliefs such as individuals perceived as trustworthy, individuals with responsibilities, individuals who hold the belief that the medication will be effective, individuals who identify as female, and individuals who can attend the clinic.

When asked to identify individuals who are least inclined to comply with HIV care and treatment, a salient belief that emerged was the association with alcohol consumption (as reported by 47.37% of participants seen in Table 5.10). This perception is based on the understanding that alcohol can impair cognitive abilities and influence behavioural choices.

“I think that would be a person that drinks, that takes alcohol, that is what I am thinking of because they would get drunk and forget to take their tablets at the set time” (Participant 019_Female).

Table 5.10: Results of the not likely to adhere questions

Not likely to adhere norm	Number	% per participant	Rank
Those who consume alcohol	9	47.37	1
Those not concerned about the future	3	15.79	2
Those experiencing side effects	2	10.53	3
Those who do not believe in medicine	2	10.53	3
Those that are afraid to take medicine in front of others	2	10.53	3
Those who do not believe that the tablets are working	2	10.53	3
Those not educated about the disease	2	10.53	3
Those who have not accepted their HIV status	1	5.26	8
Untrustworthy people	1	5.26	8
Males	1	5.26	8

The participant's statement offers valuable insight into a potential obstacle that may hinder adherence to HIV medication:

Alcohol Consumption: The participant recognises that persons who use alcohol may have a lower likelihood of adhering to their prescription regimen. This is because intoxication may result in cognitive impairment, leading individuals to inadvertently neglect their prescription at the designated intervals.

This observation emphasises the influence of lifestyle factors, such as consumption of alcoholic beverages on the adherence to medication. It emphasises the importance of healthcare providers considering these aspects when creating treatment strategies in order to ensure adherence among patients. Furthermore, it underscores the significance of educating patients about potential risks of consuming alcohol in relation to treatment adherence and overall health results.

The study also identified salient beliefs pertaining to the medication and its effects. These beliefs encompassed individuals who reported experiencing side effects, those who held scepticism towards the efficacy of medication, individuals who expressed fear or discomfort in taking medication in the presence of others, and those who doubted the effectiveness of the tablets.

Additionally, individuals who are unlikely to adhere to the prescribed guidelines include those who lack knowledge about the disease, individuals who have not come to terms with their HIV status, and individuals who are deemed untrustworthy. The category of "males" was also included in the list of individuals who are unlikely to adhere.

5.6.4 Control factors

The elicitation study yielded a number of prevalent responses to the open-ended inquiries regarding the factors that facilitate or hinder an individual's ability to manage their adherence to HIV care and treatment.

The two primary factors identified as facilitating adherence to HIV care and treatment are the ability to consistently remember to take prescribed medications and the commitment to attending scheduled clinic visits. The regular and consistent adherence to ART is crucial for its efficacy. It is imperative that ART is taken daily, preferably at a consistent time. Additionally, the monitoring of the disease's effect and impact on the individual necessitates regular assessments conducted by healthcare professionals at a healthcare facility.

According to Table 5.11, the enabling belief that exhibited the highest frequency was the practise of "setting daily reminders." A total of six responses were received, with each respondent accounting for 31.58% of the total. Subsequently, the participants indicated that "having other individuals to serve as reminders" was the most prevalent response, accounting for 26.32% of the total responses. The participants who indicated that establishing a daily reminder would facilitate their adherence to HIV care and treatment demonstrated a personal commitment to ensuring they remember to take their medication and attend clinic appointments. The participants who indicated

that relying on others to remind them to adhere to HIV care and treatment were essentially delegating the responsibility to external individuals.

Table 5.11: Results of the enabling control factors questions

Enabling control factors	Number	% per participant	Rank
Setting daily reminder	6	31.58	1
Having other people to remind me	5	26.32	2
Eliminating negative thoughts	5	26.32	2
Education on importance of adherence	4	21.05	4
Being at home at the time of taking medication	3	15.79	5
Having healthy food	2	10.53	6
Accepting HIV status	2	10.53	6
Unclassified	2	10.53	

Some participants expressed the belief that they could establish a personal reminder system and, if necessary, rely on others to remind them in the absence of an alarm. However, it was emphasised that the ultimate responsibility for remembering tasks or events rested with the individuals themselves, as illustrated in the following example.

“...it would be like setting the alarm if you have an alarm to get the tablets at the same time all the time and if you don’t have the alarm, get someone to set it for you and you get reminded. At the most, it is up to you to think for yourself because there are instances when there are no people at home, so you have to think for yourself.” (Participant 009_Female)

The participant's statement offers valuable insight into the 'enabling control factors' that support adherence to a rigorous HIV medication schedule. There are two crucial aspects to consider:

1. *Establishing a Routine [Setting a Reminder]*: The participant's setting of an alarm to consistently consume the tablets at a certain time each day exemplifies the element of control in establishing a routine. Consistent medication ingestion is essential for the efficacy of HIV treatment, and this practice enables it.

2. *Exercising Personal Agency*: The participant underscores the significance of self-reliance and individual accountability, particularly in the absence of external prompts. This emphasises the enabling control factor of personal agency, in which the individual assumes responsibility for managing their own health.

These observations emphasise the influential aspects that patients can utilise to enhance their adherence with their prescribed medication schedule, ultimately improving their health results. Furthermore, it underscores the need of healthcare practitioners in assisting patients in cultivating and sustaining these enabling control factors.

The two beliefs that received the lowest rankings were "maintaining a healthy diet" and "accepting one's HIV status," each of which were mentioned twice by participants, accounting for 10.53% of total responses. Two of the responses were not categorised.

Table 5.12: Results of the preventing control factors questions

Preventing control factors	Number	% per participant	Rank
Fear of taking treatment in front of others	6	31.58	1
Not accepting HIV status	6	31.58	1
Inability to reach clinic	5	26.32	3
Not having treatment at time to take the treatment when away of home	4	21.05	4
Nothing	4	21.05	4
Not having healthy food	2	10.53	6
Not having update on impact of treatment	1	5.26	7
Time consuming process to refill prescription at clinic	1	5.26	7
Unfriendly nurses	1	5.26	7

The responses obtained from the "preventing control factors" were not merely the opposite of those obtained from the "enabling control factors". As an example, six participants (31.58% per participant) indicated "fear of undergoing treatment in the presence of others," while five participants (26.32% per participant) mentioned "inability to access the clinic" as reasons for failure to comply. However, a certain level of correspondence was observed in the responses to the two questions, specifically

regarding HIV status (referred to as "accepting HIV status" in Table 5.10 and "not accepting HIV status" in Table 5.11) and access to healthy food (referred to as "having healthy food" in Table 5.10 and "not having healthy food" in Table 5.11).

Adherence to HIV care and treatment was also hindered by practical constraints, such as the inability to access the clinic and the time-consuming process of refilling prescriptions at the clinic. Other participants raised concerns about the lack of information regarding the progress of their treatment and the perceived unfriendliness of the nursing staff. Despite the fact that the "preventing control factors" questions were posed as the final set of open-ended questions in the interview, a relatively small proportion of participants (21.05%) did not provide any notable preventing control factors in their responses suggesting independence and confidence in their ability to adhere to their HIV care and treatment.

5.7 Identifying final set of modal salient beliefs

The objective of this elicitation study was to ascertain the modal salient behavioural, normative, and control beliefs associated with adherence to HIV care and treatment at an HIV clinic. This investigation focused on a sample of patients who had not yet commenced ART.

To identify the final set of salient beliefs within a research investigation, Ajzen and Fishbein (1980) as well as Herath (2010) proposed three guidelines to which to adhere. The regulations are outlined as follows:

1. Incorporate the ten to twelve beliefs that are most commonly referenced. According to Ajzen and Fishbein (1980), it is probable that this procedure would incorporate a subset of the beliefs articulated by the sampled respondents.
2. Incorporate those beliefs that surpass a specific threshold of occurrence. For instance, all beliefs that were cited by a minimum of 10% or 20% of the participants in the study.
3. Select a sufficient number of beliefs to explain a specific proportion (e.g., 75%) of all the beliefs mentioned.

Ajzen and Fishbein (1980) proposed that the third rule possesses a relatively lower degree of arbitrariness compared to the other rules. However, the authors did not provide further explanation or justification for this assertion. According to Francis et al. (2004) in their manual on developing questionnaires grounded in the TPB, the authors recommended adherence to the third rule, which entails incorporating 75% of all beliefs identified by participants in the elicitation study. This approach is deemed sufficient for achieving comprehensive representation of the belief population. The third rule, which has gained significant popularity among researchers (Epton et al., 2015; Spinks & Hamilton, 2015; Vayro & Hamilton, 2016), involves the application of a percentage criterion. This criterion entails identifying beliefs as modal if they are mentioned by a range of 20-30% of the sample. According to Vayro and Hamilton (2016), the inclusion of this number guarantees the incorporation of a diverse array of underlying beliefs in the primary investigation.

The inclusion of beliefs mentioned by a minimum number of participants in the first rule allows for a broader range of beliefs to be considered (Chatzisarantis & Hagger, 2005; Ungar et al., 2015; Rowe et al., 2016). Chatzisarantis and Hagger (2005) conducted a study in which they identified the three to five most frequently mentioned salient beliefs. Similarly, Ungar et al. (2015) and Rowe et al. (2016) included beliefs that were identified by at least three participants. Consequently, the current study employed the initial principle to identify the final set of salient beliefs held by PLWAH regarding adherence to HIV care and treatment.

Based on the established criterion of the top ten most commonly cited beliefs for rule one, a comprehensive set of 45 salient beliefs was identified. These beliefs encompassed 11 behavioural outcomes, 21 normative beliefs, and 13 beliefs related to perceived behavioural control. Table 5.13 displays the salient beliefs that were obtained for the final set of the TPB study.

Table 5.13: Final set of modal salient behavioural, normative and control beliefs

	Category	Belief
Behavioural outcome	Advantages	Live longer
		Boost immune system
		Prevents opportunistic diseases

	Category	Belief
		Healthier life
		Prevents virus from multiplying
		Know how you are responding to treatment
		Protects others from infection
		Get used to taking treatment
	Disadvantages	Lifelong commitment
		Side effects
		Stigma
Normative beliefs	Approve	Parents
		Siblings
		Partner
		Friends
		Children
		Grandparents
	Disapprove	Partner
		Friends
		Colleagues
	Disapprove	Parent
		Mistress
		Sibling
	Most likely to adhere	Those who want to live longer
		Trustworthy people
		Those with responsibilities
		Those who believe that the medication will work
		Females
		Those able to make to the clinic
Normative Beliefs	Least likely to adhere	Those who consume alcohol
		Those not concerned about the future
		Those experiencing side effects
		Those who do not believe in medicine
		Those that are afraid to take medicine in front of others
		Those who do not believe that the tablets are working
		Those not educated about the disease
		Those who have not accepted their HIV status
		Untrustworthy people
		Males
	Easier	Setting daily reminder

	Category	Belief
Power of control factors		Having other people to remind me
		Eliminating negative thoughts - negative people
		Education on importance of adherence
		Being at home at the time of taking medication
		Having healthy food
		Accepting HIV status
	Difficult	Fear of taking treatment in front of others
		Not accepting HIV status
		Inability to reach clinic
		Not having treatment at time to take the treatment when away of home
		Having healthy food
		Not having update on impact of treatment
		Time consuming process to refill prescription at clinic
		Unfriendly nurses

The elicitation study yielded modal salient beliefs, which were subsequently utilised to formulate the questions aimed at assessing the three predictor variables: behavioural outcomes, subjective norm, and perceived behavioural control. Francis et al. (2004) recommended that a minimum of three items be used to measure each predictor variable when constructing questionnaires based on the TPB. The authors proceeded to acknowledge the potential for the elicitation study to uncover a greater number of beliefs associated with each predictor variable. In the event that this occurs, they suggested the inclusion of a larger number of items in the questionnaire to comprehensively capture the range of behavioural outcomes, subjective norms, and perceived behavioural control. Moreover, these authors suggested that the inclusion of additional items is likely to enhance the validity of the study. However, the authors cautioned that the inclusion of additional items in the questionnaire necessitates careful consideration of factors such as questionnaire length. This is because an excessively long questionnaire may lead to participant fatigue and non-responses, ultimately compromising the representativeness of the sample and the quality of the data. However, given that the goal of this study was to develop and evaluate measures to objectively predict adherence to HIV care and treatment, all 45 items were included in the TPB questionnaire.

5.8 Conclusion

The aim of this study was to examine the understanding of adherence to HIV care and treatment, while also identifying the motivating factors that encourage recently initiated ART patients to comply with their treatment and clinic appointments. The identified factors manifested themselves through the salient beliefs of the patients. The research yielded a total of 226 beliefs that were successfully identified. A subset of 45 salient beliefs was obtained from the participants by employing a cutoff criterion of the ten most frequently mentioned beliefs. The primary objective of the elicitation study was to ascertain the factors involved, rather than evaluate their reliability, validity, or significance. The findings of this study were instrumental in the creation of the TPB questionnaire, as the data collected from the study were incorporated as variables in the construction of the questionnaire. The purpose of this questionnaire was to establish a basis for evaluating the efficacy of the TPB-based measure in predicting adherence to HIV care and treatment prior to initiating ART.

CHAPTER SIX

RESULTS OF THE QUANTITATIVE STUDY

6.1 Introduction

The main aim of this research was to create and assess measures that are grounded in the Theory of Planned Behavior (TPB) to accurately predict adherence to HIV care and treatment before commencing antiretroviral therapy (ART) in Eswatini. Additionally, this study also sought to thoroughly examine the effectiveness of the TPB-based measures in predicting adherence behaviour to HIV care and treatment prior to initiating ART. Furthermore, it aimed to determine the utility of the TPB in predicting adherence to HIV care and treatment, identify psychological factors that influence adherence to HIV care and treatment, and investigate the association between the TPB metrics of adherence and other clinical indicators such as clinic visits, pill counts, immunological data, and virological data.

A pilot study was conducted to explore preliminary findings and refine the methodology for the main study. The primary aim of the pilot study was to test the research methodology, including data collection procedures, participant recruitment strategies, and the validity of measurement tools which included participants' understanding of the questions in the questionnaire. It served as a formative assessment rather than a definitive exploration of the research questions. Therefore, while the pilot study provided valuable insights, it was not intended to generate conclusive results that would inform the final analysis.

The findings from the pilot study were not significantly different from those obtained in the main study. The pilot study indicated trends and patterns that were consistent with the larger dataset, reinforcing the validity of the research design. Given this alignment, including the pilot study results would not contribute additional value or new insights to the final report. Concentrating on the main study findings enhanced the rigor of the research and avoided potential confusion that could arise from presenting preliminary data that ultimately mirrored the primary outcomes. This approach allowed for a more streamlined presentation of the research questions and their respective answers.

A quantitative research design was implemented to carry out the investigation, in which a survey was administered to 152 participants and their responses were utilized for data analysis. A total of 210 individuals were eligible to be included in the study were approached, however, the eventual sample size was 152 participants which yielded a response rate of 72%. While Fowler (2002) argues that there is no universally accepted benchmark for acceptable response rates, Babbie (1990) suggested that a 50% response rate was sufficient. This perspective was further endorsed by Sataloff and Vontela (2021), who emphasized that response rates exceeding 50% are preferable in the context of social science research.

The data were obtained from responses by study participants to questions in a questionnaire and processed using the IBM Statistical Package for the Social Sciences (SPSS), Version 28 software application. The questionnaire was divided into three main sections, namely Outcome Evaluations (OE), Normative Beliefs (NB), and Power of Control Factors (PC), and subsequently statistical analysis was conducted on the data. These statistical analyses were based on responses to statements presented in sections 2-4 of this chapter, using a seven-point Likert scale where 1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neither agree and disagree, 5 = somewhat agree, 6 = agree and 7 = strongly agree. The data were carefully examined and cleaned to address any missing values. This step was crucial as a high proportion of missing data can introduce issues in the data analysis process, leading to biased estimates and increased standard errors (Dong & Peng, 2013). The final dataset used for analysis consisted of 152 respondents, with missing values accounting for less than 10% of the data, aligning with the guidelines proposed by Dong and Peng (2013).

6.2 Demographics of the respondents

Table 6.1 presents the demographic characteristics of the 152 participants, including their gender, age, disability status, level of education, relationship status, cohabitation with partners, number of children and adults in the family, employment status, and income levels.

Table 6.1: Demographics of the respondents

		n	%
Gender	Male	57	37,5
	Female	95	62,5
Age	18-24 years	26	17,1
	25 - 35 years	71	46,7
	36 - 45 years	40	26,3
	46 years and older	15	9,9
Disability	Yes	3	1,97
	No	149	98,03
Education	Primary	27	17,76
	Secondary	104	68,40
	College certificate or Diploma	13	8,55
	University degree	8	5,26
Marital/ Relationship status	Single (without any relationship)	17	11,2
	Single (but in a relationship)	100	65,8
	Married	32	21,1
	In a polygamous marriage	1	0,7
	Divorced	2	1,3
Living with partner	Yes	61	40,13
	No	90	59,21
Number of children living in the household	0	49	32,2
	1	33	21,7
	2	34	22,4
	3	20	13,2
	More than 3	16	10,5
Number of adults living in the household (excluding participant)	0	28	18,42
	1	60	39,47
	2	22	14,47
	3	24	15,79
	More than 3	18	11,84
		n	%
Employment status	Yes, full time	90	59,2
	Yes, part-time	23	15,1
	No, full-time student	5	3,3
	Unemployed	34	22,4
Income	Below E500 per month	30	19,7
	E501 to E1000 per month	27	17,8
	E1001 to E5000 per month	80	52,6
	E5001 to E10, 000 per month	13	8,6
	Above E10, 000 per month	1	0,7

The sample was predominantly comprised of females, with 62.5% (n=95) of participants being female and 37.5% (n=57) being male. This finding is consistent with other studies that suggests a greater probability of females undergoing HIV testing in

comparison to males (UNAIDS, 2019; NERCHA, 2019; Mills et al., 2012; Conserve et al., 2019; Jobson et al., 2019). The age group with the highest representation was the 25-35 years category, accounting for 46.7% of the sample (n=71). This was followed by the 36-45 years category with 26.3% (n=40), and the 18-24 years category with 17.1% (n=26). Out of the total participants, a significant majority of 98.0% (n=149) stated that they did not have any disability, however a small percentage of 1.97% (n=3) admitted to having a disability. In terms of relationship status, 65.8% (n=100) of the participants were in a non-marital relationship, 21.1% (n=32) were married, and one participant was in a polygamous marriage. Moreover, a significant proportion of participants (59.2%, n=90) did not live with their partners, whereas 40.13% (n=61) did. It is noteworthy that 72.36% of households, excluding the participants, had two adults or less. Regarding offspring, 32.2% (n=49) of the respondents were childless, while 44.10% had one or two children, and 23.70% had three or more children.

The participants' socio-economic position was assessed based on their highest levels of education, employment status, and income. Of the participants, 68.40% (n=104) had completed secondary education, 17.76% (n=27) had completed primary education, 8.55% (n=13) had obtained a college certificate or diploma, and 5.26% (n=8) had earned a university degree. Among these individuals, 59.2% (n=90) were employed on a full-time basis, 15.10% (n=23) were employed on a part-time basis, 22.4% (n=34) were unemployed, and 3.3% (n=5) were enrolled as full-time students. A majority of the participants (52.60%, n=80) had a monthly income ranging from E1 001 to E5 000¹. Additionally, a significant portion (19.70%, n=30) earned less than E500 per month while 17.80% (n=27) of individuals had a monthly income ranging from E501 to E1 000. Additionally, 8.60% (n=13) earned between E5 001 and E10 000 per month, while only one person earned above E10 000 per month. Out of the study participants, 61.9% were found to have an income above the poverty level of \$2.15 per day, as determined by The World Bank (2022). This amounts to a monthly income of E1,212.60. Thus, among the study participants, 38.1% were classified as living below the poverty line, with a monthly income of E1,000 or less.

¹ US\$1=R18.80=E18.80

6.3 Analysis of questionnaire data

This section provides an overview of the primary data gathered directly from the participants of the study. The data were collected through the use of the TPB questionnaire, which was developed and finalized after the qualitative phase was concluded.

6.3.1 Descriptive statistics

To mitigate the impact of response bias and ceiling effect, the questionnaire was designed using a mix of positively and negatively worded items. This suggests that in certain situations, high scores may imply a negative outcome. Research has shown that the use of negatively worded items in questionnaires can create cognitive challenges for participants. This leads to increased carefulness in completing the questionnaire, resulting in improved accuracy of the scale in measuring the intended characteristics and enhancing its effectiveness in measurement (Zeng et al., 2020).

Table 6.2 highlights the statements that were expressed in a positive manner, whereas Table 6.3 focuses on the statements that were expressed in a negative manner. The statistics were derived from responses to items using a seven-point Likert scale, where 1 represents strongly disagree and 7 represents strongly agree (see Appendix 6). There were 34 statements with positive wording, whereas 11 had negative wording. To ensure the face validity of the survey questionnaire, it was crucial to include negatively worded statements.

Table 6.2: Descriptive statistics of positively worded items

Variable		Mean	Median	Std. Deviation
Adhering to my HIV care and treatment will make me live longer	OE1	6.90	7.00	0.414
If I adhere to my HIV care and treatment my immune system will be boosted	OE2	6.70	7.00	0.783
Adhering to my HIV care and treatment will prevent me from getting opportunistic diseases	OE3	6.63	7.00	0.915
I will have a healthier life if I adhere to my HIV care and treatment	OE4	6.68	7.00	0.833

Variable		Mean	Median	Std. Deviation
Adhering to my HIV care and treatment will prevent the virus from multiplying in my body	OE5	6.72	7.00	0.752
If I adhere to my HIV care and treatment, I will know how I am responding to the treatment	OE6	6.50	7.00	1.166
If I adhere to my HIV care and treatment, I will protect others from becoming infected by me	OE7	6.97	7.00	0.200
I will get used to taking the treatment if I adhere to my HIV care and treatment	OE8	6.62	7.00	0.998
My parents would want me to adhere to my HIV care and treatment	NB1	5.90	7.00	1.904
My brothers and sisters would want me to adhere to my HIV care and treatment	NB2	6.17	7.00	1.671
My partner would approve of me adhering to my HIV care and treatment	NB3	5.75	7.00	1.978
My friends would want me to adhere to my HIV care and treatment	NB4	5.52	7.00	2.039
My children would approve of me adhering to my HIV care and treatment	NB5	6.18	7.00	1.527
My grandparents would want me to adhere to my HIV care and treatment	NB6	5.84	7.00	1.681
Those who want to live longer are likely to adhere to their HIV care and treatment	NB8	6.92	7.00	0.521
Trustworthy people are likely to adhere to their HIV care and treatment	NB9	6.93	7.00	0.523
People who have responsibilities are likely to adhere to their HIV care and treatment	NB10	6.91	7.00	0.474
People who believe that the treatment will work are likely to adhere to their HIV care and treatment	NB11	6.93	7.00	0.529
Females are likely to adhere to their HIV care and treatment	NB12	6.84	7.00	0.729
People who are able to make it to the clinic are likely to adhere to their HIV care and treatment	NB13	6.72	7.00	1.180
People who consume alcohol are less likely to adhere to their HIV care and treatment	NB14	6.93	7.00	0.588
If I set a daily reminder, it would make it easier for me to adhere to my HIV care and treatment	PC1	6.94	7.00	0.287
Having people close to me remind me to take my treatment would make it easier for me to adhere to my HIV care and treatment	PC2	6.37	7.00	1.602

Variable		Mean	Median	Std. Deviation
Eliminating negative thoughts would make it easier for me to adhere to my HIV care and treatment	PC3	6.56	7.00	1.254
Being educated on adherence would make it easier for me to adhere to my HIV care and treatment	PC4	6.88	7.00	0.766
Being at home at the time when I have to take my treatment would make it easier for me to adhere to my HIV care and treatment	PC5	6.90	7.00	0.411
If I had healthy food to eat it would be easier for me to adhere to my HIV care and treatment	PC6	6.75	7.00	1.044
Accepting my HIV status would make it easier for me to adhere to my HIV care and treatment	PC7	6.95	7.00	0.252
My fear of taking the treatment in the presence of others would make it difficult for me to adhere to my HIV care and treatment	PC8	6.50	7.00	1.535
If I am unable to get to the clinic, it would make it difficult for me to adhere to my HIV care and treatment	PC9	6.76	7.00	1.016
Not having my treatment with me at the time that I have to take it would make it difficult for me to adhere to my HIV care and treatment	PC10	6.98	7.00	0.140
If I am not given feedback / updates on how I am responding to the treatment, it will make it difficult for me to adhere to my HIV care and treatment	PC11	5.01	7.00	2.742
The time-consuming process of refilling prescriptions at the clinic would make it difficult for me to adhere to my HIV care and treatment	PC12	4.96	7.00	2.776
Unfriendly nurses at the clinic would make it difficult for me to adhere to my HIV care and treatment	PC13	5.79	7.00	2.326

Based on the positively worded statements in Table 6.2, most mean and median values fall between 5 and 7. This indicates that participants generally agreed with the statements. The highest six statements with a mean score higher than 6.90 were as follows:

OE7 – “If I adhere to my HIV care and treatment, I will protect others from becoming infected by me” (M = 6.97, SD = 0.200), followed by:

NB09 - "Trustworthy people are likely to adhere to their HIV care and treatment" (M = 6.93, SD = 0.523),

NB11 - "People who believe that the treatment will work are likely to adhere to their HIV care and treatment" (M = 6.93, SD = 0.529),

NB08 - "Those who want to live longer are likely to adhere to their HIV care and treatment" (M = 6.92, SD = 0.521).

The fourth highest variable was, NB10 - "People who have responsibilities are likely to adhere to their HIV care and treatment",

whereas the fifth highest variable was OE1 - "Adhering to my HIV care and treatment will make me live longer " (M = 6.90, SD = 0.414).

PC12 had the lowest mean score, indicating that "The time-consuming process of refilling prescriptions at the clinic would make it difficult for me to adhere to my HIV care and treatment" (M = 4.96, SD = 2.776).

This was followed by PC11 - "If I am not given feedback / updates on how I am responding to the treatment, it will make it difficult for me to adhere to my HIV care and treatment" (M = 5.01, SD = 2.742).

The other two lowest scores were NB4 - "My friends would want me to adhere to my HIV care and treatment" (M = 5.52, SD = 2.039), followed by

NB3 - "My partner would approve of me adhering to my HIV care and treatment" (M = 5.75, SD = 1.978).

Table 6.3: Descriptive statistics of negatively worded items

Variable		Mean	Median	Std. Deviation
Adhering to my HIV care and treatment will be difficult because it is a lifelong commitment	OE9	6.99	7.00	0.116
Adhering to my HIV care and treatment will give me side effects	OE10	6.11	7.00	1.656
There is stigma associated with adhering to HIV care and treatment	OE11	6.95	7.00	0.328
My colleagues would not approve of me adhering to my HIV care and treatment	NB7	5.49	7.00	2.055
People who are not concerned about their future are less likely to adhere to their HIV care and treatment	NB15	6.82	7.00	0.870
People experiencing side effects are less likely to adhere to their HIV care and treatment	NB16	6.87	7.00	0.734

Variable		Mean	Median	Std. Deviation
People who do not believe that the treatment will work are less likely to adhere to their HIV care and treatment	NB17	6.95	7.00	0.300
People who are afraid of taking the treatment in the presence of others are less likely to adhere to their HIV care and treatment	NB18	6.92	7.00	0.495
People who have not been educated about the disease are less likely to adhere to their HIV care and treatment	NB19	6.83	7.00	0.875
People who have not accepted their HIV status are less likely to adhere to their HIV care and treatment	NB20	6.89	7.00	0.729
Males are less likely to adhere to their HIV care and treatment	NB21	6.56	7.00	1.432

Upon examining the negatively worded statement presented in Table 6.3, it is evident that the respondents expressed a strong agreement with statement OE9, which states that "Adhering to my HIV care and treatment will be difficult because it is a lifelong commitment." The mean (M) of 6.99 and standard deviation (SD) of 0.116 at a 95% confidence interval suggest that most participants were in agreement that adhering to HIV therapy is challenging due to its lifelong nature.

Another statement that the respondents highly agreed with, which was written negatively, was NB17: "People who do not believe that the treatment will work are less likely to adhere to their HIV care and treatment". The mean was 6.95 and the standard deviation was 0.300.

Another statement was OE11, "Adhering to my HIV care and treatment will give me side effects". The mean was 6.95 and the standard deviation was 0.328.

These responses reflect the attitudes and thoughts of the participants towards HIV treatment and care. They indicate that in this particular sample, accepting one's HIV status and being prepared contribute to better adherence to treatment and care. While there may be lower means, they nonetheless rank high on the seven-point Likert scale and demonstrate a degree of agreement (albeit modest) with the statement. Notably, respondents in category NB7, when it comes to normative beliefs, indicate that they

still perceive the workplace as unfriendly towards individuals with HIV. This is shown in the mean score of 5.49 (SD = 2.055).

In this study, the questionnaire included questions regarding participants' social networks, which, while generally pertinent to understanding social dynamics, were not relevant to all participants. For example, individuals who did not have a partner or grandparents may have found these questions less applicable, potentially leading to disengagement or incomplete responses. However, this limitation did not significantly impact the study results in this case, as the analysis focused on broader trends rather than individual responses. The inclusion of social network questions served to enrich the dataset, allowing for nuanced insights into the varying experiences of participants without undermining the overall findings. Moreover, the diverse range of responses provided valuable context for interpreting the data, highlighting the complexity of social interactions and their potential influence on the study's primary variables. Thus, while the relevance of certain questions varied among participants, it ultimately did not detract from the robustness of the study's conclusions.

6.3.2 Relative importance index

The Relative Importance Index (RII) was utilised to rank the variables in this investigation. The RII is a highly valuable and dependable statistical technique used to assess the significance of various variables within a given dataset (Johnson & Lebreton, 2004). The calculation involves assigning weights to each variable based on their respective contributions to the total variance of the data. According to Johnson and Lebreton (2004), when a variable is allocated a larger weight, it is deemed to be more significant in explaining the variation in the data. This technique is very valuable in surveys, such as Likert scale surveys, where participants evaluate factors. It offers valuable information, particularly when there is a substantial number of variables, as observed in this study. The study employed the RII to assess the significance of the 45 statements in the questionnaire about beliefs related to adherence and non-adherence to HIV care and treatment.

The relative importance index (RII) was analysed using the following equation (Johnson & Lebreton, 2004):

$$RII = \left(\frac{7n_7 + 6n_6 + 5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{A * N} \right) * 100$$

where n_7 = number of participants for strongly agree.... n_1 is the number of the participants for strongly disagree. A is the highest number which is 7 and the N is the total number of the participants, which is 152 in this study.

Ninety-five percent of the survey participants reached a consensus on the highest level of relevance for 12 statements (Table 6.4). These views were considered significant determinants in the impact of beliefs on adherence and non-adherence with HIV care and treatment. Most of these assertions were linked to the ideas of subjective norms. This encompassed six items that captured participants' perceptions of the opinions of significant individuals in their lives regarding their adherence or non-adherence to HIV care and treatment. Notably, the participants showed the highest agreement with subjective norm statements (NB) that emphasised individuals who are likely to comply with HIV care and treatment.

Table 6.4: Highest RII Score

Item	RII (95% and higher)	Rank
PC33	99.2	1
NB20	99.1	2
NB22	99.0	3
NB19	98.9	4
NB21	98.8	5
OE7	98.5	6
NB23	97.7	7
OE1	96.7	8
NB24	96.1	9
OE4	95.5	10
OE5	95.4	11
OE2	95.1	12

These individuals include trustworthy individuals, those who have a desire to live longer, those who have responsibilities, those who believe in the effectiveness of the

treatment, females, and those who can attend clinic appointments. The participants' focus was more on these characteristics rather than the opinions of influential individuals in their lives regarding the behaviour. This suggests that certain individuals who play significant roles in the lives of the participants may not have a favourable perception of their commitment to HIV care and treatment.

The second most prominent cluster of statements (consisting of 5 items) pertained to the participants' attitudes on adherence to HIV care and treatment. The attitude (OE) statements primarily addressed the positive consequences of following HIV care treatment, including “live longer”, “boost immune system”, “healthier life”, “prevent virus from multiplying” and “protect others from infection”.

In contrast, the RII revealed that 14 statements were deemed unimportant by the participants in terms of their impact on adherence or non-adherence to HIV care and treatment (Table 6.5). These statements were phrased negatively, indicating that the respondents disagreed with their content. A majority of these statements pertained to subjective norm beliefs, focusing on individuals who were least likely to adhere to HIV care and treatment, such as those who consumed alcohol, were unconcerned about the future, experienced side effects, did not believe in the efficacy of treatment, were afraid of taking medication in front of others, were not educated about the disease, did not accept their HIV status, and were male.

Table 6.5: Lowest RII Score

Item	RII (less than 30%)	Rank
PC42	14.6	32
NB28	15.0	33
NB25	15.3	34
NB29	15.4	35
NB31	15.8	36
OE9	15.9	37
NB27	16.2	38
NB30	16.7	39
NB26	16.8	40
PC41	17.8	41
OE11	18.4	42
NB32	20.6	43
PC40	21.4	44
OE10	27.1	45

These statements offer valuable insights into the factors that influence adherence to care and treatment, highlighting the role of observational learning and modelling, whereby individuals observe and emulate the behaviour of others. The fact that these statements were deemed unimportant suggests that the participants did not view these factors as significant barriers to adherence. This could indicate that the participants either did not personally experience these factors or did not perceive them as influential in their own adherence behaviours.

6.3.3 Analysis of patients' clinic data

This section provides an overview of the secondary data obtained from the patients' clinic records, including information on clinic visits, pill count, remaining pills, and pill adherence.

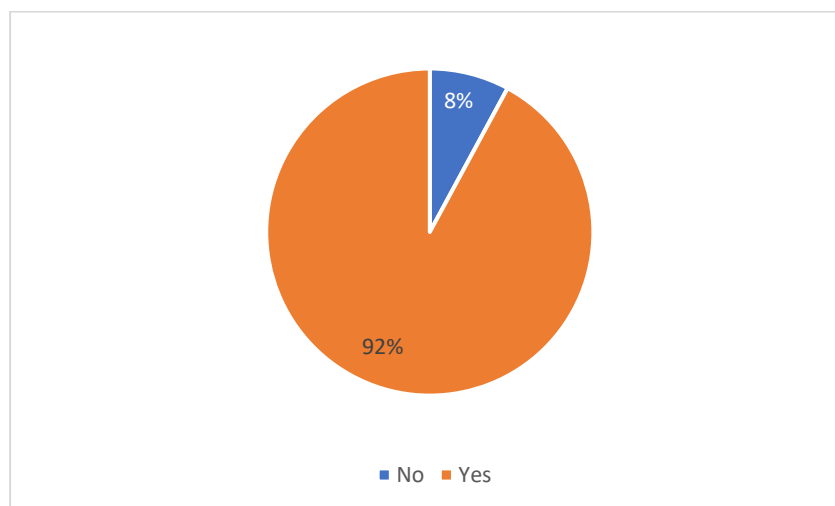
Before the onset of the COVID-19 pandemic, patients attending the HIV clinic followed a treatment plan that involved visiting the clinic every month for medical examinations and to obtain refills of their medications. The duration of the treatment plan was extended from 30 days to 90 days due to the implementation of movement restrictions aimed at mitigating the spread of the coronavirus. The 90-day treatment plan included

an additional three days to accommodate patients who were unable to visit the clinic on the 90th day, for any reason. This extended the treatment plan to a total of 90+3 days. Patients who visited the clinic on the 90th day or later, but during the following 3 days, were deemed to have adhered to the treatment plan.

6.3.3.1 Clinical visit adherence

The findings below provide insights into the compliance of individuals with the scheduled quarterly clinic visit within a specific timeframe.

Figure 6.1: Quarterly clinic visit date honoured (90+3 days after last visit)

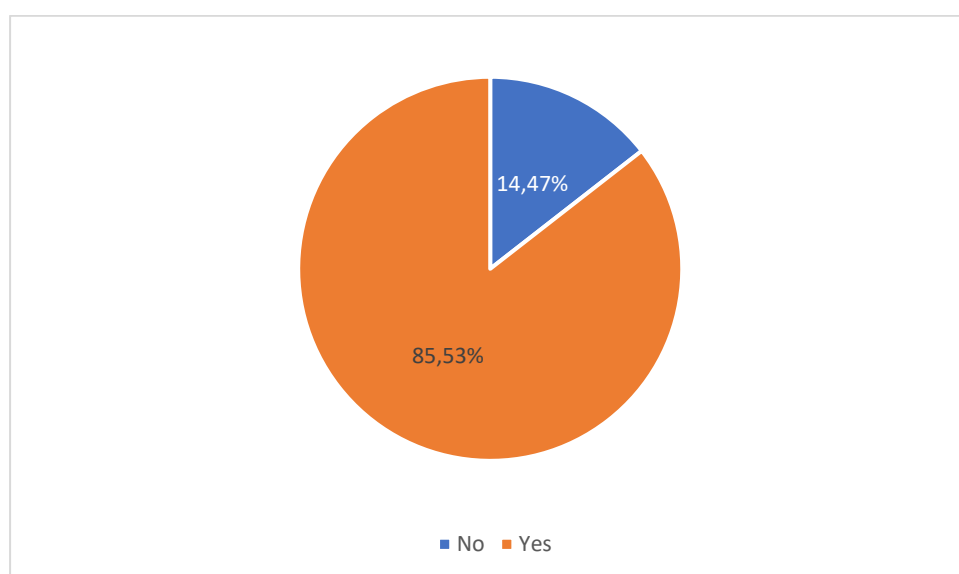


The data presented in Figure 6.1 indicates that 92.11% (n=140) of the participants complied with the quarterly clinic visit schedule within 90+3 days after their prior visit. This high compliance rate suggests that most individuals recognized the importance of regular clinic visits and made a conscious effort to adhere to the scheduled appointments. Conversely, a small proportion of participants, specifically 7.89% (n=12) did not comply with the designated dates and failed to visit the clinic within the specified timeframe. It is worth noting that this non-compliance rate, although relatively low, still represents a group of individuals who may be missing out on the potential benefits of regular check-ups. These individuals may be at a higher risk of undetected health issues or delayed treatment, which could have negative consequences for their overall well-being.

6.3.3.2 Pill usage

The determination of pill usage was based on the assessment of the quarterly precise count of pills taken (90+3 tablets), which meant that the number of pills consumed by the patient was recorded accurately every three months; the quantity of pills left out of 90+3, to identify if the patient was missing doses or not taking the medication as prescribed; and the adherence to the pill regimen on a quarterly basis.

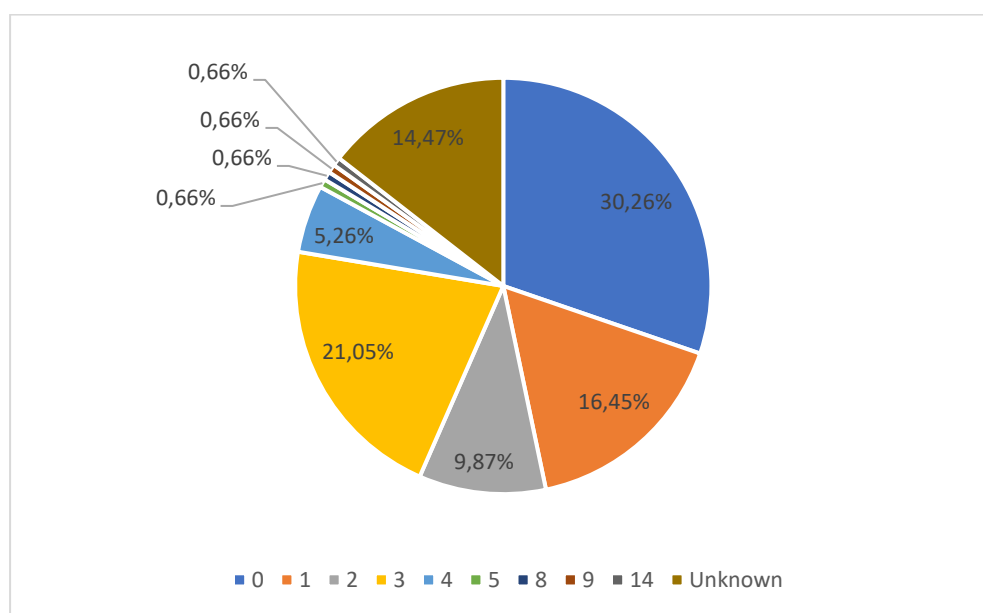
Figure 6.2: Quarterly accurate pill count recorded (90+3 tablets)



The patient's subsequent clinic session, during which they presented the pill bottle, served as the foundation for ascertaining the quantity of tablets consumed by the patient. If the participants returned on day 93, the number of pills would be zero. Alternatively, if they returned on the 90th day, there would be a surplus of three tablets. According to Figure 6.2, 85.53% of the participants, which is equivalent to 130 persons, had an accurate record of the number of pills they had consumed during the quarter. This means that these patients presented their pill bottle during their planned visit, irrespective of whether they had actually taken the recommended medication for the entire quarter as instructed. However, a total of 14.47% of the participants, specifically 22 individuals, were unable to provide an accurate pill count due to their failure to return with the pill container. Consequently, it was not possible to conduct a pill count for these participants.

According to the data presented in Figure 6.3, a considerable proportion of patients had exhausted their pill supply before their clinic appointment. Specifically, 30.26% of patients (n=46) had completely depleted all of their prescribed medications, while 16.45% (n=25) had only one pill remaining, 9.9% (n=15) had two pills remaining, and 21.11% (n=32) had three pills remaining. Analysing the range of zero to three tablets, it becomes evident that 77.71% of patients had a pill count that aligned with the expected quantity.

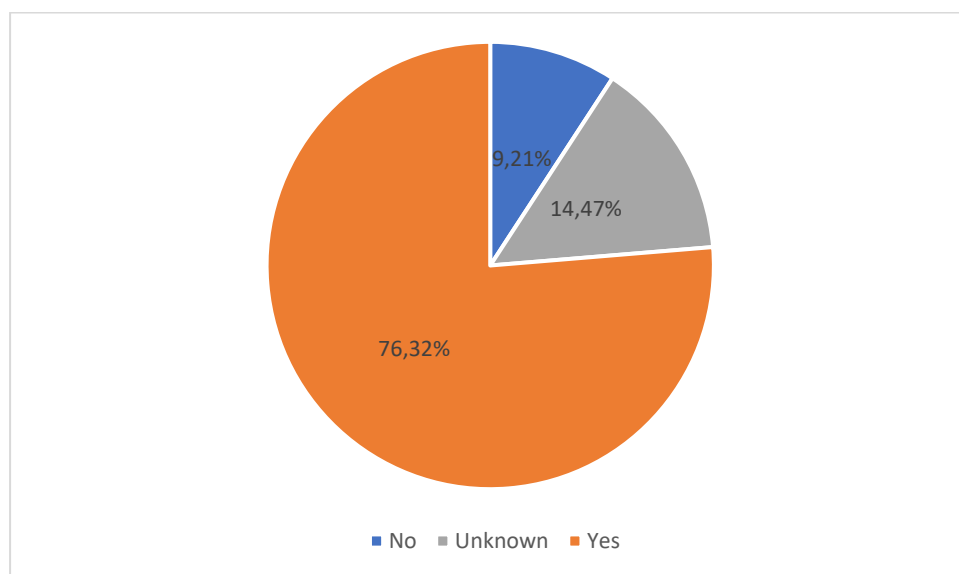
Figure 6.3: Number of pills remaining from the 90+3 supplied



This suggests that most patients were able to adhere to their prescription schedule throughout the quarter, as indicated by the number of tablets they returned to the clinic. The data reveals a positive outcome, indicating that a significant number of patients are following the prescribed medication regimen and demonstrating a strong commitment to maintaining their health. However, it is worth noting that 8.1% of individuals possessed an excessive number of medications for their scheduled clinic visit, surpassing the appropriate quantity. This implies that these participants did not fully comply with the specified treatment regimen. Furthermore, a total of 14.5% of participants failed to bring their pill bottles from their previous clinic appointment, resulting in their lack of knowledge regarding the number of pills they had consumed. This suggests that there are individuals who may not have a complete understanding of the importance of keeping track of their medication intake.

Based on the analysis of pill count and the number of pills remaining, it was determined that most of the study participants, precisely 76.32% (n=116) of participants, were deemed to be compliant with their quarterly pill prescription (Figure 6.4). This is a positive finding as it indicates that the majority of patients were taking their medication as prescribed, which is essential for the effective management of the disease. However, the study also identified a concerning 14.47% (n=22) of patients who were non-compliant with their quarterly pill regimen.

Figure 6.4: Quarterly pill adherence



Non-adherence to medication can have serious consequences, including treatment failure, disease progression and ultimately mortality. Among the total number of participants, 9.21% (n=14) were classified as unknown due to the inability to verify their pill usage. This was attributed to their failure to bring their pill bottle during the clinic visit. This highlights the importance of patient education and communication to ensure that patients understand the importance of bringing their medication to their clinic visits. It also underscores the need for healthcare providers to have alternative methods of verifying medication adherence.

6.3.3.3 Understanding participants' adherence to HIV care and treatment

The study aimed to provide a contextual understanding of the participants' adherence to HIV treatment, specifically in relation to their pill usage. This was predicated on the premise that a pill audit was undertaken, and the quantity of remaining pills was ascertained, leading to a determination of whether the patient has complied with their prescribed pill regimen or not. To achieve this objective, a three-way cross tabulation was performed, analysing the relationship between the participants' pill count, the number of pills remaining, and their overall adherence to treatment. This relationship was looked at in terms of whether the participants honoured their scheduled quarterly clinic visit or not. This statistical analysis allowed researchers to examine patterns and trends within the data, providing valuable insights into the participants' adherence behaviours. Based on the analysis conducted, it became apparent that out of the 152 individuals who took part in the study, 140 individuals demonstrated adherence to clinic visits, whereas 12 participants did not comply with the scheduled visits.

Table 6.6 indicates the 12 individuals involved in the study who failed to comply with their scheduled quarterly appointments, which necessitated their return to the clinic after a period of 90+3 days for a medical examination and to refill their prescriptions. Out of these twelve participants, two returned with their pill bottles for a pill count to be carried out, while the remaining ten did not bring back their pill bottles.

Table 6.6: Three-way cross tabulation of pill count, number of pills remaining and pill adherence for patients who did not honour quarterly clinic visit date

Number of pills remaining out of 90+3	Pill Count		Pill Adherence		Total
			No	Unknown	
0	Pill Count	Yes	2		2
	Total		2		2
Unknown	Pill Count	No		10	10
	Total			10	10
Total	Pill Count	No	0	10	10
		Yes	2	0	2
	Total		2	10	12

Regardless of whether the participants returned for a pill count or not, both groups of non-compliant participants were classified as overall non-adherent. This classification was based on the understanding that they would have exhausted their prescribed medication within the 90+3-day period, regardless of whether they took it as prescribed or not. This highlights the importance of regular follow-up appointments and medication refills to ensure continuous and effective treatment.

Table 6.7 presents a diverse range of intriguing findings obtained from the three-way cross tabulation conducted among the 140 study participants who honoured their scheduled clinic visits. The table is categorised into three main divisions: high adherence, low adherence, and unknown adherence. Based on the table, it is evident that 116 individuals can be categorised as very compliant with their HIV care and treatment. Out of the 116 participants, all of them had an exact count of pills during their visit to the clinic. The number of pills they had left ranged from 0 to 3. This count was based on the interval of 90 days plus an additional 3 days for the clinic appointment. This indicates that these participants consistently followed their prescribed medication regimen.

Table 6.7: Three-way cross tabulation of pill count, number of pills remaining and pill adherence for patients who honoured quarterly clinic visit date

Number of pills remaining out of 90+3	Pill Count		Pill Adherence			Total
			No	Unknown	Yes	
0	Pill Count	Yes			44	44
	Total				44	44
1	Pill Count	Yes			25	25
	Total				25	25
2	Pill Count	Yes			15	15
	Total				15	15
3	Pill Count	Yes			32	32
	Total				32	32
4	Pill Count	Yes	8			8
	Total		8			8
5	Pill Count	Yes	1			1
	Total		1			1
8	Pill Count	Yes	1			1
	Total		1			1
9	Pill Count	Yes	1			1
	Total		1			1
14	Pill Count	Yes	1			1
	Total		1			1

Number of pills remaining out of 90+3	Pill Count		Pill Adherence			Total
			No	Unknown	Yes	
Unknown	Pill Count	No		12		12
	Total			12		12
Total	Pill Count	No	0	12	0	12
		Yes	12	0	116	128
	Total		12	12	116	140
a. Clinic visit = Yes						

On the other hand, a total of 12 participants exhibited low adherence and displayed greater variability in their pill consumption. This is evident from the varying number of pills remaining, ranging from 4 to 14. Such inconsistent pill usage highlights a significant lack of adherence to their HIV treatment, irrespective of the quantity of pills left. This inconsistent pill usage not only indicates a lack of adherence but also raises concerns about the effectiveness of their HIV treatment.

Equally concerning is the fact that 12 individuals neglected to return their pill bottles, rendering it unfeasible to perform a pill count and determine their compliance with the recommended medication. Without performing a pill count, it is impossible to precisely ascertain whether these individuals are complying with their medication regimen. The absence of accountability not only hinders the assessment of their compliance but also gives rise to concerns over the possible abuse or inadequate storage of the drug.

Collectively, the participants' irregular pill use and their inability to bring back pill containers underscore a notable deficiency in adherence. Their failure to follow their HIV treatment schedule poses serious risks to their health and well-being, since it undermines the efficacy of the medication and increases the likelihood of disease progression. It is essential to focus on and enhance compliance among these patients to guarantee the efficacy of their treatment for HIV and subsequently enhance their overall health results.

6.3.3.4 The association of socio-economic factors to pills usage

The Chi-square test of association is used to determine the presence of a statistically significant relationship between two categorical variables (McHugh, 2013). Chi-square tests are frequently used as nonparametric tests that do not conform to the assumptions of parametric tests, specifically the assumption of a normal distribution. If the observed data and predicted data are exactly the same in the context of these tests, the resulting Chi-square value will be 0. On the other hand, if there is a greater difference between the observed and expected data, the Chi-square value will be higher (McHugh, 2013). In Sub-Saharan Africa socioeconomic factors such as education, employment and income have been reported as major barriers to adherence to ART (Peltzer & Pengpid, 2013; Mfinanga & Chawene, 2017; Moomba & Van Wyk, 2019). The study examined the relationship between socio-economic factors, which serve as the independent variable, and clinic adherence, pill usage, CD4 count, and viral load, which are the dependent variables to determine whether socioeconomic factors had an impact on adherence ART in this specific study. Chi-Square Test of Association (X^2) was used to determine the presence of a statistically significant association between socioeconomic factors and health outcomes by comparing observed and expected data. The Chi square test uses the equation:

$$X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

A p-value quantifies the likelihood of obtaining the observed outcomes, with a lower p-value indicating a higher level of statistical significance for the observed discrepancy (McHugh, 2013). A p-value equal to or less than 0.05 is commonly regarded as statistically significant. To assess the strength of the relationship for components that are statistically significant, Cramer's V test (ϕ) was used. A weak degree of association is indicated by ϕ values less than 0.30 (McHugh, 2013).

According to the data presented in Table 6.8, there is no substantial evidence to indicate a statistically significant relationship between socioeconomic factors and clinic adherence, pill usage, and HIV monitoring data. In other words, the absence of

correlation indicates that the participants' adherence to the ART programme was not affected by these socio-economic factors. The lack of a statistically significant association suggests that factors such as income, education level, employment status, and living conditions did not exert a substantial influence on the participants' adherence to the ART plan. This implies that factors beyond socio-economic status exerted a more significant influence in determining their adherence.

Table 6.8: Chi-square analysis for association between socio-economic factors, pill usage, clinic adherence, and HIV monitoring data

	Socio-economic factors					
	Education		Employment		Income	
	x ²	p-value	x ²	p-value	x ²	p-value
Clinic visit	0.970	0.914	3.254	0.354	1.374	0.927
Pill count	2.275	0.685	1.435	0.697	1.184	0.946
Pill remaining	40.978	0.261	18.988	0.870	26.871	0.985
Pill adherence	5.703	0.680	2.888	0.823	2.805	0.986
Viral load	170.049	0.278	114.643	0.621	215.132	0.220

It should be emphasised that the absence of a correlation does not indicate that socio-economic determinants have no relevance to clinic adherence, pill usage, and HIV monitoring. Other studies have shown that socio-economic factors can certainly exert an influence on these outcomes (Chindedza et al., 2013; Reda & Biadgilign, 2012; Coetzee et al., 2011). Nevertheless, within the specific context of this study and the data provided in Table 6.8, there was an absence of a distinct correlation between socioeconomic factors and the participants' adherence with the ART programme.

These findings have implications for healthcare providers and policymakers who are involved in HIV/AIDS treatment and prevention. They propose that programmes targeting improvement of clinic adherence and pill usage should not exclusively prioritise the resolution of socio-economic disparities. Alternatively, a more holistic strategy that considers additional variables, such as patient education, social support, and healthcare system factors may be required to enhance treatment success.

6.3.4 HIV monitoring data

The CD4 count and viral load, which are vital indicators for monitoring individuals living with HIV, are displayed in Table 6.9 and Table 6.10, respectively. The tables provide valuable insights regarding the immunological state and response to ART in the participants. Through the analysis of CD4 count and viral load measurements over a period of time, healthcare providers can detect patterns and trends that reveal the efficacy of ART and the overall immune response. This information enables informed decision-making in the management of HIV in patients.

Table 6.9 displays the results of the initial assessment of the CD4 count in 152 individuals participating in the study. Among the group of participants, a total of 142 individuals were subjected to testing. The results showed that the average CD4 count was 318, with a standard deviation of 255.5. Additionally, the median CD4 count was also found to be 318. Looking at the percentiles, among this cohort, 25% of the individuals exhibited a CD4 count equal to or exceeding 471.5. It is noteworthy that the CD4 count in question fell below the recommended range of 500 – 1500 cells / mm³ (Battistini Garcia & Guzman, 2022).

Following a 12-month period in the ART programme, a second evaluation of the CD4 count was performed. The purpose of this subsequent evaluation was to determine the effect of ART on the immunological status of the participants. The findings demonstrated a notable improvement in the CD4 count of the individuals, with an average of 528 cells / mm³ (standard deviation = 267.1). It is important to mention that the CD4 count was only measured in 19 individuals during the follow-up, although 142 patients were tested during the first assessment.

Table 6.9: CD4 count at baseline and after 12 months

		CD4 count baseline. (cells / mm ³)	CD4 count after 12 months. (cells / mm ³)
Number of participants (N)	Valid	142	19
	Missing data	10	133
Mean		351,54	528,11
Median		318	460,00
Std. Deviation		255,466	267,063
Minimum		0	202
Maximum		1721	1079
Percentiles	25	181	281,00
	50	318	460,00
	75	471,5	746,00

The decline in CD4 count testing can be ascribed to modifications in the disease management protocol in the country. As per the guidelines provided by the World Health Organization (WHO) (2013), the CD4 count is primarily assessed to determine the patient's immunological status prior to starting the ART programme. After treatment is started, the viral load becomes the primary measure for assessing the treatment's success. Consequently, the emphasis transitions from monitoring the CD4 count to monitoring the levels of viral load.

In summary, the results of the initial evaluation of the CD4 count in 152 patients indicated that a considerable proportion of the patients had a CD4 count that fell below the recommended threshold range. Nevertheless, following a 12-month period in the ART programme, the subsequent evaluation demonstrated a relative improvement in the CD4 count of the patients.

At the onset of the study, 89 individuals were subjected to an initial assessment of viral load. After a period of 12 months, the total number of persons who underwent testing increased to 107. Unfortunately, the remaining data on viral load were unavailable for analysis because it was not in the participants' clinic files at the time of data collection.

Nevertheless, the existing findings as seen in Table 6.10 suggest a notable decline in the mean viral load throughout the 12-month duration. The initial average viral load was quantified at M = 60.45 HIV-RNA copies/mL. Following the conclusion of the 12-month duration, the average subsequently declined to 50.84 HIV-RNA copies/mL. This indicates that, on average, the amount of virus in the body decreased by approximately 9.61 HIV-RNA copies/mL resulting in an estimated 16% decline. The study was unable to determine the proportion of participants who achieved viral suppression due to the limited availability of paired viral load data, thus constituting a limitation of the study.

Furthermore, the study revealed a decrease in the maximum detected viral load. Initially, the highest level of viral load observed was 804 HIV-RNA copies/mL. However, over a period of 12 months, the highest recorded result declined to 570 HIV-RNA copies/mL. This signifies a decrease of 234 HIV-RNA copies/mL in the highest viral load observed.

Table 6.10: Viral load at baseline and after 12 months

		Viral load at baseline HIV-RNA copies / mL	Viral load after 12 months HIV-RNA copies / mL
N	Valid	89	
	Missing	63	
Mean		60,45	50,84
Median		30,00	30,00
Std. Deviation		142,145	88,125
Minimum		0	0
Maximum		804	570
Percentiles	25	6,00	
	50	30,00	
	75	30,00	

The results indicate that the ART treatment had a beneficial effect on decreasing the viral load in the studied patients.

The Wilcoxon signed rank test was performed to compare the paired samples (Coleman, 2018). This study utilised the Wilcoxon signed rank test to examine the initial CD4 count and viral load, and to compare them with the data obtained after 12 months in the ART programme. Through the utilisation of the Wilcoxon signed rank test, the researchers were able to ascertain whether there existed a significant difference between the baseline measurements and the data taken after 12 months of ART. The test considers the paired nature of the data, which is crucial in this study as it compares each participant's initial measures with their own measurements after 12 months. The Wilcoxon signed rank test was assessed by means of the following equation:

$$W = \sum_{i=1}^{N_r} \text{sgn}(x_{2,i} - x_{1,i}) * R_i$$

where W is the test statistics, N_r is the sample size, excluding pairs where $x_1 = x_2$, sgn is the sgn function with $x_{1,i}$, $x_{2,i}$ corresponding rank pairs from two distributions and R_i is rank i . The outcomes of the Wilcoxon test are displayed in Table 6.11 below.

Table 6.11: Wilcoxon signed rank test for immunological data at baseline and after 12 months

			N	Mean Rank	Sum of Ranks	Z	p-value
Clinic visit Adherence	CD4 after - CD4 baseline	Negative Ranks	0	0	0	-3,621	<,001
		Positive Ranks	17	9	153		
		Ties	1				
		Total	18				
	Viral load after - Viral load baseline	Negative Ranks	31	29,42	912	-0,857	0,392
		Positive Ranks	33	35,39	1168		
		Ties	13				
		Total	77				
Pill count	CD4 after - CD4 baseline	Negative Ranks	0	0	0	-3,621	<,001
		Positive Ranks	17	9	153		
		Ties	0				
		Total	17				
		Negative Ranks	30	28,3	849	-,895	0,371
		Positive Ranks	32	34,5	1104		

			N	Mean Rank	Sum of Ranks	Z	p-value
	Viral load after - Viral load baseline	Ties	11				
		Total	73				
Pill adherence	CD4 after - CD4 baseline	Negative Ranks	0	0	0	-3,296	<,001
		Positive Ranks	14	7,5	105		
		Ties	0				
		Total	14				
	Viral load after - Viral load baseline	Negative Ranks	25	25,06	626,5	-1,204	0,229
		Positive Ranks	30	30,45	913,5		
		Ties	9				
		Total	64				

The assessment of the CD4 (CD4 after - CD4 baseline) reveals a statistically significant difference with a z-score of -3.621, indicating a p-value of less than .001. The results are mostly influenced by the positive sign rank, indicating that the CD4 count after the clinic visit was greater than the CD4 count at baseline. Similar trends can be observed in relation to the pill count ($z = -3.261$, $p < .001$) and adherence to pill regimen ($z = -3.296$, $p < .001$). This suggests the possibility of a progressive improvement in the CD4 count over a period of time. It is imperative to recognise that these findings should be approached with caution due to the limited before and after data available. Given the small sample size of only 19 observations for the CD4 count, the findings may not provide an accurate representation of the characteristics of the entire population.

The assessment of the viral load in this study indicated no statistically significant difference between the initial test and the one conducted after 12 months. This was applicable to all individuals, even those who routinely attended clinic visits and adhered to their prescription medication, as demonstrated in Table 6.11. The clinic visit data was subjected to statistical analysis, which yielded a z-score of -0.859 and a p-value of 0.392. These results indicate that there is no statistically significant difference. The z-score for pill count was -0.895, indicating a lack of significant difference, as supported by the p-value of 0.371. Similarly, the z-score for pill adherence was -1.0224, with a p-value of 0.229, which suggests that there is no statistically significant difference.

6.4 Conclusion

The participants in this study were selected based on their initiation of ART on the same day as their interview, which took place subsequent to obtaining a confirmed positive HIV test outcome. The commencement of this medication was in line with the 2015 WHO Test and Treat Guidelines, which advocate for the prompt initiation of ART upon diagnosis.

In summary, the study revealed the intricate relationship between individuals' perceptions about social norms, their attitudes, and their perceived ability to control their behaviour in influencing their adherence to HIV care and treatment. Although the viewpoints of influential individuals in the participants' life held significance, the participants' personal views and attitudes regarding adherence were discovered to have a greater impact. This indicates the necessity for treatments and support systems that prioritise empowering individuals to assume responsibility for their own adherence and overcome any obstacles they encounter. Furthermore, the results underscore the significance of education and understanding of HIV and its treatment in influencing attitudes towards adherence.

Throughout a 12-month duration, these patients were observed, with HIV monitoring data, including CD4 count and viral load, being documented at the start of the study and again at the end of the 12-month period. The objective of this monitoring was to determine adherence to HIV care and treatment. According to Shoko and Chikobvu (2019), previous findings indicate that patients who consistently adhere to their ART regimen and are not experiencing additional challenges can achieve viral suppression within a period of six months after initiating treatment. Viral suppression is commonly described as maintaining a viral load below 200 copies/mL. However, to be deemed durably suppressed, patients must consistently maintain a viral load that cannot be detected for an additional period of six months.

Considering the length of this study, it was anticipated that, by strictly following the prescribed treatment, the vast majority, if not all, of the patients would have an undetectable viral load. Nevertheless, the viral load tests conducted at the 12-month

milestone did not validate this anticipation. Although the patients claimed substantial pill usage, their virus load remained detectable. This disparity indicates the possibility of either treatment failure or incorrect administration of the antiretroviral therapy (UNAIDS, 2016). Some patients may have participated in a behaviour called "pill dumping" before their planned visits (Population Council et al., 2004). This study evaluated medication adherence by using self-report or subjective verification of pill usage. Nevertheless, depending exclusively on self-reporting may result in an inflated perception or inaccurate indication of adherence, as demonstrated by the findings of this study. Hence, it is crucial to contemplate other approaches for evaluating adherence in order to acquire more precise data.

CHAPTER SEVEN

INTEGRATION OF RESULTS AND DEVELOPMENT OF THE MANAGEMENT FRAMEWORK FOR HIV/AIDS CARE AND TREATMENT

7.1 Introduction

This chapter discusses the findings of the study and the development of the management framework for predicting adherence to HIV/AIDS care and treatment, which is guided by the Theory of Planned Behavior (TPB). The study consisted of two parts, with the first phase being an elicitation study. This phase aimed to gather qualitative data to uncover the attitudes, subjective norms, and perceived behavioural control beliefs of people living with HIV (PLHIV) towards adherence to HIV care and treatment. The findings obtained from the elicitation study were utilised to construct the TPB questionnaire, which was subsequently administered to participants in the second phase of the study that consisted of gathering quantitative data for the main study. The finalised TPB questionnaire was administered to the primary study sample consisting of 152 participants. This sample of 152 participants constituted a cohort of patients who were monitored for a duration of 12 months to collect information regarding their compliance with HIV care and treatment. The quantitative data obtained from the TPB questionnaire, along with the qualitative data from the elicitation study, were analysed to understand the full insights of their adherence to (antiretroviral therapy) ART.

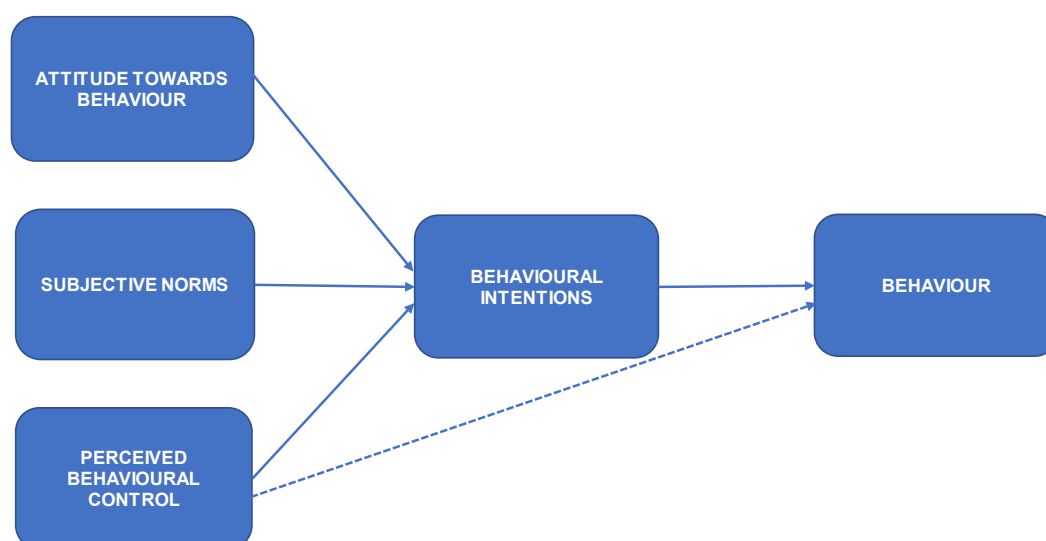
This chapter outlines the process of triangulating the findings derived from both qualitative and quantitative data. Subsequently, suggested extensions are made to the original TPB model based on the insights and findings obtained from the current study.

7.2 Original Theory of Planned Behavior Model as the basis of the study

The study was based on Ajzen's Theory of Planned Behavior (TPB) (Ajzen, 1988; Ajzen, 1991; Ajzen, 2006), which is a predictive model for intentional behaviours. The TPB consists of three components: attitude towards behaviour, subjective norms, and perceived behavioural control (refer to Figure 7.1). The TPB model is adaptable and

relevant to various behavioural circumstances, although its use in medication adherence is limited (Holmes et al., 2014).

Figure 7.5: The Theory of Planned Behavior (Ajzen, 1991)



An elicitation study was conducted within the TPB framework to collect qualitative data. Questions were used to assess predictor variables, and through data analysis, 226 behavioural, normative, and control beliefs were identified. These beliefs are crucial for influencing behaviour in the context of adherence to HIV care and treatment.

To summarise, the qualitative findings from the elicitation study showed that participants understood the advantages of HIV treatment. These advantages included protecting others, boosting their health, and increasing their CD4 count. The PLHIV participating in the study may need lifestyle changes to maintain a lifelong commitment to ART. Participants believed the treatment's advantages outweighed its disadvantages.

The elicitation study showed that normative referents like close family can influence HIV treatment adherence. This behaviour is usually supported by normative referents, but not always. The results of the current study are consistent with the research conducted by Vissman et al. (2013), which also highlighted the limited support provided by social environments for PLHIV. This implies that the social networks surrounding PLHIV may not effectively encourage adherence to ART. However, it is

important to note a key distinction between the current study and the research conducted by Vissman et al. (2013). In the current study, the data were collected prior to the initiation of ART, whereas Vissman et al. (2013) focused on individuals who were already receiving ART. This difference in timing suggests that some individuals who were newly diagnosed with HIV already anticipated a lack of support from their social circles even before starting treatment. This finding shed light on the potential challenges faced by PLHIV, particularly during the early stages of their diagnosis. It suggests that some individuals may already have concerns about the level of support they will receive from their social networks, which could impact their willingness to adhere to ART.

The study revealed the traits of PLHIV whom PLHIV thought were more likely to follow HIV therapy. Dependability, responsibility, modest alcohol use, and progressiveness were considered features of these people. Internal control factors including reminders and accepting HIV status were found to be the biggest influences on HIV treatment adherence. However, logistical and financial barriers, patient issues, sickness issues, treatment issues, healthcare system issues, and patient-provider relationship concerns were outside barriers. Data from the elicitation study were included as variables in the TPB questionnaire, hence its results were crucial.

Multiple noteworthy findings were identified from the TPB questionnaire data after the quantitative data were analysed. According to the study, attitudes, subjective norms, and perceived behaviour control are associated with HIV care and medication adherence. Despite influence from others, participants' opinions and attitudes about adherence had a relatively stronger impact. The results of a research study carried out by Nutor et al. (2020) in Zambia among HIV-positive pregnant and breastfeeding women, utilizing the TPB, corroborate the notion that attitude towards ART was closely linked to adherence intention. It is worth noting that the study in Zambia focused on women who were already receiving ART, while the current study was conducted prior to ART initiation. This distinction is important as it highlights the potential impact of pre-existing attitudes towards ART on adherence intention. This underscores the importance of addressing attitudes towards ART in promoting adherence. Therefore, treatment and support systems must encourage patients to take responsibility for their

adherence and overcome hurdles. Likewise, HIV education and treatment information also influenced adherence.

Data such as CD4 count and viral load were assessed at the start and end of the 12-month research to monitor HIV treatment adherence. Shoko and Chikobvu (2019) reported that those who follow their ART protocol and endure no additional challenges can achieve viral suppression in six months. By following the recommended course of treatment, most patients should have had undetectable viral levels by the end of the study, given its duration. After 12 months, viral load tests did not confirm this expectation. Despite frequent pill use, viral load remained high. Treatment ineffectiveness or incorrect administration of ART may explain this discrepancy (UNAIDS, 2016). Self-report or subjective pill usage verification assessed medication adherence in this study. As evident in this study, self-reporting alone may increase adherence perceptions. Therefore, different methods are needed to obtain more accurate adherence statistics.

In this study, it became evident that there are established and widely utilised methods for assessing adherence to HIV care and treatment. These protocols involve the use of clinical data to evaluate the outcomes. This implies that by doing so, the efficacy and practicality of the TPB model may be improved as well as its impact on adherence to HIV care and treatment. This is achieved by combining self-assessment through monitoring pill usage with objective assessment using clinical data such as viral load and CD4 count. By analysing clinical data and employing the three distinct categories for measuring HIV viral load as defined by the World Health Organisation (2023) - unsuppressed (>1000 copies/mL), suppressed (detected but ≤ 1000 copies/mL), and undetectable (viral load not detected by the test used) - it is possible to ascertain an individual's adherence to HIV care and treatment protocols. This diverges from the perception-based outcomes that one would typically obtain when employing the original TPB model.

The study found no statistically significant relationship between socioeconomic factors (education, employment, income) and clinic adherence, pill usage, and HIV monitoring data. This discovery is noteworthy given the substantial data in literature that emphasises the adverse effects of socioeconomic conditions (Chindedza et al., 2013;

Reda & Biadgilign, 2012; Coetzee et al., 2011; Saal & Kagge, 2012). This study indicates that variables other than education level, employment status, and income have greater influence on adherence to ART among PLHIV. There are various possible explanations for this intriguing result, including the location of the HIV clinic in the central business district of Manzini, Eswatini, which provides easy access to transportation facilities. Additionally, the Eswatini government has implemented psychoeducation interventions with the goal of ending AIDS by 2030 (NERCHA, 2018a). While these factors may contribute to the findings, it is important not to overlook the broader developmental challenges and socioeconomic factors, such as high unemployment rates and significant poverty levels prevalent in developing nations such as Eswatini. These factors may also influence the predictive variables associated with adherence to HIV care and treatment.

These factors are not accounted for in the original TPB model. Incorporating clinical data and considering developmental challenges and socioeconomic factors can improve the TPB model's capacity to evaluate adherence to HIV care and treatment. This enhanced methodology offers a more all-encompassing comprehension of the factors that impact adherence and can guide targeted interventions to enhance outcomes in HIV care and treatment.

To effectively address the issue of adherence to HIV care and treatment in developing countries such as Eswatini, it is crucial to update or extend the TPB model in its current form. The TPB model, which focuses on the relationship between attitudes, subjective norms, perceived behavioural control, and behavioural intentions, may not fully capture the complexities and unique challenges associated with adherence to HIV care and treatment in these contexts. To address this limitation, this research proposes extensions to the existing TPB model by broadening its scope beyond observable behaviour. While the TPB model primarily focuses on predicting and explaining behavioural intentions, it fails to consider the objective assessment of the observed behaviour itself. In the context of adherence to HIV treatment, it is essential to evaluate the efficacy of the observed behaviour in order to understand the factors that contribute to successful adherence.

Such extensions to the TPB are provided in more detail later in this chapter.

7.3 Integration of qualitative and quantitative results

The study is based on the TPB, which identifies predictor variables or constructs associated with three types of beliefs: attitudes, subjective norms, and perceived behavioural control. The synthesis of the qualitative and quantitative results is in accordance with the three predictor variables. These predictor variables were widely utilised in health behavioural research to successfully predict and explain various health behaviours (White et al., 2010; Jing et al., 2009; Chang, 2013; Norman, 2011; Tickner et al., 2010; McMillan et al., 2009; McMillan & Conner, 2003). The effectiveness of the TPB's attitudes, subjective norms, and perceived behavioural control in predicting behavioural intentions and behaviour was supported by the results of empirical studies (Doll & Ajzen, 1992; Armitage & Talibudeen, 2010), as well as a meta-analysis conducted by Armitage and Conner (2001).

7.3.1 Attitudes

Attitudes, as defined by the TPB, pertain to an individual's evaluation of a target behaviour in terms of its positivity or negativity (Ajzen & Fishbein, 1980). An individual's evaluation of behaviour is determined by two interactive components: behavioural beliefs, which are beliefs about the consequences of the behaviour, and outcome evaluations, which are the corresponding positive or negative evaluations of those beliefs (Francis et al., 2004). The perception of a person's motivation to engage in a specific behaviour is crucial in the context of HIV. This is because the individual's beliefs about the outcomes of adhering to HIV care and treatment (behavioural beliefs) and their corresponding positive or negative evaluation of these outcomes (outcome evaluations) combine to form an overall positive or negative attitude towards adhering to HIV care and treatment.

During the emergence of HIV/AIDS in the 1980s, it was widely recognised that being HIV positive carried a social stigma (Kontomanolis et al., 2017). Moreover, being HIV positive was almost a terminal condition due to the absence of treatment for the disease. Nevertheless, advancements in scientific research have facilitated the progress of HIV care and treatment, granting those diagnosed with HIV the opportunity

to make a deliberate decision. This decision has potential outcomes, both favourable and unfavourable, depending on their adherence to HIV care and treatment.

The adherence to HIV care and treatment has been associated with the efficacy of ART in significantly reducing the morbidity and mortality due to HIV/AIDS, while enhancing the health outcomes of PLHIV (Chammartin et al., 2018). In the field of HIV, the results of the elicitation study conducted in the initial phase of this research indicate that the beliefs regarding the behavioural outcomes of adhering to HIV care and treatment can be categorised into three groups: medical (related to the medication and its effects on the HIV-infected individual), social (pertaining to the infected individual's life in general and their interactions with others), and societal (beliefs regarding the broader impact on society as a whole).

From a medical perspective, following HIV care and treatment enables healthcare providers and patients to assess the patient's response to treatment and prevent the replication of the HIV virus, resulting in viral suppression. This in turn enhances the immune system's ability to combat opportunistic diseases and ultimately enhances the quality of life for the infected individual. The medical beliefs about behavioural outcomes that emerged from the elicitation study conducted with recently diagnosed HIV patients prior to starting the ART programme were consistent with scientific research. These studies have demonstrated that patients who maintain an adherence rate of 95% or higher can effectively suppress the viral load to undetectable levels, enhance the immune system by increasing the CD-4 cell count, and ultimately enhance the quality of life for people living with HIV (Kato et al., 2014; Shoko & Chikobvu, 2019; Eisinger et al., 2019).

The medical behavioural outcome beliefs are directly associated with the social behavioural outcome beliefs. Enhanced adherence to HIV care and treatment leads to increased quality of life for PLHIV, resulting in positive social behavioural outcomes.

The findings of the current study indicate that the majority of PLHIV have the conviction that they may safeguard others from contracting the virus, and that their own quality of life will be enhanced by viral suppression and higher CD4 count, leading to a longer and healthier life. Studies have demonstrated that closely following a highly

active antiretroviral therapy (HAART) regimen can result in a substantial decrease in illness and death rates (Danel et al., 2015; Palella et al., 1998; Paterson et al., 2000). Due to decreased morbidity and mortality, PLHIV can lead lives that closely resemble normalcy. Women can conceive and, with the help of prevention of mother-to-child transmission (hereafter referred to as PMTCT) measures, give birth to babies who are free from HIV. The PLHIV are now able to plan for their future without the looming threat of imminent death, and parents can live long enough to raise their children.

The social behavioural outcome beliefs are directly linked to the societal behavioural outcomes. A decrease in morbidity and mortality rates was associated with the life expectancy of PLHIV. Teeraananchai et al. (2017, p. 256) stated that “Life expectancy is a key indicator used to assess mortality trends and is also a surrogate for the overall health status of a population.” The World Health Organization (WHO) and other developmental organisations utilise life expectancy as a metric to track changes in healthcare over time (WHO, 2014). It serves as a crucial indication that guides decision-making in policies regarding PLHIV. The meta-analysis conducted by Teeraananchai et al. (2017) indicated that the life expectancy of PLHIV has increased over time after initiating ART. This is further supported by the findings of a cohort study conducted by Trickey et al. (2022), which compared PLHIV who started ART at different time periods since 1996. The study found that PLHIV on long-term ART with high CD4 cell counts had life expectancies similar to those of the general population, regardless of when they initiated ART. The enhanced life expectancy of PLHIV leads to a decrease in the number of orphans affected by AIDS in a society.

While following HIV care and treatment has proven to yield positive behavioural outcomes, the current study revealed some attitudes that were associated with negative behavioural outcomes. To obtain advantages from ART, individuals afflicted with HIV/AIDS must receive continuous and ongoing care and treatment, as there is presently no cure for HIV infection. Thus, PLHIV may perceive lifelong commitment as onerous due to the need to adjust their lifestyles and integrate HIV care and treatment into their daily routines, which entails following medication schedules and attending regular clinic appointments. To combat the global AIDS epidemic, certain countries, such as Eswatini, have implemented strategies to offer ART at no cost at public healthcare institutions. This has been made possible by donor funding and by giving

priority to HIV/AIDS treatment. While the administration of ART may not necessitate payment, there is still a financial cost linked to accessing healthcare facilities for HIV care and treatment (Azia et al. 2016).

In addition to the enduring commitment, individuals identified as HIV positive also face societal stigma, which is perceived as an obstacle to the successful implementation of HIV prevention and treatment initiatives. The study highlighted HIV/AIDS-related stigma as a negative consequence of behaviour and belief, which has been associated with low utilisation and inadequate adherence to HIV/AIDS prevention, care, and treatment services (Mahajan et al., 2008). The fear of being stigmatised may lead individuals to avoid disclosing their HIV status, which can result in non-adherence to medicine in order to prevent others from discovering their sickness (Sayles et al., 2006). Research conducted in Africa (Weiser et al., 2003; Nachega et al., 2006) and Asia (Kumarasamy et al., 2005) has demonstrated the detrimental impact of stigma on the ability of individuals to remain in HIV care and adhere to treatment.

Like any other medication, ART can cause side effects that may result in significant negative outcomes. These adverse events have the potential to reduce patient adherence if individuals see them as uncontrollable or unmanageable (Chesney et al., 2000). Consistent with prior research (Kvarnström et al., 2021; Azia et al. 2016; Krueger et al., 2005), the study participants identified side effects as a negative consequence of their beliefs and behaviours.

The individual's attitude towards a behaviour significantly influences their intention to engage in that behaviour. If the person has a positive appraisal of the behaviour, they are more inclined to actually carry out the behaviour.

7.3.2 Subjective norms

Subjective norms, as defined by the TPB, refer to beliefs about different social referents that collectively exert social pressure to engage in a particular behaviour (Ajzen, 2012). These pertain to an individual's perception of the opinions held by important individuals in their lives regarding their execution or lack thereof of a particular behaviour. Perceived social pressure can be categorised at three levels:

immediate, community, and governmental/structural. The immediate level refers to the influence exerted by close friends and family members. The community level encompasses the societal norms and expectations that impact an individual's behaviour. Lastly, the governmental/structural level pertains to the pressure exerted by governments and policies such as the adoption of the WHO (2015) "test and treat" recommendations (Chauke et al., 2020; Mugavero et al., 2012).

The study's findings indicate that the immediate social pressure is comprised of the family unit, which encompasses parents, partners, children, siblings, grandparents, and friends. Although most of these normative referents endorse the behaviour's execution, a few respondents expressed that the immediate normative referents would disapprove of their adherence behavioural action. Multiple studies have established a connection between decreased adherence and unfavourable social interactions, lack of engagement from family and friends, social isolation, and solitary living, all of which were identified as risk factors (Kissinger et al., 1995; Mehta et al., 1997). Kissinger et al. (1995) hypothesised that HIV infection could lead to social isolation, which in turn may increase the likelihood of non-compliance among PLHIV. However, a study conducted by Singh et al. (1996) found no significant relationship between higher perceived social support and adherence. This means that the perception of normative referents on the behaviour's performance did not influence the adherence of PLHIV to HIV care and treatment.

When individuals are uncertain about how to behave, they often seek guidance from community members who serve as role models for that behaviour. Examining the social pressure perceived at the community level, this study discovered that PLHIV mostly focused on the specific individuals in their communities who were more or less inclined to follow HIV care and treatment. Those individuals within the communities, who were considered influential in determining whether to engage in a particular behaviour or not, possessed notable attributes such as trustworthiness, accountability, alcohol dependency, and concern for the future, among other qualities.

Although this study did not address the impact of governmental or structural influences, existing evidence indicates that these also contribute to the perceived social pressure to engage or abstain from certain behaviours. For instance, in societies

such as in Eswatini, individuals are tested for HIV and promptly initiated on treatment as per the recommendation of the “test and treat” initiative (WHO, 2015), which is being implemented by governments worldwide. The PLHIV may interpret this as the government's expectation for them to strictly follow their HIV care and treatment. Another illustration is the PMTCT programme. In South Africa, the guidelines for preventing the transmission of communicable diseases from mother to child specify that every pregnant woman should be provided with an HIV test during her initial antenatal care visit. If the test result is positive, the mother is promptly started on ART to prevent transmission to the foetus (South African National Department of Health, 2019). Although the PMTCT programme is technically optional, it is effectively compulsory due to the strong desire of parents to avoid having a child infected with the illness.

Subjective norms play a crucial role in shaping behavioural intentions. They are influenced by an individual's beliefs about how important people in their life expect them to behave, as well as the positive or negative judgement associated with conforming to those expectations. These factors ultimately determine whether the individual intends to engage in the behaviour or not.

7.3.3 Perceived behavioural control

Perceived behavioural control, defined as the level of ease or difficulty in carrying out one's intentions (Ajzen, 1988; Ajzen, 1991; Ajzen, 2006), plays a crucial role, particularly in developing countries characterised by (1) limited resources and inadequate healthcare systems or infrastructure, and (2) high levels of poverty and unemployment. In such contexts, PLHIV may face barriers in accessing necessary treatment, even if they have the intention to adhere to HIV care and treatment.

Within this study, the factors that were believed to facilitate the execution of the behaviour were predominantly internal, meaning they were under the control of the individual, rather than external, that is, outside the individual's control. The controllable factors for the individual encompassed establishing daily reminders, eradicating negative thoughts, embracing their HIV status, and ensuring accessibility to medication at home throughout medication consumption. Hence, it is crucial that

PLHIV are provided with the necessary knowledge and abilities to engage in the desired behaviour.

However, providing PLHIV with the necessary information and skills to engage in the desired behaviour will not have a significant impact if the external obstacles to treatment, which are predominantly prevalent in developing nations, are not effectively addressed. The administration and delivery of healthcare often involves physical barriers that hinder adherence to care and treatment. These barriers encompass factors such as the frequency of clinic visits, the distance to the treatment facility, the processes within the clinic, the lack of transportation options, the associated costs of accessing healthcare facilities and purchasing medication, the absence of childcare at home, the presence of severe illness, the unavailability of a primary care physician at the healthcare facility, and concerns regarding confidentiality (Kissinger et al., 1995; Mehta et al., 1997; Lucas et al., 1999; Ickovics & Meade, 2002; Weiser et al., 2003).

The results of the current study were consistent with the existing body of research on external factors that hinder adherence to HIV care and treatment. Despite the respondents' strong intention to adhere, challenges such as limited access to the clinic, time-consuming prescription refills, and unsupportive nursing staff posed significant barriers to adherence. Furthermore, the respondents also identified food requirements as an additional perceived barrier, in addition to the external considerations already described. Adopting a healthy diet is crucial for individuals diagnosed with HIV in order to maintain a healthy lifestyle (Airhihenbuwa & Ogregon, 2000). In underdeveloped nations characterised by widespread unemployment and pervasive poverty, obtaining nutritious meals may pose a challenge.

The construct of perceived behavioural control is significant as it examines the gap between intention and behaviour and recognises that having a positive intention to engage in an activity does not guarantee that the behaviour will be carried out due to inhibitory variables.

The findings of the study have demonstrated that adherence to HIV care and treatment cannot be analysed in isolation from the socioeconomic factors faced by developing countries, as they significantly impact individuals' ability to adhere to treatment

regimens. Factors such as poverty, limited access to healthcare services, stigma, and discrimination can all influence adherence behaviours. By integrating these variables into the revised model, a more comprehensive understanding of adherence to HIV care and treatment can be achieved. Ultimately, it is crucial to update the TPB model within the specific context of adherence to HIV care and treatment in developing countries. This study suggests an extension to the current model by expanding its scope beyond observable behaviours, incorporating an objective method to evaluate the efficacy of the observed behaviours, and integrating factors that are specific to the socioeconomic challenges encountered by developing countries. By adopting this approach, it is possible to attain a more comprehensive and accurate understanding of adherence to HIV care and treatment. This, in turn, can result in the development of more efficient interventions and strategies aimed at enhancing adherence rates in these particular contexts.

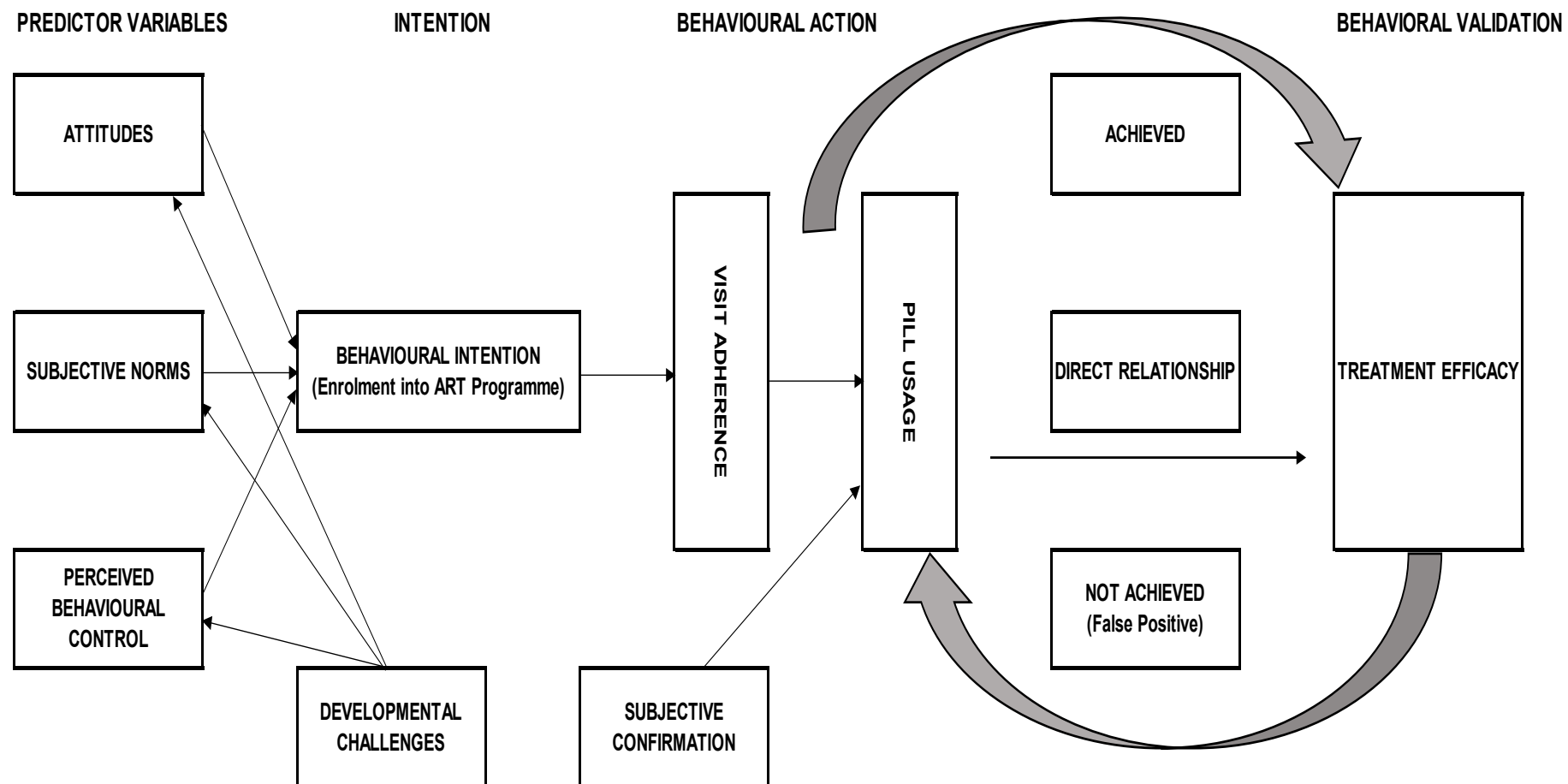
7.4 Development of the Management Framework for predicting adherence to HIV/AIDS care and treatment

The revised and adapted conceptual TPB model, as depicted in Figure 7.2, is presented below. This updated version incorporates improvements and extensions to the initial model, making it highly suitable for implementation in developing nations. The enhancements aim to address specific challenges and considerations that are unique to these contexts. It recognizes the importance of understanding the specific context in which the model will be applied and tailoring it accordingly. By doing so, the model becomes more relevant and effective in guiding behaviour change interventions in developing nations. However, before implementing the refined TPB model in different contexts, it is crucial to conduct rigorous testing such as structural equation modelling to ensure its applicability and effectiveness. This testing should involve diverse populations and settings to assess the model's robustness and generalizability. By conducting such tests, researchers and practitioners can gain insights into the model's strengths and limitations, as well as identify any necessary modifications or adaptations.

Figure 7.2 illustrates the conceptual model that was developed from analysis of the study data. Jaakkola (2020) defined a conceptual model as a theoretical framework

that predicts correlations between concepts by revealing previously unidentified relationships between constructs. The current study has developed a conceptual model for predicting and managing adherence to HIV care and treatment. This model builds upon the original TPB model developed by Ajzen (1991) by incorporating four important additions: (1) an enhanced behavioural intention (2) developmental challenges driven by socio-economic factors (3) subjective confirmation regarding the behavioural action, and (4) behavioural validation of the behavioural action. The next sections offer a thorough analysis of these innovative constructs, including their correlation with the original constructs of the TPB.

Figure 7.2: Proposed Management Framework for HIV/AIDS Care and Treatment Driven by TPB (adapted from Ajzen, 1991)

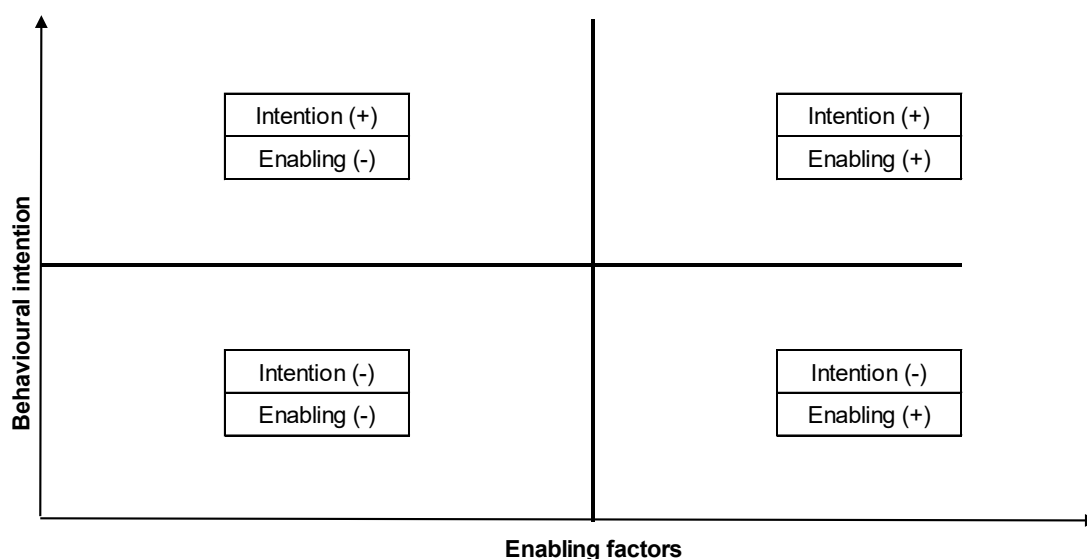


7.4.1 Behavioural intention

Understanding the predictor variables of attitudes, subjective norms, and perceived behavioural control in the context of HIV care and treatment could facilitate the understanding of the intention to perform a behaviour. Behavioural intention, as defined in the TPB, refers to an individual's inclination or preparedness to engage in a specific action or conduct (Ajzen, 2006). Behavioural intention, as defined by Ajzen (1991), serves as the direct precursor to behaviour. It is determined by one's attitude towards the behaviour, subjective norm, and perceived behavioural control. Once one understands the intention, predicting the behaviour becomes very straightforward.

The relationship between behavioural intention and actual behaviour is not absolute and linear, as demonstrated in Figure 7.3

Figure 7.3: Behavioural intention matrix (Figure generated by the researcher).



An optimal situation would involve a positive intention to perform the behaviour and positive enabling factors that allow for the behaviour to be executed. However, in an imperfect world, alternative scenarios may arise. Firstly, there might be a positive intention to perform the behaviour, however, there are inhibiting factors that make it difficult to perform the behaviour. For instance, the individual may lack access to healthcare facilities. Secondly, there might be a negative intention to perform the behaviour but enabling factors are present. This could involve easy access to

healthcare facilities, strong social support, and a clear understanding of the consequences and societal judgements associated with the behaviour. Despite these advantages, the individual still chooses not to engage in the behaviour. Lastly, there could be a negative intention to perform the behaviour, coupled with inhibiting factors that prevent its execution. For example, the individual may lack interest in ART, and there may be no available ART programme.

The composite attitude towards the behaviour is denoted as AD_j and can be calculated in a similar manner with other studies for composite index (Worku, 2019):

$$AD_j = \frac{\sum_{i=1}^n IT_{ij}}{n}$$

where IT_i is the value of indicators ($IT_1, IT_2, \dots, IT_n$) that determines the attitude from the observations of the respondents within a setting j . For the subjective norm, SN_j :

$$SN_j = \frac{\sum_{i=1}^n ST_{ij}}{n}$$

where ST_i is the value of indicators ($ST_1, ST_2, \dots, ST_n$) which is the perception of how the individual believes is expected of them by key people in their lives.

For perceived behavioural control, BP_j :

$$BP_j = \frac{\sum_{i=1}^n PT_{ij}}{n}$$

where PT_i is the value of indicators ($PT_1, PT_2, \dots, PT_n$) which is the ease or difficulty in performing the behaviour. The composite score can be used to understand the levels of a predictor behaviour that can influence the behavioural intention. A regression analysis can be conducted to understand the how and if the three predictor variables influence the behavioural intention:

$$OBI_j = \alpha + \beta_1 AD_j + \beta_2 SN_j + \beta_3 BP_j + \varepsilon$$

where α is the constant, β_1, β_2 and β_3 are coefficients of the predictor variables and ε is the error term.

The behavioural intention (BI) is contingent upon the scores of the attitude (A), subjective norm (SN) and perceived behavioural control (PBC). If the scores for the three predictor variables are high, then the intention to perform the behaviour will be high.

In the framework of this current study, the behavioural intention refers to an individual's decision to actively participate in the ART programme. By enrolling in the programme, the individual is expressing their readiness to seek the required assistance. If an individual's scores for A, SN, and PBC are high, it indicates that the individual has a positive overall assessment of adhering to HIV care and treatment (A), is at ease with the social expectations of adhering to HIV care and treatment (SN) and possesses self-control and confidence in their ability to adhere to HIV care and treatment (PBC). This will lead to the optimal outcome of Positive Intention (+) and Enabling factor (+), indicating that the individual's compliance with HIV care and treatment is expected to be high.

7.4.1.1 Developmental challenges

The study model has also shown that behavioural intention cannot be perceived as a monotonous phenomenon. Moderating effects can have either an amplifying or diminishing impact on the intention to participate in a behaviour. Unemployment, poverty, limited access to healthcare facilities, and lack of infrastructure might either strengthen or weaken the intention to seek HIV care and treatment (Dorcélus et al., 2021; Reda & Biadgilign, 2012). The impact of developmental state challenges on behavioural intention should not be ignored, as they might serve as significant obstacles hindering positive intentions. Attitudes, subjective norms, and perceived behavioural control are all elements that contribute to behavioural intention. However, it is important to note that other factors can also influence intention, as seen in the behavioural intention matrix in Figure 7.3 and developmental state challenges.

7.4.2 Behavioural action

The TPB defines behavioural activity by considering four elements: **Target** (at which behaviour is directed), **Action** (specific behaviour), **Context** (where and for what purpose) and **Time** (time frame of observation) (Ajzen, 1991). In this study, the **action** behaviour was adherence to HIV care and treatment, the **target** was people living with HIV/AIDS, the **context** was to improve health outcomes of PLHIV, and the observation **time** was over a period of 12 months. The behavioural intention in this psychological study may be highly subjective due to the absence of a perfect correlation between behavioural intention and actual behaviour. However, there are two measurable actions that should be undertaken to demonstrate the conversion of behavioural intention into behavioural action. The two behavioural activities are adherence to clinic visits and pill usage.

Clinic visits are an actual objective action that involves physically going to a healthcare facility. When someone visits the healthcare facility in person, they are doing so to ensure that they adhere to the requirements of the ART Programme. This includes attending scheduled appointments and completing all necessary medical examinations and tests during each visit. This also includes the act of refilling the necessary prescription medications as a component of the treatment plan.

The utilisation of medication, known as pill usage (PU), is determined by three factors: pill count (PC), pill adherence (PA), and pill remaining (PR). The PC refers to the precise tally of the pills that are left over; the patient returns the actual pill containers, and a healthcare professional physically counts the remaining pills. The return of surplus pills serves as evidence of non-adherence. The PA is a record indicating whether the patient has adhered to the prescribed pill count, while PR represents the recorded number of pills that remain. When patients are provided with pills for their treatment period, they are given an additional quantity of pills in case they are unable to attend their scheduled appointments. Consequently, the accurate count of remaining pills includes these additional pills.

To understand the pill usage by the person, PU_j it is important to understand the pill count, PC_j , pill adherence, PA_j and pills remaining, PR_j . The equation for PU_j :

$$PU_j = (PC_j * PA_j * PR_j)$$

Where PU_j of 100% indicates the desirable pill usage. This together with visit adherence, VA_j determines the total behavioural actions, BA_j :

$$BP_j = PU_j * VA_j$$

With higher score as close to 100% indicating the maximum action to adherence to HIV care and treatment.

The behaviour of adherence to HIV care and treatment in this study is deemed to have been executed when the patient has honoured their clinic visit and recorded an accurate pill usage.

7.5 Behavioural validation

The TPB model, originally introduced by Ajzen (1991), comprises five psychological constructs or variables: attitudes, subjective norms, perceived behavioural control, behavioural intentions, and behaviour. These variables explain the variables that influence an individual's actions. However, the current study has enhanced the TPB model by incorporating a sixth variable, namely **behavioural validation**. This variable represents the empirical evidence that the observed behaviour has been executed. Behavioural validation, in the context of this study, pertains to confirming that PLHIV are regularly adhering to the prescribed behaviour, which includes attending scheduled visits and following medication instructions. Integrating behavioural validation into the model is essential for enhancing the health outcomes of PLHIV. There is a strong scientific association indicating that when individuals regularly adhere to the prescribed behaviour, the efficacy of the treatment may be noticed (Ross et al. 2020; Tariku et al., 2023; Parsons et al., 2008). Through the process of validating behavioural action, healthcare providers can ensure that PLHIV are receiving the necessary medical attention and support, resulting in improved health outcomes.

The emergence of ART has significantly altered the trajectory of the AIDS epidemic. With the implementation of complex therapy protocols in the late 1990s, HIV infection has undergone a remarkable transformation, becoming a manageable chronic illness (Deeks et al., 2013). Individuals must obtain and comply with HIV care and treatment for HIV infection to transition into a chronic condition. Extensive literature has consistently demonstrated that maintaining a high degree of adherence to HIV care and ART is crucial for achieving successful treatment outcomes (Gardner et al., 2011; Mugavero et al., 2014; Reveles et al., 2015; Danel et al., 2015; Bessong et al., 2021). The efficacy of ART became evident in the early 2000s following the meticulous application of treatment principles for different categories of ART drugs known as combined ART (Iacob et al., 2017). This approach resulted in a substantial reduction in mortality and transmission risk due to viral suppression. Successful treatment is determined by achieving viral suppression, which refers to the state of having undetectable levels of the HIV virus. To reach this state, HIV patients are predicted to need a high degree of adherence to their care and treatment, namely above 95% (Chesney, 2000).

The evaluation of treatment efficacy for HIV is particularly significant compared to other chronic diseases due to the ability to scientifically verify the execution of behavioural actions. Studies have demonstrated that with adherence to ART, the CD4 count can grow and continues to increase over a 10-year period after commencing ART (Bishop et al., 2016). The study conducted by Bishop et al. (2016) found that the CD4 count showed the greatest increase three months after initiating ART. The average increase in CD4 count from baseline was 102 cells/mm³ at this time point. Over the course of the Bishop et al. (2016). study, the mean increase in CD4 count continued to rise, reaching 206 cells/mm³ at year 1, 278 cells/mm³ at year 2, 419 cells/mm³ at year 5, and 509 cells/mm³ at year 10. The monitoring of CD4 count alone, however, is not enough to evaluate the progression of disease in patients using ART because it can take time for normal CD4 cell count to be obtained, which is where viral load becomes significant. In a study conducted by Shoko and Chikobvu (2019), it was shown that within six months of initiating ART, viral load suppression can be attained. Consequently, both CD4 count, and viral load serve as indicators of the effectiveness of HIV treatment and the progression of the disease.

The analysis of clinic patient data, which comprised clinic visit, pill usage, CD4 count, and viral load (discussed in Chapter Six), yielded mixed results when the Wilcoxon Signed Rank Test was employed. Some study participants claimed to have performed the behavioural action, but the behaviour validation revealed that the activity was not actually accomplished. This is not unlikely because while the adherence to clinic visits can be objectively confirmed by examining clinic attendance records (where 1 indicates a clinic visit and 0 indicates no clinic visit), the validation of treatment efficacy through pill usage (such as pill count, pill adherence, and pill remaining) relies on **subjective confirmation**. Healthcare professionals depend on the information provided by patients and if patients provide misleading information about their pill usage, this might lead to a false positive result. Therefore, treatment effectiveness determined by pill consumption can yield a misleading positive outcome due to subjective confirmation. If a reliable and unbiased method of verifying pill consumption were available, it would enable the attainment of a positive validation through pill usage. Hence, the lack of an unbiased assessment of pill usage creates a limitation on the study framework.

Treatment efficacy in this study was validated by analysing the CD4 count and viral load of the participants after a 12-month period. These data were used to determine if the desired behavioural action, specifically the consistent administration of pills, was accomplished. According to scientific principles, when a person is on ART, it is expected that their CD4 count will rise, and their viral load will decrease. If this is not true, then it means that either the patient is not following the ART regimen as prescribed or there is a failure in the treatment.

As a result of this improved TPB model, new insights have been presented on the management of HIV care and treatment, with a special emphasis on the prediction of adherence. The model was developed as a result of the findings achieved by this study. However, it is important to underscore that further work is needed to properly test and validate the model to assure its dependability and applicability in real-world situations. This entails performing additional tests, collecting more data, and maybe improving the model based on the outcomes of these evaluations to ensure its effectiveness and accuracy in predicting HIV care and treatment adherence..

7.6 Conclusion

The present chapter introduced the Management Framework for predicting adherence to HIV/AIDS Care and Treatment, which was formulated using the TPB. This framework can be utilised to predict whether an individual would comply with HIV care and treatment prior to initiating ART. By quantifying the scores of each predictor variable, namely attitudes, subjective norms, and perceived behavioural control, one may ascertain the extent of influence that each predictor variable has on the behavioural intention. There is a positive correlation between the scores of the predictor variables and the desire to adhere to HIV care and treatment. As the scores of the predictor variables increase, so does the intention to execute the action. The management framework has demonstrated that the behavioural action of adhering to HIV care and treatment can be verified by calculating pill usage. This, in conjunction with clinic visit adherence and clinical data, will indicate the degree of adherence to care and treatment.

The following chapter addresses various important issues that arose because of the findings in this investigation.

CHAPTER EIGHT

CONCLUSIONS AND RECOMMENDATIONS

8.1 Introduction

The World Health Organisation (WHO) issued a recommendation in 2015 stating that all people living with HIV (PLHIV) should initiate antiretroviral treatment (ART) regardless of the stage of their disease or their CD4 count. This recommendation prompted many countries, particularly those with low- and middle-income levels in sub-Saharan Africa where most HIV/AIDS cases are concentrated, to expand their efforts in providing access to HIV care and treatment. Eswatini and other low- and middle-income countries have observed a rise in the number of individuals being introduced to ART. As the patient population continues to grow, it is crucial to establish a healthcare system that can effectively handle many patients while ensuring high-quality care at minimal expense.

Commencing ART promptly for all individuals with HIV offers significant health advantages, such as enhanced well-being, prolonged lifespan, and a reduced likelihood of HIV transmission (Deeks et al., 2013). However, these advantages can only be attained if there is a high level of adherence to HIV care and treatment. Research has demonstrated that the initial year after being linked to HIV care and treatment is a period of significant change and development for patients as they adapt to a diagnosis that profoundly affects their lives (Mugavero et al., 2012). Patients in this phase are highly susceptible and, without adequate support and subpar initial retention in HIV care and treatment, are at risk of discontinuing treatment.

A study conducted in Eswatini reported a high first-year retention rate of 95% for HIV care and treatment in 2015 (NERCHA, 2021). This is one of the most recently published statistics suggesting that little attention has been paid to the analysis and reporting of the first-year retention rate in Eswatini. The 5% of PLHIV who were not retained in HIV care and treatment remains a concern, as the goal is to achieve 0% non-adherence to the ART programme in order to further improve the outcomes of HIV/AIDS treatment. Lack of adherence to ART might expedite the emergence of viral resistance, necessitating the use of second-line treatment for the patient. The initial

drug combination administered to a patient is commonly referred to as the first line regimen (WHO, 2009). When this regimen becomes ineffective in inhibiting HIV, an alternative regimen consisting of new medications is required, known as the second line regimen (WHO, 2009). If this ultimately proves unsuccessful, it is typically advised to consider a third course of treatment, or a combination of medications known as a salvage cocktail (WHO, 2009). The availability of second- and third-line ART regimens in Eswatini is limited (NERCHA, 2012). Consequently, it is crucial to enhance adherence measures to the first-line regimen to minimise the number of individuals who discontinue treatment and are lost to follow up.

Eswatini, like other nations grappling with a high prevalence of HIV, has established an ART programme. The primary aim of this programme is to mitigate the development of HIV drug resistance. This is achieved by promoting active engagement and comprehension among participants, who are encouraged to adhere to the HIV care plan, including consistent adherence to medication and overall HIV care. Despite the implementation of an intervention to promote adherence to HIV care and treatment, there are still PLHIV who do not comply with the recommended care and treatment. This lack of adherence could have severe ramifications for countries like Eswatini and other low- and middle-income nations. Although there may be systems in place to track patients who were classified as lost to follow-up, the implementation of these systems is hindered by insufficient financial and human resources in such countries.

In order to optimise the utilisation of scarce financial and human resources, it is necessary to implement a stratified model for retention and adherence support. This model should aim to identify patients who require intensified and focused care, rather than providing uniform help to all patients. Prior to the commencement of ART regimens, it is necessary to perform patient profiling to promptly commence tailored care. Nevertheless, due to the lack of a profile tool, healthcare facilities are compelled to allocate their limited resources towards providing standardised adherence assistance. This approach may be inadequate for individuals who require it the most, while also resulting in a misallocation of resources for others who do not require such assistance.

To address the existing gap resulting from the absence of a profiling tool that enables stratified support for HIV retention and adherence, the objective of this research endeavour was to create an HIV/AIDS care and treatment management framework that could be applied prior to enrolling patients in ART programmes. This framework would accurately classify patients as high or low risk for non-adherence and/or loss to follow-up, enabling them to be assigned to the most suitable adherence support stream.

As the foundation for the current investigation, the TPB was utilised to develop the management framework. The understanding of adherence to HIV care and treatment of PLHIV was investigated using an elicitation study, a formative research approach utilised to identify accessible attitudes, normative beliefs, and control beliefs in accordance with the TPB. The TPB questionnaire, which was developed using the results obtained from the elicitation study, underwent extensive testing in the main study to ascertain its effectiveness and utility in predicting adherence to HIV care and treatment prior to the commencement of ART. Throughout the testing phase of the TPB-based questionnaire, psychological predictors of adherence to HIV treatment and care were identified. Additionally, the association between the TPB-based measure and other clinical indicators utilised for monitoring treatment adherence, such as clinic visits, pill counts, immunological and virological data, was examined.

A management framework for HIV/AIDS care and treatment, guided by the TPB, was formulated by triangulating the results obtained from the elicitation study and the main study, as well as by reviewing existing literature. As a means of determining the degree to which patients intend to adhere to HIV care and treatment, it is suggested that this management framework serve as a guide for profiling patients prior to their enrolment in the ART programme. Support for the patient should be tailored to the level of intention; that is, standardised adherence and retention support should be administered when intention is high; intensified and targeted support should be provided when intention is low. As suggested by the management framework, the medication usage, in conjunction with visit adherence, should be utilised to validate the behavioural action of adherence to HIV care and treatment. This calculation would indicate the degree of treatment efficacy linked to adherence to care and treatment.

8.2 Theoretical implications of the study

The conceptual framework constructed in this study for predicting adherence to HIV care and treatment builds upon the initial TPB model established by Ajzen (1991) by incorporating four additional crucial elements into the established theory: (1) developmental challenges (2) calculation of behavioural intention, (3) subjective confirmation; and (4) behavioural validation. In the preceding chapter, the extensions to the TPB model and their implementation in predicting adherence to HIV treatment and care were discussed in depth. Apart from augmenting the model, the current research has made a scholarly contribution to the body of knowledge concerning the predication of adherence prior to treatment initiation.

The original TPB model does not effectively address the ***developmental challenges*** faced by PLHIV who must adhere to HIV care and treatment in the societies in which it is implemented, leading to a gap in the current body of knowledge. When implementing the TPB model in countries with low to middle incomes, it is essential to take into account the contextual factors. While the study's findings revealed that education, employment, and income had no effect on study participants' adherence, socioeconomic factors encompass more than the three variables examined in this study. Prior research has shown that contextual factors have a substantial impact on adherence results. An example is a study conducted by Weiser et al. (2003) in Botswana, which found that financial limitations hindered the adherence to ART. Nevertheless, when eliminating these constraints using logistic regression, it was projected that adherence would rise from 54% to 74%. The current study adds to the existing body of research on predicting adherence to HIV care and treatment in developing countries, particularly in sub-Saharan Africa, where the impact of the HIV epidemic is disproportionately high. The study emphasises that the predictor variables that determine the level of intention to adhere might still be influenced by developmental challenges often experienced by low- and middle-income countries, such as poverty, unemployment, and the distance individuals must travel to access health facilities. Thus, this model includes the contextual aspect by integrating the variable of developmental challenges.

The study has shown that the determination of **behavioural intention** can be achieved through objective means by calculating the scores of predictor variables (attitudes, subjective norms, and perceived behavioural control) and utilising these scores to establish risk bands (low risk, middle risk, high risk) that will determine the level of intention. By doing this, the study extends the original TPB model, which suggests that intentions can be assessed by posing questions in the TPB questionnaire that pertain to either performance intention (a person's deliberate desire to carry out a certain behaviour), generalised intention (a broader aim that includes a variety of related behaviours), or intention simulation (the mental rehearsal or visualisation stage of a behaviour that people go through before performing it) (Francis, 2004).

In addition, the study also showed that when using the TPB in the field of adherence to HIV care and treatment, behavioural action can be measured both objectively (can be verified through objective sources, for example through healthcare workers) or subjectively (by asking the patient). The information received from the patient can lead to what this study has termed **subjective confirmation**. Subjective confirmation can result in a false positive whereby the patient claims to have executed the behaviour and however, the treatment efficacy shows otherwise.

Furthermore, the new extended model has demonstrated the need for **behavioural validation** which is critical when it comes to health behaviours such as adherence to chronic medication, especially ART. In the field of HIV, studies have shown a very high correlation between adherence to ART and CD4 count and viral load (Bishop et al., 2016; Shoko et al., 2019) which means that the behaviour of adherence can be scientifically validated to tell whether it has been performed or not. Behavioural validation can show the efficacy of the behaviour that has been executed and this can be done by using the CD4 count and viral load data. Therefore, for the TPB model to be used effectively in monitoring adherence to HIV care and treatment, the construct of behaviour validation must be added.

The utilisation of the TPB for predicting adherence to HIV care and treatment has not been extensively documented, with the Vissman et al. (2013) study being one of the most recent publications on the subject. Still, this study specifically examined the level

of adherence among patients who had already initiated treatment. Research employing alternative health behaviour models has been carried out to better understand adherence in the context of HIV treatment. Most of these studies focused on patients who were already receiving treatment for HIV and their objective was to determine whether these patients intended to continue adhering to their HIV care and treatment (Roco et al., 1999; Spire et al., 2002; Bisson et al., 2006; Parruti et al., 2006; Caluwaerts et al., 2009; Carrieri et al., 2006; Cornell et al., 2010; Zachariah et al., 2008). The current study has contributed to the existing body of knowledge by demonstrating that, with the proposed extensions, the TPB can be utilised to predict the level of adherence with HIV care and treatment among recently diagnosed HIV-positive individuals who have not yet initiated ART. Research on predicting adherence to HIV care and treatment has primarily been carried out in developed countries in Europe and the United States, with only a few studies undertaken in developing countries (Do et al., 2010; Lubega et al., 2010; Cornell et al., 2010).

8.3 Implications for the stakeholders

The findings of this study, which resulted in the development of the Management Framework for HIV/AIDS Care and Treatment based on the TPB, have consequences for three distinct groups: PLHIV, healthcare facilities, and policy makers.

8.3.1 People living with HIV

As evidenced by the literature, the absence of a cure for HIV necessitates a high degree of adherence from patients to enhance their health outcomes. The study's model can be utilised as a component of the patient's treatment plan by initially profiling the patients and assessing their level of behavioural intention to adhere to their HIV care and treatment. The model then measures their behavioural action at specific intervals of the treatment plan and validates the behaviour by evaluating treatment efficacy. Those PLHIV who were identified as being at high risk for not following their treatment plan might receive specific support measures starting from their enrolment into the ART programme. This assistance aims to promote adherence to the treatment and enhance their health outcomes. The model provides a means to validate the behaviour of patients who, on the surface, seem to be following their care

and treatment. This validation is achieved by assessing the effectiveness of the treatment, which provides objective confirmation of the patient's actions. The utilisation of this model has the potential to enhance the health outcomes of PLHIV. However, for this to occur, PLHIV must be open to the assessment conducted during the profiling stage and be aware of the issues identified by the assessment. This awareness will enable them to collaborate with healthcare professionals to address and overcome these challenges.

8.3.2 Healthcare facilities

The study's framework offers an effective way for healthcare personnel in low- and middle-income countries, where resources are scarce and HIV prevalence is high, to profile individuals. This framework serves as a guide to address the challenges posed by limited financial and human resources. Profiling patients will enable healthcare workers to offer stratified assistance for ART adherence and retention, tailored to the identified level of risk. This will enhance the ability of healthcare facilities to manage the large influx of patients, uphold the standard of service, and optimise the utilisation of scarce resources. To ensure the effectiveness of this model, it is advisable for healthcare facilities to establish a stratified ART adherence and retention support model. They should maintain accurate records regarding patients' enrolment in the ART programme, clinic appointments, and pill usage. Additionally, it is important to collect the required immunological and virological data during routine visits to confirm adherence behaviour and treatment efficacy.

8.3.3 Policy makers

Policy makers establish the rules and regulations that govern the health sector. This study has created a theoretical and evidence-based framework that can be employed by the government to verify the efficacy of current ART programmes. The framework incorporates behavioural action variables, namely clinic visits and pill usage, which are derived from established standard practices for tracking HIV care and treatment adherence in Eswatini. Hence, the factors in the study will enable policy makers to ascertain the effectiveness of the current method of evaluating adherence behaviour.

Consistent routine collection of immunological and virological data is necessary to validate behaviour by assessing treatment efficacy through the analysis of CD4 count and viral load. The WHO (2013) advised that CD4 cell count should be assessed prior to initiating ART, and that viral load testing should be used to detect treatment failure following the introduction of ART. This study discovered that the collection and recording of HIV monitoring data in patient files was not done regularly or consistently. This is concerning because previous research has demonstrated that analysing both the CD4 count and viral load is crucial for monitoring the progression of the disease (Bishop et al., 2016; Shoko et al., 2019). Due to the expenses involved in conducting immunological tests and the practical limitations of performing both CD4 and viral load for all HIV-infected patients, it is advisable for the government to establish a standardised approach for selecting either of the two HIV monitoring tests to be regularly conducted for each patient. This will enable the measurement of treatment effectiveness according to the proposed model. Implementing this will reduce the expenses associated with performing immunological testing, while also enhancing operational effectiveness.

The study incorporated the variable of subjective confirmation, which arises from the dependence on patients to provide data on pill usage. This study has established that the data on pill usage is based on personal opinions or feelings, and examination of the research data revealed that certain patients had indicated their adherence in terms of pill usage. However, the treatment efficacy data indicated that the desired conduct was not attained. Hence, it is advisable for the government to devise methods to enhance the subjective verification of pill consumption. Additionally, it is necessary to implement awareness initiatives that emphasise the significance of pill adherence, with the objective of promoting behavioural modification.

It is recommended that policymakers conduct a thorough verification of the proposed model to determine its suitability for implementation in local healthcare facilities.

8.4 Limitations of the study

Like any scientific investigation, this study has inherent limitations. Several limitations pertain to both the application of the Theory of Planned Behavior and the methods

employed in the study. The limitations are outlined below and should be considered when interpreting the findings of the study.

Sampling and low generalisability

The elicitation study aimed to identify attitudes, norms, and control beliefs of PLHIV on adherence to HIV care and treatment. This was achieved by a thematic analysis of qualitative data obtained from interviews with a small number of participants. The purpose of the elicitation study was not to obtain a representative sample of the population, as the objective was to understand the salient beliefs regarding a desired behaviour to develop TPB instruments that are tailored to the specific behaviour of interest. Although limited, the study offered a comprehensive and intricate comprehension of the cognitive and affective foundations of the beliefs held by PLHIV regarding adherence prior to initiating ART.

Expanding upon the limitation of the elicitation study, the outcomes of the main study cannot be extrapolated because the sample consisted of a single cohort that was selected from a healthcare facility exclusively dedicated to HIV care and treatment. This specialised healthcare facility was chosen as a convenient location to select the sample because individuals who seek assistance from the facility are either HIV positive or seeking to determine their HIV status. However, it should be noted that the services offered by this facility may not accurately represent the services provided by public healthcare facilities. The healthcare facility utilised in this study is operated and financed by a global organisation that offers state-of-the-art HIV medication and advocacy. This could potentially have a beneficial impact on patient outcomes that may not be available in healthcare facilities lacking such support.

The study included all patients who tested positive for HIV and who agreed to participate in the study throughout the enrolment period and had clinic visits that coincided with the interviewer's presence at the clinic. Enrolment in the study was optional, and patients autonomously chose to participate. The study predominantly consisted of female patients, which may have introduced a gender bias into the study's findings. Consequently, there is limited knowledge regarding males, the patients who declined to partake in the study or those who opted to withdraw from the study during an interview. The patients who declined to engage in the study as well as males may

have exhibited significant psychological or social differences compared to those who actively participated, but this pertinent information is not accessible for comparison. Furthermore, it is uncertain whether there were any behavioural differences between them in terms of pill usage and visit adherence. Additionally, the efficacy of their treatment is also unknown.

Furthermore, the limited availability of paired baseline and 12-month follow-up HIV monitoring data poses challenges in drawing comprehensive conclusions from the findings. This scarcity of data means that the results may not fully capture the diverse characteristics and experiences of the entire population under study. In particular, the absence of a robust dataset may lead to potential biases, as certain groups or individuals could be underrepresented or overlooked in the analysis. Consequently, it is essential to interpret the findings of this study with caution and to recognize that they may not reflect the broader trends or variations that exist within the larger population.

Prior to enrolment in the ART programme, patients were questioned to determine their degree of adherence to HIV care and treatment. Although this is a notable advantage of the study, it fails to reflect the actual elements that influence an individual's adherence to treatment in real-life situations after they have initiated it. The study examined perceived factors that may not necessarily be applicable to the patients once they leave the healthcare facility and start using the treatment. For instance, although patients may not actually experience any side effects from the treatment, side effects were still included as perceived negative outcomes of being on ART. Gathering these data at a single point in time results in the omission of actual encountered factors and their subsequent evaluation of influence.

As additional work is conducted on the model, it is anticipated that the model's generalisability will enhance.

Social desirability

In addition, despite the fact that the interview was carried out by an unfamiliar researcher in a different building from the clinic, and the confidentiality of responses was guaranteed during the consent process, it is possible that the answers may have been influenced by social desirability. Although patients were previously assured that

their involvement in the study would not influence their treatment at the healthcare facility, they may have provided responses that they believed were suitable due to concerns that the study's results could impact the services they received.

Subjective pill count data

According to the findings of this study, relying on pill usage as a measure of behavioural action may not always be dependable due to the potential for subjective confirmation. The practice of using returned pills as a measure of ingested tablets presents a difficulty due to previous research revealing instances of patients discarding or exchanging medications before to their planned clinical appointments (Population Council et al., 2004; Wagner et al., 2001). This may have skewed the true findings of the research.

The aforementioned possible limitations could affect the interpretation of the results. Despite the mentioned interpretive cautions, the study's findings have resulted in the development of a theory-based conceptual framework. This framework aims to assess adherence to HIV care and treatment prior to commencing the ART programme. Its purpose is to identify patients who are at the greatest risk of non-adherence and should be provided with extra support. This outcome is significant for the study, as adherence to HIV care and treatment plays a crucial role in improving the health outcomes of PLHIV.

8.5 Overall study conclusions

The **first study objective** which was to explore the understanding of adherence to HIV care and treatment of PLHIV and **second study objective** which was to determine the psychological predictors of adherence to HIV care and treatment were appropriately addressed using an elicitation study. The study's findings indicate that patients possess an understanding of adherence to HIV care and treatment. This was apparent from the number of salient beliefs that were identified for each of the predictor constructs: 11 attitudes, 21 normative beliefs, and 13 beliefs related to perceived behavioural control. This indicates that individuals possess knowledge of factors that are likely to impact their adherence or non-adherence to HIV care and treatment even prior to undergoing an HIV test.

The study's results indicate that the three predictor variables (attitudes, subjective norm, perceived behavioural control) play a significant role when assessing adherence to HIV care and treatment. This is evident as there were no significant differences in the outcomes of each variable when they were averaged out. This appropriately addressed the **fourth study objective** which set out to establish the usefulness of the TPB in predicting adherence to HIV care and treatment.

Furthermore, through the analysis of the quantitative data collected using the TPB questionnaire developed using the predictor variables identified during the elicitation study, it became apparent in this study that although the TPB model can be utilised, there are noticeable limitations in terms of the adherence to treatment and care for HIV in developing countries. This addressed the **third study objective** which set out to rigorously test the TPB measure to determine its efficacy in predicting adherence behaviour to HIV care and treatment prior to initiation to ART. Subsequently, the existing TPB model was extended to address the mentioned shortcomings. These extensions incorporated the addition of **developmental challenges**, which can affect behaviour, and highlighted the **subjective confirmation** aspect, which poses a challenge in validating pill usage.

Ultimately, when investigating the relationship between TPB measures and other clinical measures like clinic visits, pill counts, immunological, and virological data, as outlined in **study objective five**, it was found that including behavioural validation in the model, which was statistically analysed using the Wilcoxon signed-rank test, improves its effectiveness. This is because it enables the objective validation of behavioural actions using clinical data such as CD4 count and viral load, which helps assess the effectiveness of treatment.

8.6 Suggestions / directions for future studies

Future investigations should aim to ascertain whether the salient attitudes, normative, and control beliefs identified in the current study are more widely applicable to the broader population of PLHIV. Moreover, this study could serve as a valuable resource for informing future research endeavours concerning treatment adherence to HIV.

A comparable investigation ought to be undertaken in public healthcare facilities due to the possibility that the services provided differ from those rendered at the specialised healthcare facility that served as the study's context. In the event that the services provided by public healthcare facilities diverge from those identified in this study - for instance, the specialised HIV healthcare facility may employ more meticulous monitoring of pill usage than the public healthcare facility - then the aforementioned services will need to be incorporated to conform to the framework and address any existing gaps.

Further investigation is required to ascertain more efficient methods of tracking pill usage that will yield unbiased data. The current method of tracking pill usage by depending on patients' self-reporting presents a challenge since it may result in a false positive regarding medication adherence. Nevertheless, our study has demonstrated that without a reliable means of objectively tracking pill use, the effectiveness of treatment might serve as a means of confirming the accuracy of the information provided by patients regarding their pill usage.

It is suggested that there be a follow-up study on the cohort of patients who took part in this research. The purpose of the follow-up study would be to determine if there is a difference between the factors that were identified by the predictor variables of TPB before enrolling in the ART programme and initiating treatment, and the actual factors that affect adherence, regardless of whether they have a positive or negative effect.

Lastly, prior to implementation, it is critical that the conceptual framework developed by this study to manage HIV/AIDS care and treatment based on TPB be validated. The researcher proposes a follow-up study that employs structural equation modelling to assess and evaluate the multivariate causal relationships identified in this model in order to validate it.

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APPENDICES

Appendix 1: Wits HREC (Medical) Ethical Clearance Certificate



R49 Ms T Mango

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL) CLEARANCE CERTIFICATE NO. M210371

NAME: Ms T Mango **DEGREE:** PhD
(Principal and Co-Investigators)

DEPARTMENT: School of Human and Community Development
Department of Psychology
University

PROJECT TITLE: *Developing a management framework for predicting adherence to HIV care and treatment in Eswatini*

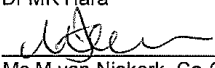
DATE CONSIDERED: Ad hoc

DECISION: Approved unconditionally

CONDITIONS: Formerly M160615 (expires on 2021/10/11)
Change of study title noted on 2024/02/14

NOTE: If contact information regarding student study participants is required, please contact the Registrar's office <Nicoleen.Potgieter@wits.ac.za>

SUPERVISOR: Dr MK Hara

APPROVED BY: 
Ms M van Niekerk, Co-Chairperson, HREC (Medical)

DATE OF APPROVAL: 8 April 2021 **EXPIRY DATE:** 7 April 2026

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report** in the format available at <https://wits.ac.za/research/researcher-support/research-ethics/ethics-committees/>. This report is due annually, for the duration of the Clearance Certificate, beginning on the first anniversary of Date of Approval above. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator

Date



R14/49 Miss Thabiso Mango

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160615

NAME: Miss Thabiso Mango
(Principal Investigator)
DEPARTMENT: School of Human and Community Development , Psychology
LaMvelase HIV Clinic, Manzini - Swaziland

PROJECT TITLE: Predicting Adherence to HIV Care and Treatment in
Swaziland using the Theory of Planned Behaviour (TPB):
A Development and Evaluation of Measures

DATE CONSIDERED: 24/06/2016

DECISION: Approved (Phase One, Phase Two and Phase Three)

CONDITIONS: South African Human Research Ethics Committees
(HRECs) have no standing outside South Africa.
Ethics approval is also required from local HRECs in Swaziland

SUPERVISOR: Dr Mambwe Kasese Hara

APPROVED BY: 
Professor P Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 12/10/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/3rd Floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in June and will therefore be due in the month of June each year.

Principal Investigator Signature _____

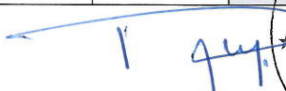
Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Appendix 2: Eswatini Ministry of Health Ethical Clearance



Research Protocol clearance certificate

Type of review	Expedited	☒		Full Board	☐
Name of Organization	STUDENT				
Title of study	PREDICTING ADHERENCE TO HIV CARE AND TREATMENT IN SWAZILAND USING THE THEORY OF PLANNED BEHAVIOUR (TPB): A DEVELOPMENT AND EVALUATION OF MEASURES.				
Protocol version	1.0				
Nature of protocol	New	☒		Amendment	☐
List of study sites	LAMVELASE HIV CLINIC, MANZINI				
Name of Principal Investigator	THABISO MANGO				
Names of Co- Investigators	N/A				
Names of steering committee members in the case of clinical trials	N/A				
Names of Data and Safety Committee members in the case of clinical trials	N/A				
Level of risk (Tick appropriate box)	Minimal		☒	High	
Clearance status (Tick appropriate box)	Approved		☒	Disapproved	
Clearance validity period	Start date	14/07/2017		End date	14/07/2018
Signature of Chairperson	 				
Date of signing	14/07/2017				
Secretariat Contact Details	Name of contact officers	Ms Simangele Masilela			
	Email address	kaluamasi@gmail.com			
	Telephone no.	(00268) 24040865/24044905			

APPROVAL CONDITIONS

Ref.	Conditions	Indication of conditions (tick appropriate box)				
1	Implementation of approved version of protocol	✓				
2	Reporting of adverse events within 5 days of occurrence	✓				
3	Submission of progress reporting for multi-year studies	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5
		N/A	N/A	N/A	N/A	N/A
4	Submission of end of project report (Hard copy)	✓				
5	Submission of end of project report (Soft copy)	✓				
6	Submission of data sets	✓				

List of reviewed documents

Ref.	Documents	Reviewed documents (tick appropriate box)
1	Completed application form	✓
2	Cover letter	✓
3	Evidence of administrative permission to conduct the research by involved institutions/sites (where applicable)	✓
4	Detailed current resume or curriculum vitae of Principal Investigator/s including Principal investigators declaration	✓
5	Summary resume or biography for other investigator(s)	✓
6	Evidence of approval/rejection by other Ethics Committees, including comments and requested alterations to the protocol, where appropriate.	
7	Research protocol (see outline in Annex 1)	✓
8	Questionnaires and interview guides (with back-translated versions where applicable)	✓
9	Case report forms (CRFs), abstraction forms and other data collection tools	✓
10	Participant/subjects Information Statement(s) (where applicable)	✓
11	Informed consent form(s) including photographic and electronic media consent statements.	✓
12	Advertisements relevant to the study (where applicable)	
13	Source of funding and detailed budget breakdown including material and incentives to participants if applicable	
14	Notification form for adverse effects/events.	
15	Proof of payment	✓
16	Proof of insurance cover for research subjects in clinical trials or where applicable	
17	Any other special requirements should be stated, if applicable	None

[Handwritten signature]

Appendix 3: AIDS Health Foundation letter of support



LaMvelase Help Centre
Manzini, Swaziland
Tel/Fax: +268 2505 9183
Email: ahf@realnet.co.sz
Website: www.aidshealth.org
Address: P. O. Box 7352 Manzini

27 April 2016

Ms Thabiso Mango
P O Box 13749
Norkem Park
1619

Dear Ms Mango,

**PREDICTING ADHERENCE TO HIV CARE AND TREATMENT IN SWAZILAND
USING THE THEORY OF PLANNED BEHAVIOUR (TPB): A DEVELOPMENT AND
EVALUATION OF MEASURES**

1. The request for organisational support (not financial) in relation to the above-mentioned research to be conducted at LaMvelase HIV Clinic in Manzini, Swaziland is hereby approved in principle, provided that you supply the AIDS Healthcare Foundation (AHF) with your ethical clearance from the University of the Witwatersrand.
2. The onus lies with the researcher to seek approval from the above-mentioned institution.

Please do not hesitate to call should you require additional assistance.

Kind regards



Dr Nduduzo Dube
Program Manager

AHF Swaziland - Lamvelase
P.O. Box 7352 Manzini
Tel/Fax: 00268 25059183 / 25056496
website: www.aidshealth.org

Date 27/04/16

Appendix 4: Elicitation Study Interview Guide

What is adherence to HIV care and treatment? Adherence to HIV care and treatment is taking medication, honouring clinic appointments, following a recommended diet and executing lifestyle changes as recommended by the health care provider.

Instructions: Please take a few minutes to tell us what you think about the possibility of adhering to HIV care and treatment on a daily basis for the rest of your life. There are no right or wrong responses; we are merely interested in your personal opinions. In response to the questions below, please list the thoughts that come immediately to mind. Write each thought on a separate line. (Five lines are provided for each question.)

Behavioural outcomes - (the consequence of performing a particular behaviour)

- 1) What do you see as the advantages of you adhering to HIV care and treatment on a daily basis for the rest of your life?
- 2) What do you see as the disadvantages of you adhering to HIV care and treatment on a daily basis for the rest of your life?
- 3) What else comes to mind when you think about you adhering to HIV care and treatment on a daily basis for the rest of your life?

Normative referents - (the people that would have influence on whether the behaviour is performed or not)

When it comes to you adhering to HIV care and treatment on a daily basis for the rest of your life, there might be individuals or groups who would think you should or should not perform this behaviour.

- 1) Please list the individuals or groups who would approve or think you should you adhere to HIV care and treatment on a daily basis for the rest of your life.
- 2) Please list the individuals or groups who would disapprove or think you should not adhere to HIV care and treatment on a daily basis for the rest of your life.
- 3) Sometimes, when we are not sure what to do, we look to see what others are doing. Please list the individuals or groups who, after being initiated on ART, are most likely to adhere to HIV care and treatment on a daily basis for the rest of their life.
- 4) Please list the individuals or groups who, after being initiated on ART, are least likely to adhere to HIV care and treatment on a daily basis for the rest of their life.

Control factors - (factors or circumstances that would have an influence on whether a behaviour is performed or not)

- 1) Please list any factors or circumstances that would make it easy or enable you to adhere to HIV care and treatment on a daily basis for the rest of your life.
- 2) Please list any factors or circumstances that would make it difficult or prevent you from adhering to HIV care and treatment on a daily basis for the rest of your life.

Appendix 5: Pilot TPB questionnaire

PREDICTING ADHERENCE TO HIV CARE AND TREATMENT IN SWAZILAND USING THE THEORY OF PLANNED BEHAVIOR (TPB): A DEVELOPMENT AND EVALUATION OF MEASURES

November – December 2018

Questionnaire Number	000
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Field Quality Control

Name of Interviewer	
On-site checkback? (Y/N)	
If Yes: Date and time of checkback	
Comments and suggested action by interviewer:	

Comments

Interviewer:
Researcher:

QUESTIONNAIRE FOR CLIENT INTERVIEWS

Instructions to interviewer: Clients should be interviewed individually and in private before they collect their treatment from the health facility pharmacy. For each question, please answer by describing as appropriate or mark the correct response circling the number next to it. If the client agrees to continue, begin the questionnaire by asking Q1. Be sure to return to this page at the end of the interview to indicate whether the survey is complete.

General Information	Responses	
Facility name:	LaMvelase HIV Clinic	
Location	Urban	1
	Rural	2
	Semi-urban	3
Has the client consented to the interview?	Yes	1
	No	2
Date of interview:	dd ____/mm ____/yy ____	
Start time:		
End time:		
Interviewer:		
Interview result:		
Interview completed		
Partially completed (give reasons in space below)		
Other (specify in space below)		
Notes:		

CLIENT INTERVIEW			
Q #	Questions	Responses-codes	
SOCIO-DEMOGRAPHIC INFORMATION			
1.	What is your gender?	Male	1
		Female	2
2.	How old are you?	Years _____	
3.	Do you have any disabilities?	Yes (If yes, please specify in space below)	1
		No	2
4.	What is the highest level of education you completed?	Primary	1
		Secondary	2
		College certificate/diploma	3
		University degree	4
		Other (Please specify in space below)	5
5.	What is your current relationship status?	Single and without any relationship	1
		Single, but in a relationship	2
		Married	3
		In a polygamous marriage	4
		Divorced	5
		Separated	6
		Widowed	7
		Other (Please specify in space below)	8
	Refuse to answer	988	
6.	Are you living with your husband/partner?	Yes	1
		No	2
		Refuse to answer	988

7.	Are you currently employed?	Yes, full time	1					
		Yes, part time	2					
		No, full-time student	3					
		Unemployed	4					
8.	How many people live in your household (not including yourself)?	_____ adults						
		_____ children under 18						
		Refuse to answer	998					
9.	How much do you earn each month?	Below E500 per month	1					
		E501 to E1000 per month	2					
		E1001 to E5000 per month	3					
		E5001 to E10, 000 per month	4					
		Above E10, 000 per month	5					
		Refuse to answer	998					
10.	Have you ever been on any HIV care and treatment	Yes	1					
		No	2					
OUTCOME EVALUATIONS I would like to ask you about the consequences of adhering to HIV care and treatment. Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.								
11.	Adhering to my HIV care and treatment will make me live longer							
	Strongly disagree	1	2	3	4	5	6	7
12.	If I adhere to my HIV care and treatment my immune system will be boosted							
	Strongly disagree	1	2	3	4	5	6	7
13.	Adhering to my HIV care and treatment will prevent me from getting opportunistic diseases							
	Strongly disagree	1	2	3	4	5	6	7
14.	I will have a healthier life if I adhere to my HIV care and treatment							
	Strongly disagree	1	2	3	4	5	6	7
15.	Adhering to my HIV care and treatment will prevent the virus from multiplying in my body							
	Strongly disagree	1	2	3	4	5	6	7
16.	If I adhere to my HIV care and treatment I will know how I am responding to the treatment							

	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
17.	If I adhere to my HIV care and treatment, I will protect others from becoming infected by me								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
18.	I will get used to taking the treatment if I adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
19.	Adhering to my HIV care and treatment will be difficult because it is a lifelong commitment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
20.	Adhering to my HIV care and treatment will give me side effects								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
21.	There is stigma associated with adhering to HIV care and treatment.								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
NORMATIVE BELIEFS									
Now I would like to ask you about the people that would have an influence on whether you adhere to your HIV care and treatment, and they type of people who are or not likely to adhere to their HIV care and treatment.									
22.	My parents would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
23.	My brothers and sisters would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
24.	My partner would approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
25.	My friends would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
26.	Children would approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
27.	My grandparents would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
28.	My colleagues would not approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

29.	Those who want to live longer are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
30.	Trustworthy people are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
31.	People who have responsibilities are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
32.	People who believe that the treatment will work are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
33.	Females are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
34.	People who are able to make it to the clinic are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
35.	People who consume alcohol are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
36.	People who are not concerned about their future are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
37.	People experiencing side effects are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
38.	People who do not believe that the treatment will work are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
39.	People who are afraid of taking the treatment in the presence of others are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
40.	People who have not been educated about the disease are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
41.	People who have not accepted their HIV status are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

42.	Males are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
POWER OF CONTROL FACTORS Now I would like to ask you about the factors or circumstance that would have an influence on whether you adhere to your HIV care and treatment or not.									
43.	If I set a daily reminder it would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
44.	Having people close to me remind me to take my treatment would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
45.	Eliminating negative thoughts would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
46.	Being educated on adherence would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
47.	Being at home at the time when I have to take my treatment would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
48.	If I had healthy food to eat it would be easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
49.	Accepting my HIV status would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
50.	My fear of taking the treatment in the presence of others would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
51.	If I am unable to get to the clinic, it would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
52.	Not having my treatment with me at the time that I have to take it would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
53.	If I am not given feedback / updates on how I am responding to the treatment, it will make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

54.	The time-consuming process of refilling prescriptions at the clinic would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
55.	Unfriendly nurses at the clinic would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Appendix 6: Final TPB questionnaire

PREDICTING ADHERENCE TO HIV CARE AND TREATMENT IN SWAZILAND USING THE THEORY OF PLANNED BEHAVIOR (TPB): A DEVELOPMENT AND EVALUATION OF MEASURES

June 2019

Questionnaire Number	000
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Field Quality Control

Name of Interviewer	
On-site checkback? (Y/N)	
If Yes: Date and time of checkback	
Comments and suggested action by interviewer:	

Comments

Interviewer:
Researcher:

QUESTIONNAIRE FOR CLIENT INTERVIEWS

Instructions to interviewer: Clients should be interviewed individually and in private before they collect their treatment from the health facility pharmacy. For each question, please answer by describing as appropriate or mark the correct response circling the number next to it. If the client agrees to continue, begin the questionnaire by asking Q1. Be sure to return to this page at the end of the interview to indicate whether the survey is complete.

General Information	Responses	
Facility name:	LaMvelase HIV Clinic	
Location	Urban	1
	Rural	2
	Semi-urban	3
Has the client consented to the interview?	Yes	1
	No	2
Date of interview:	dd ____/mm ____/yy ____	
Start time:		
End time:		
Interviewer:		
Interview result:		
Interview completed		
Partially completed (give reasons in space below)		
Other (specify in space below)		
Notes:		

CLIENT INTERVIEW			
Q #	Questions	Responses-codes	
SOCIO-DEMOGRAPHIC INFORMATION			
1.	What is your gender?	Male	1
		Female	2
2.	How old are you?	Years _____	
3.	Do you have any disabilities?	Yes (If yes, please specify in space below)	1
		No	2
4.	What is the highest level of education you completed?	Primary	1
		Secondary	2
		College certificate/diploma	3
		University degree	4
		Other (Please specify in space below)	5
5.	What is your current relationship status?	Single and without any relationship	1
		Single, but in a relationship	2
		Married	3
		In a polygamous marriage	4
		Divorced	5
		Separated	6
		Widowed	7
		Other (Please specify in space below)	8
	Refuse to answer	988	
6.	Are you living with your husband/partner?	Yes	1
		No	2
		Refuse to answer	988

7.	Are you currently employed?	Yes, full time	1					
		Yes, part time	2					
		No, full-time student	3					
		Unemployed	4					
8.	How many people live in your household (not including yourself)?	_____ adults						
		_____ children under 18						
		Refuse to answer	998					
9.	How much do you earn each month?	Below E500 per month	1					
		E501 to E1000 per month	2					
		E1001 to E5000 per month	3					
		E5001 to E10, 000 per month	4					
		Above E10, 000 per month	5					
		Refuse to answer	998					
10.	Have you ever been on any HIV care and treatment	Yes	1					
		No	2					
OUTCOME EVALUATIONS I would like to ask you about the consequences of adhering to HIV care and treatment. Please answer each of the following questions by circling the number that best describes your opinion. Some of the questions may appear to be similar, but they do address somewhat different issues. Please read each question carefully.								
11.	Adhering to my HIV care and treatment will make me live longer							
	Strongly disagree	1	2	3	4	5	6	7
12.	If I adhere to my HIV care and treatment my immune system will be boosted							
	Strongly disagree	1	2	3	4	5	6	7
13.	Adhering to my HIV care and treatment will prevent me from getting opportunistic diseases							
	Strongly disagree	1	2	3	4	5	6	7
14.	I will have a healthier life if I adhere to my HIV care and treatment							
	Strongly disagree	1	2	3	4	5	6	7
15.	Adhering to my HIV care and treatment will prevent the virus from multiplying in my body							
	Strongly disagree	1	2	3	4	5	6	7
16.	If I adhere to my HIV care and treatment I will know how I am responding to the treatment							

	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
17.	If I adhere to my HIV care and treatment, I will protect others from becoming infected by me								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
18.	I will get used to taking the treatment if I adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
19.	Adhering to my HIV care and treatment will be difficult because it is a lifelong commitment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
20.	Adhering to my HIV care and treatment will give me side effects								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
21.	There is stigma associated with adhering to HIV care and treatment.								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
NORMATIVE BELIEFS Now I would like to ask you about the people that would have an influence on whether you adhere to your HIV care and treatment, and they type of people who are or not likely to adhere to their HIV care and treatment.									
22.	My parents would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
23.	My brothers and sisters would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
24.	My partner would approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
25.	My friends would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
26.	Children would approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
27.	My grandparents would want me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
28.	My colleagues would not approve of me adhering to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

29.	Those who want to live longer are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
30.	Trustworthy people are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
31.	People who have responsibilities are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
32.	People who believe that the treatment will work are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
33.	Females are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
34.	People who are able to make it to the clinic are likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
35.	People who consume alcohol are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
36.	People who are not concerned about their future are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
37.	People experiencing side effects are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
38.	People who do not believe that the treatment will work are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
39.	People who are afraid of taking the treatment in the presence of others are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
40.	People who have not been educated about the disease are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
41.	People who have not accepted their HIV status are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

42.	Males are less likely to adhere to their HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
POWER OF CONTROL FACTORS Now I would like to ask you about the factors or circumstance that would have an influence on whether you adhere to your HIV care and treatment or not.									
43.	If I set a daily reminder it would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
44.	Having people close to me remind me to take my treatment would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
45.	Eliminating negative thoughts would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
46.	Being educated on adherence would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
47.	Being at home at the time when I have to take my treatment would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
48.	If I had healthy food to eat it would be easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
49.	Accepting my HIV status would make it easier for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
50.	My fear of taking the treatment in the presence of others would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
51.	If I am unable to get to the clinic, it would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
52.	Not having my treatment with me at the time that I have to take it would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
53.	If I am not given feedback / updates on how I am responding to the treatment, it will make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

54.	The time-consuming process of refilling prescriptions at the clinic would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree
55.	Unfriendly nurses at the clinic would make it difficult for me to adhere to my HIV care and treatment								
	Strongly disagree	1	2	3	4	5	6	7	Strongly agree

Appendix 7: Patient data collection tool

Study Participant Number	Patient File number	Age (yrs)	Gender	Quarterly Clinic Visit Date Honoured (90+3 days after last visit)	Quarterly Accurate Pill Count Recorded (90+3 tablets)	Quarterly Pill Adherence	Number of pills remaining out of 90+3	Initial / Baseline CD4 Count Before ART	CD4 Count After 12 Months On ART	Initial / Baseline Viral Load Count Before ART	Viral Load Count After 12 Months On ART	Comments

Appendix 8: Participant informed sheet

Participant Information Sheet for Research Study Participants

Hello, my name is Thabiso Mango; I am a PhD student in Psychology at the University of Witwatersrand. As part of my study programme, I am conducting a research study that aims to predict adherence to HIV care and treatment prior to initiation of ART. I invited you to take part in the research study. Before you decide whether to participate, you need to understand why the research study is being done and what it would involve. Please take the time to read or to listen as I read the following information. You may talk to others about the research study if you wish. Please ask me if there is anything that is not clear, or if you would like more information. When all of your questions have been answered and you feel that you understand this research study, you will be asked if you wish to participate in the research study, and if yes to sign a Consent Form. You will be given a signed copy of the Consent Form to keep.

Purpose of the Research Study and Requirements

What is the study? The overall purpose of the research study is to develop and evaluate measures based on the Theory of Planned Behavior to predict adherence to HIV care and treatment prior to initiation of ART in Swaziland.

Why have I been invited to take part? I am asking people coming to LaMvelase HIV Clinic for HIV care and treatment to take part in this research study in order for me to gain insight on whether adherence to HIV care and treatment can be accurately predicted before the initiation of treatment. You have been asked to participate because you are a registered patient of the clinic. The information you give me during this study will be important in understanding the prediction of adherence to HIV care and treatment. What is learnt in this research study will assist me in developing and evaluating measures that will be used to identify people who are at high risk for non-adherence to HIV care and treatment so that interventions and support programmes can be put in place for them. This will potentially reduce the number of people who do not adhere to HIV care and treatment in Swaziland.

What will happen if I take part? If you agree to take part in the research study, I will ask you to sign this form indicating that you agree to be part of the research study. I will sit with you and ask you a series of questions which I will record on a questionnaire. I will also ask to have access to your clinic file and/card to gather some of your medical data. The information that you provide will be kept completely confidential. Your responses and medical data will be combined with those of other participants in the research study. Together this information will be analysed to inform the measures that will predict adherence to HIV care and treatment.

How long will the interview last? The interview will take approximately 30 minutes.

How often will your medical records be accessed? Your medical records will be accessed once every three months for the duration of the study to gather data pertinent to the study.

I may contact you again if I need to obtain further information or clarification regarding the information you provide me with today.

Risks

What are the risks of research study?

An inconvenience may be the time and effort you take to be a participant. You may find one or more questions that I ask to be upsetting or emotionally sensitive. You do not have to respond to any question that makes you uncomfortable. You may end the interview at any time without penalty or loss of any services to which you are entitled.

Confidentiality

Will my participation in the research study be kept confidential? Your interview will be conducted in a private area of the clinic where no one can hear your discussion with me. The information that is collected during this interview will not include your name or any other information to personally identify you. You will be allocated a unique research study participant number which will be used to identify you during the study. Only my supervisor and I will have access to the information you provide. You will not be identified in any reports or publications regarding the research study. Your participation in the research study will not be divulged to anyone.

Voluntary Participation

What are my rights as a participant? Your participation in this research study is completely voluntary. If you decide not to participate, you will not lose any services to which you are entitled. If you agree to participate in this research study, you may end your participation at any time without penalty or loss of existing or future services to which you are entitled. If you decide to take part, you are free to refrain from answering any questions. You are free to withdraw at any time without affecting your relationship with the clinic.

Additional Information

What will I receive for participating? You will not receive any monetary or other incentive for participation.

What will happen to the results of the research study? The results and progress of the research study will be presented in research publications and at meetings and conferences in Swaziland, South Africa and in other countries. The Ministry of Health in Swaziland will use the results to make improvements to their HIV care and treatment programmes and services. In addition, the research study progress and results will be put on a website so that others can learn from this study and strengthen services in their countries.

Who has reviewed the study for ethical issues? This research study has been reviewed by the University of the Witwatersrand Human Research Ethics (Medical) Committee and the Scientific and Ethics Committee (SEC) of the Swaziland Ministry of Health and Social Welfare.

What if I need more information? If you have a concern about any aspect of the research study, you should ask to speak to me, and I will do my best to answer your questions and address your concerns.

What if I suffer psychological distress during the study? If you suffer psychological distress at any time during the duration of the study, please contact Ms Lombuso Mthethwa a psychologist based at the Psychosocial Department of the LaMvelase HIV Clinic on +268 2 505 9106 Ext 215. Ms Lombuso Mthethwa is available for consultation at any time between 8am – 5pm from Monday to Friday.

What if there is a problem? For any concern you may have about the research study or any possible harm you might suffer, please contact me, Thabiso Mango, on +27 83 407 4828 or +268 7 605 2364 or My supervisor Ms. Mambwe Kasese-Hara on +27 11 717 4552.

Should you require to direct queries, concerns or complaints regarding the ethical activities surrounding the study, please contact the University of the Witwatersrand Human Research Ethics (Medical) Committee, contact details: Prof P Cleaton Jones, Tel +2711 717 2301, email peter.cleaton-jones1@wits.ac.za or Ms Z Ndlovu Administrative Officer 011 717 2700/1234/1252 zanele.ndlovu@wits.ac.za

Thank you for taking the time to read this information sheet.

Appendix 9: Informed consent form

Informed Consent Form for Study Participants

Participant Statement: I have read or listened to the Participant Information Sheet for this study. I have received an explanation of the planned research study, procedures, risks and benefits and privacy of my personal information.

I understand that my participation in this research study is voluntary, and I can withdraw anytime I want to.

I understand that my name will not appear on the questionnaire or clinical data, and it will not be used in the final report.

I understand that I will be assigned a unique research study participant number for the duration of the research study.

Any information I reveal to the researcher will be treated with confidentiality.

I agree to take part in the research study, by answering questions on the questionnaire.

If I have trouble, I will ask for the researcher's assistance.

Your name: _____

Your signature: _____ **Date:** _____

Researcher who conducted Informed Consent discussion: I, Thabiso Mango confirm that I have personally explained the nature and extent of the planned research study, study procedures, potential risks and benefits, and confidentiality of personal information.

I have assured the participant that participation is voluntary and that he/she can withdraw anytime he/she wants to.

I have also guaranteed the participant that all information revealed to me will be treated with confidentiality and that his/her name will not appear on the questionnaire or clinical data, and it will not be used in the final report.

If the participant requires my help, I will be of assistance.

Name of person obtaining consent: _____

Signature of person obtaining consent: _____ **Date:** _____

Contact number: +27 83 407 4828 or +268 7 605 2364.

Or you can contact my supervisor:

Ms. Mambwe Kasese-Hara on +27 11 717 4552

Appendix 10: Access to clinic file / care consent form

Access to Clinic File / Card Consent Form

Participant Statement: I have read or listened to the Participant Information Sheet for this study. I have received an explanation of the planned research study, procedures, risks and benefits and privacy of my personal information.

I agree that the researcher may have access to my clinic file and card to extract whatever data may be necessary for the research.

If I have trouble, I will ask for the researcher's assistance.

Your name: _____

Your signature: _____ **Date:** _____

Appendix 11: Complete list of 226 beliefs elicited from participants.

	Category	Belief
Behavioural outcome	Advantages	Helps you live longer
		Protects others from getting the disease
		Reduces the number of orphans
		Contains the virus
		Prevents opportunistic diseases
		Live longer
		Continue to work
		Prevents opportunistic diseases
		Regain health
		Will get used to taking treatment
		Will live
		Give birth to healthy babies
		Immune system will be boosted
		Protected from opportunistic diseases
		Know how tablets are in system
		Know if not responding well
		Boost immune system
		Immune system will fight other diseases
		Prevents opportunistic diseases
		Boost immune system
		Live longer
		Healthy life
		Prevent the HIV virus from spreading in body
		No opportunistic diseases
		Live longer
		No opportunistic diseases
		Virus is contained
		Live longer
		Not get sick easily
		Virus is contained
		Live longer
		Happiness
		Live longer
		Live longer
		Live longer
		Health life
		Increased immunity

	Disadvantages	Will be healthy and feel good
		No disadvantages
		No disadvantages
		No disadvantages
		No disadvantages
		Stigma associated with taking treatment
		Remembering to take treatment
		Give birth to sickly children
		Life could be difficult
		No disadvantages
		None
		Side effects
		None
		None
		None
		Side effects
		None
		None
		It's a lifelong commitment
		None
		None
		Discrimination from close ones
		Need support system to remind to take treatment
		Scary that have to take treatment for rest of life
		Afraid of side effects
		Side effects
Normative beliefs	Approve	Partner
		Mother
		Grandmother
		Mother
		Sister
		Mother
		Sister
		Friend
		Boyfriend
		Brother
		Mother
		Mother
		Mother
		Mother

		Friends
		Mother
		Sister
		Friends
		Sister
		Counsellor
		Sister
		Friends
		Mother
		Friends
		Family
		Partner
		Family
		Mom
		Sister
		Husband
		Children
		Cannot say
		Husband
		Partner
		Mother
		Children
	Disapprove	Mother
		Friends
		None
		Boyfriend
		No one
		Friends
		No one
		No one
		Boyfriend
		Boyfriend
		Mistresses
		No one
		No one
		Sisters
		Those that are not well informed about the disease and ARVs
		Colleague
		Boss

	Most likely to adhere	Everyone who has to take them
		Those who trust that the tablets will work
		Those that love life and want to live
		Those that see that the tablets are working
		Psychologist -they understand the situation
		People with high self-esteem - will know why they are taking treatment
		Celebrities - they do not want to be seen to be sick
		People with responsibilities
		People with businesses
		People with money
		People who are trustworthy
		People willing to have healthy lives
		Females
		Sister
		Those who want to live
		Women with children
		Young people
		Those that want to live
		Those that able to make it to the clinic
		Those that are able to follow instructions
		Those that value their lives
		Know importance of taking care of their lives
		Those who want to live longer
		Those who want to live
		Friends of similar age group
		Trustworthy people
		Trustworthy people
		Those that want to live
	Least likely to adhere	Those taking alcohol
		Those with no hope
		Those taking alcohol
		Those who do not believe that the tablets are working
		Those reacting negatively to treatment
		Traditionalist - don't believe in health centres
		Missionaries - believe God will heal them
		People experiencing side effects
		Those taking alcohol

		Those are scared of taking them in front of other people
		Males
		Those that think it's a shame
		Those taking alcohol
		Those frequenting nightclubs
		Those not educated about disease
		Those that have not accepted their status
		Those that don't follow instructions
		Those taking alcohol
		Those who do not think of their lives and future
		Those taking alcohol
		Those who smoke
		Those who do not have food
		Those who do not care about their lives
		Those that discriminate against people that have HIV
		Those who do not take care of themselves and their lives
		Those taking alcohol
Power of control factors	Easier	Not understanding treatment
		Discrimination
		Setting daily reminder
		Hearing and understanding what tablets are doing
		Understanding the impact of taking tablets
		Eliminating negative thoughts
		Blocking others negative views
		Being at home and not going out every day to miss time for taking tablets
		Associating with people with positive mindset
		Family responsibility - want to see my son grow
		Setting daily reminder
		Disclosing status and treatment
		Setting daily reminder
		Setting daily reminder
		Someone to remind me
		Disclosing status and treatment
		Accepting status
		Accepting status
		Setting daily reminder
		Not wanting to start afresh

		Good healthy food
		Ignoring what people say
		Listening to doctors
		Setting daily reminder
		Those that I have disclosed to encouraging me
		Those that I have disclosed to reminding me to take tablets
		Being at home and not going out every day to miss time for taking tablets
	Difficult	Not accepting HIV status
		Not having a clinic nearby
		Not having an update on health status while on treatment
		Fear of taking treatment in front of others
		Not disclosing status to others
		Nothing
		Cannot get to the clinic
		Not willing to go
		Lack of money to go to clinic
		Clinic is far
		Lack of money to go to clinic
		Not taking tablet with you when visiting places
		Long process when going to clinic
		Unfriendly nurses
		Low self esteem
		Pride
		Ego
		Not having food
		Not taking tablet with you when visiting places
		Not disclosing status to others
		Nothing
		Nothing
		Not having the tablets with me at set time
		Nothing
		Being away from home when have to take tablets
		Not disclosing status to others
		Not having food
		Fear of taking treatment in front of others
		Shame in status
		Not accepting status

