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PERCEIVED FACTORS ASSOCIATED WITH LTFU FROM ART PROGRAM AMONG ADULTS LIVING WITH HIV IN VHEMBE DISTRICT, SOUTH AFRICA

By

Netshifhefhe Livhuwani E

Student Number: 11615102

A mini dissertation submitted in fulfilment of the requirement for the degree: Master of Public Health

UNIVERSITY OF VENDA
FACULTY OF HEALTH SCIENCES
DEPARTMENT OF PUBLIC HEALTH

Promoter	*Co-Promoters*
Prof L. Makhado	**Dr SE Tshivhase**

March 2023

DECLARATION

I, ***Livhuwani E Netshifhefhe***, hereby declare that the proposal, ***"Perceived factors associated with LTFU from art program among adults living with HIV in Vhembe district, South Africa"*** submitted by me, has not been submitted previously for a degree at this or any other university, that it is my own work in design and in execution, and that all reference material contained therein has been duly acknowledged.

Signature: **Date**: 10 March 2023

PREFACE

This mini dissertation is written for my Master of Public Health Degree and presented in an **Article Format**. The title of my mini dissertation is "***Perceived factors associated with LTFU from ART program among adults living with HIV in Vhembe district, South Africa***". This mini dissertation is presented in three Sections. **Section 1-** Overview of the mini dissertation. **Section 2** – Provides the articles as they were published in different Publications and **Section 3-** presents the conclusion, implications, recommendations and limitations of the mini dissertation.

SECTION 1: MINI DISSERTATION OVERVIEW

This section presents the study procedure that details the background, problem statement, and objectives of this study. The section further offers a detailed outline of the research methods used to gather data.

SECTION 2: ARTICLE /PAPERS

This section has a total of 2 articles as detailed below:

- **Article 1: Titled "Impact of loss-to-follow-up from ART program on morbidity and mortality among adult PLHIV in South Africa: a mixed methods systematic review".**

This paper is about review of all studies on factors associated with Loss-to-follow-up from Antiretroviral Therapy (ART) programs among adults on Anti-retroviral treatment in South Africa.

- **Article 2: Titled "Factors Contributing to Loss-to-Follow-Up from ART Programs Among Adults Living with HIV in Vhembe District, South Africa"**

This paper is about a descriptive cross-sectional survey conducted in Sibasa Local Area which is situated in Thulamela B Municipality in Thohoyandou in the Vhembe District in the Limpopo Province of South Africa. The study was conducted in six primary health care clinics: Tshififi, Dzingahe, Sibasa, Mbilwi, Pfanani, and Magwedzha clinic and one Community Health Centre, the Thohoyandou Health Centre.

SECTION 3: CONCLUSION, IMPLICATIONS, RECOMMENDATIONS AND LIMITATIONS

This section presents the introduction, conclusion of the systematic literature review, conclusion of the article, general conclusion, recommendations, and the summary of the whole study.

PUBLICATIONS

Two manuscripts were crafted from this mini dissertation, thus

Netshifhefhe LE, Makhado L & Tshivhase SE. Impact of loss-to-follow-up from ART program on morbidity and mortality among adult PLHIV in South Africa: a mixed methods systematic review. *International Journal of Environmental Research and Public Health* **(Under review)**

Netshifhefhe LE, Makhado L & Tshivhase SE. Factors Contributing to Loss-to-Follow-Up from ART Programs Among Adults Living with HIV in Vhembe District, South Africa. *Challenges* **(Under review)**.

ABSTRACT

Losses to follow-up have emerged as a legitimate threat to the long-term success of the Anti-Retroviral therapy program. The success of Anti-Retroviral therapy program is monitored through retention in care and viral load suppression. This study describes perceived factors associated with loss to follow-up. A quantitative approach, cross sectional survey design study was conducted guided by the Health Belief Model. Permission to conduct the study was sort from the relevant authorities prior conducting the study and informed consent obtained from respondents who voluntarily participated. Respondents were selected through simple random sampling technique from seven primary health care facilities in Sibasa, Limpopo. An adapted questionnaire developed to measure constructs of the Health Belief Model was self-administered to measure perceived susceptibility and severity to complications of HIV disease and perceived benefits and barriers to attending HIV clinic. Reliability and validity of the questionnaire was evaluated during pretesting of the questionnaire to check if the questionnaire was measuring what it was intended to measure and if it was able to yield the same results in more than one occasion. The internal consistency of the instrument was measured using the Cronbach’s alpha reliability coefficient. The instrument showed greater internal consistency. Descriptive statistics such as frequencies and percentages were used to analyze the data. The analysis was performed using SPSS VERSION 28. Results were presented in the form of frequency tables, bar charts, and tables.

Results: 376 respondents participated in the study. Descriptive statistics revealed low perception of susceptibility to complications of HIV infection, somewhat closeness between the agree and disagree to perceived severity towards the complications of HIV infections, high perceived benefits and low perceived barriers regarding attendance and adherence to HIV treatment. Perceived motivation towards improvement of the general health status and proper lifestyle modification was high.

Conclusion: The study revealed that low perceived susceptibility to complications of HIV infection and low perceived severity to complications of HIV were factors associated with LTFU from ART program. It is recommended that health education be strengthened about complications which may arise due to lowered immune system.

Keywords**:** Adults living with HIV, anti-retroviral therapy program, disengagement, loss to follow-up

DEDICATION

This mini dissertation is dedicated to my husband Mr. Ravhutsi Thifhelimbilu, my children Mukonazwothe Ravhutsi and Ompha Ravhutsi and not to mention my sister Florah Netshifhefhe for their understanding, sacrifices and support offered to the success of this project.

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I give thanks to God, the Almighty for his grace, mercy and love upon my life.

I would like to sincerely appreciate the following individuals:

1. My supervisor, Prof Lufuno Makhado and co-supervisor Dr Shonisani Tshivhase for the patience, support and guidance offered throughout my study.
2. All the primary healthcare facility managers, for their assistance and granting me permission to conduct this study in their facilities.
3. All the study respondents for agreeing to take part in this project.
4. All the lay counselors and defaulter tracers in all PHC facilities.
5. My family members, especially my niece Khuthadzo Netshifhefhe and my mother Phophi Netshifhefhe for all their support throughout my studies.

LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	: Acquired Immunodeficiency Syndrome
ART	: Antiretroviral Therapy
ARV	: Antiretroviral
CCMDD	: Central Chronic Medication Dispensing and Distribution
HAST	: HIV and AIDS, Sexual Transmitted Infections and TB
HIV	: Human Immunodeficiency Virus
LTFU	: Loss-to-follow-up
PLHIV	: People Living with HIV/AIDS
SFLA	: Spaced and Fast Lane Appointment
UNAIDS	: Joint United Nations Programme on HIV and AIDS
WHO	: World Health Organization

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Section 1: Mini Dissertation Overview

1 Introduction

1.1. Background

1.1.1. General background and data-based literature

The WHO (2016) defines loss-to-follow-up (LTFU) as a patient not attending their scheduled appointment or drug pick-up for three months or more, unascertained death, or silent transfers due to a lack of information. Disengagement from care can reflect patient issues, and social-structural barriers may lead to disengagement from care (Matsumoto et al. 2015). The UNAIDS (2021) "95-95-95" strategy aims to diagnose 95% of people with HIV, place 95% of diagnosed people on treatment, and ensure that 95% of those on treatment are virally suppressed by 2030. Global LTFU rates at 12 months averaged 20% in 2015-2016, exceeding the WHO-recommended target of 15% (WHO 2016). Less than half of all people living with HIV in the United States are linked and retained in care, and only 68% of those achieve viral suppression (Holtzman et al. 2016). Retention and adherence are distinct behaviors that are interrelated and may share similar barriers and facilitators (Holtzman et al. 2015).

Lack of adherence to antiretroviral (ARV) regimens, combined with treatment interruptions, limits the effectiveness of HIV programs worldwide (Mobula et al. 2015). Non-adherence and inadequate retention to HIV treatment result in suboptimal viral suppression, increased risks of HIV transmission, drug resistance, regimen switch to more expensive second and third-line ART drugs, and longer hospital stays (Mobula et al. 2015; Mukumbang et al. 2017). Retention in care provides opportunities to monitor the response to HIV therapy, prevent HIV-associated complications, have scheduled laboratory tests done, and deliver ancillary services as prescribed by healthcare providers (Yehia et al. 2015; Mukumbang et al. 2017). Retention rates were reported to be 65% in Africa, 80% in Asia, and 64% in Latin America and the Caribbean (Fox 2015).

The incidence rate of LTFU increases with each calendar year of ART initiation (Mberi et al. 2015). Difficulties in retaining patients in care for lifelong treatment were documented in sub-Saharan Africa, with retention declining from 86.1% at 06 months to 72.3% at 36 months (Owachi 2018). A study revealed that retention rates declined from 83.1% at year 1 to 66.6% at year 5 in the adjusted analysis, and the percentage of patients who stopped ART increased from 8.5% at year 1 to 18.8% at year 5, with 14.7% dying (Haas et al. 2018). The rates of LTFU were 30% in Addis Ababa, Ethiopia, and 33.2% in Nairobi, Kenya, with identified barriers being stigma, use of religious healing, dissatisfaction with care, economic constraints, competing life activities, and side effects (Tiruneh et al. 2016; Ronoh 2018). In Wakiso district, Uganda, 33.4% of patients in public health facilities were lost to follow-up (Opio et al. 2019).

The HIV services in South Africa have been decentralized to primary healthcare (PHC) facilities and simplified medication. The Department of Health has developed standard operating procedures for a package of interventions to improve linkage to care, adherence to treatment, and retention in care. These interventions include Spaced and Fast Lane Appointments (SFLA), Adherence Clubs, Central Chronic Medicine Dispensing and Distribution (CCMDD) program, and tracing and retention in care. In the 2014/2015 financial year, the adult retention in care at 12 months was 66.0% for the Limpopo Province and 67.0% for Vhembe District, according to the Limpopo Provincial AIDS Council Annual Progress Report (2017). However, the Thulamela B sub-district in Limpopo Province had a loss-to-follow-up (LTFU) rate of 28.6% in the first quarter and 25.7% in the second quarter of the 2020/2021 financial year, according to the Thulamela B Sub-district report Q2 2020/2021.

1.1.2. Conceptual or Theoretical-based Literature:

The Health Belief Model is the underlying model for the topic area, according to Razmara et al. (2018). This model is a psychological health behavior change model, as noted by Razmara et al. Onoruoiza et al. (2015) state that the Health Belief Model was developed by Godfrey Hochbaum, Irwin Rosenstock, and Stephen Kegels in the 1950s in response to the failure of a free tuberculosis health screening program. The program was meant for adults and had mobile X-ray units located in various neighborhoods, but only a few adults utilized the service. Hochbaum found that those who did come out were motivated by their perceived risk of disease and perceived benefits of action. The Health Belief Model includes concepts such as perceived susceptibility, perceived severity, perceived benefits, and perceived barriers. Later on, the concept of cue to action was added to stimulate behavior, and in 1988, the concept of self-efficacy was added to better explain individual differences in health behaviors. The Health Belief Model has been applied to various health-related issues such as public response to preventative health programs, non-compliance to medical regimen, and sick role behaviors. According to Tarkang and Zotor (2015), the Health Belief Model aims to motivate people to take positive health actions by using the desire to avoid negative health consequences as a prime motivation.

Razmara et al. (2018) suggests that certain constructs of the Health Belief Model can differ among individuals and predict engagement in health-related behaviors. According to Razmara et al. (2018), perceived severity refers to the subjective evaluation of the severity of a health problem and its potential consequences, including physical and social consequences. Onoruoiza et al. (2015) notes that when a health problem is perceived as serious, individuals are more likely to engage in preventive behaviors. In this study, perceived severity pertains to the seriousness of HIV complications resulting from disengagement of PLHIV from HIV care.

Perceived susceptibility, according to Puneet et al. (2019), refers to an individual's subjective assessment of the risk of developing a health problem. The Health Belief Model predicts that individuals who perceive a high risk of being personally affected by a particular health problem will take steps to reduce their risk. Onoruoiza et al. (2015) observes that individuals who perceive a low susceptibility to a health problem may deny their risk and engage in unhealthy behaviors. In this study, the questionnaire will measure if PLHIV who have disengaged from HIV care and stopped taking HIV treatment feel at high risk of developing HIV-related complications.

Perceived benefits, as noted by Onoruoiza et al. (2015) and Razmara et al. (2018), refer to an individual's assessment of the value of engaging in a health-promoting behavior to decrease the risk of disease. If an individual believes that a particular action will reduce susceptibility to a health problem or decrease its severity, then they are more likely to engage in that behavior. In this study, the questionnaire will measure if PLHIV see the benefits of adhering to ART treatment and clinic attendance.

Perceived barriers are possible obstacles that impede an individual's ability to take action or engage in a behavior. Skinner et al. (2015) notes that barriers may include inconveniences, expenses, dangers, discomfort, and lack of access to affordable health care. The questionnaire will measure if there are barriers to continuous engagement in care and adherence to ART treatment, leading to loss-to-follow-up and the magnitude of those barriers.

The Health Believe Model asserts that there must be a trigger or cue to action for an individual to engage in health-promoting behavior. This trigger can be either internal, such as experiencing pain or symptoms, or external, such as information from healthcare providers, media, or close acquaintances that promote health-related behavior (Puneet et al., 2019).

Self-efficacy, or an individual's belief in their ability to perform a behavior successfully, is also an important factor (Puneet et al., 2019).

Modifying variables, which include demographic, psychosocial, and structural factors, indirectly affect health-related behaviors by impacting perceived seriousness, susceptibility, benefits, and barriers. According to Puneet et al. (2019), the Health Belief Model proposes that demographic variables, such as age, sex, race, ethnicity, and education, psychosocial variables like personality, social class, peer pressure, and structural variables such as knowledge about a given disease and prior contact with the disease, can all affect health-related behavior. The study will include demographic variables and analyze their impact or influence on the behavior taken (Puneet et al., 2019).

In this study, the Health Belief Model was utilized to create a framework for investigating non-retention in the ART program, which refers to non-compliance with scheduled clinic visits and medication pick-ups, as well as failure to access ancillary services. The adapted HBM questionnaire was employed to collect information that led to recommendations. The study suggests that obtaining information on perceived susceptibility, severity, benefits, barriers, and health motivation regarding non-retention in the ART program can help patients and clinicians develop strategies to encourage patients to engage in health-promoting behavior. This includes adhering to treatment regimens and consistently visiting clinics for treatment and continuous monitoring.

The literature review focused on several areas, including the benefits of antiretroviral treatment, the obstacles to retaining patients in care, the risks and consequences of anti-retroviral treatment interruption, and susceptibility to those consequences and cues to action.

1.2 Problem Statement

Makgato (2018) recommends that patients who have started antiretroviral treatment must remain in care for the treatment to be effective. However, in Sibasa, loss-to-follow-up from the ART program is a significant challenge, with a six-month loss-to-follow-up rate of 28.3%, well above the annual target of 10% (Thulamela sub-district HAST review 2nd quarter report: 2020/2021). Both adults and children are affected, leading to the failure to access antiretroviral treatment, prophylactic treatment, routine monitoring blood tests, and dietician consultations, as required by HIV positive patients according to guidelines (Mukumbang et al. 2017). This can result in increased healthcare service utilization, hospitalization, and mortality, as well as suboptimal viral suppression, drug resistance, and increased risk of HIV transmission to others. Despite the implementation of various interventions, including task shifting, simplified medication, spaced and fast lane appointments, adherence clubs, CCMDD, and patient tracing, patients still disengage from care and stop taking their ARV treatment (Department of Health 2016). No study has been conducted on loss-to-follow-up from the ART program in Sibasa, making it a priority health problem. Therefore, this proposed study aimed to investigate perceptual factors associated with loss-to-follow-up from the HIV program among adult patients in Sibasa.

1.3. Rationale for the study

Several studies were conducted on facilitators and barriers of adherence to ART and factors leading to loss to follow up from ART programme in different countries, including South Africa. However, the statistics of patients who are loss to follow up from ART program in Sibasa local area keeps on rising above the set district target of 10%. The proposed research investigated perceptual factors associated with LTFU in Sibasa local area. There was a need for identifying contributory factors to LTFU so that intervention strategies specific to the variables predicting adoption of unhealthy behavior of disengagement or LTFU from ART care can be developed.

1.4. Significance of the study

If the findings of the study are accepted, the Department of Health may use them to develop new strategies for individualized assessment for possibility of disengagement from HIV care during initial assessment before commencing treatment and come up with strategies to prevent loss to follow up. Policies may be developed that may inform nursing practice focusing on behavioral change interventions and content of education to be given to patients and relatives. The findings may further be used for future research and for the development of intervention strategies to reduce loss to follow up in Sibasa.

1.5. Study purpose and objectives:

1.5.1. Purpose:

- To describe perceived factors associated with loss-to-follow-up (disengagement) from ART program among adult PLHIV 18 years and above on ART in Sibasa.

1.5.2. Objectives:

- To assess the level of perceived susceptibility and severity to complications of HIV infection.
- To determine perceived benefits and barriers of attending HIV clinic regularly and adhering to HIV treatment.
- To evaluate motivation to engage in health promoting behavior.

Definitions of Key Terms:

This study was based on the following key concepts:

1.6.1 **Perceived factor**: Perception means how one sees the World (McDonald 2011). In the proposed study, perceived factor will mean an individual's unique way of viewing susceptibility and seriousness to complications of HIV infection as well as benefits and barriers to attending HIV clinic regularly and adhering to HIV treatment.

1.6.2. According to WHO, **LTFU** includes 'silent transfers, dead, unknown outcomes and disengaged due to barriers or other reasons' (WHO REPORT 2012). In the proposed study, LTFU will mean PLHIV on ART who have more than 90 days after the last scheduled appointment and has an outcome of LTFU from Tier.net register and not accessing HIV care services.

1.6.3. **Disengagement** means avoiding contact with services, either intentionally or unintentionally over a period of time (England NHS *Disengagement policy*, 2020). In the proposed study, disengagement from the ART program (HIV care) means not receiving continued HIV care services for 90 days after the last scheduled appointment irrespective of a particular site.

1.6.4. **PLHIV** stands for People Living with HIV and AIDS. In the proposed study, PLHIV means adults who are 18 years and above who have HIV and AIDS and were initiated to ART.

2. Methodology:

Quantitative research as defined by Creswell (2018, p. 41) is "an approach for testing objective theories by examining the relationship among variables."

In the proposed study, quantitative approach will enable the researcher to examine the relationship between perceived susceptibility, seriousness, benefits, barrier, health motivation and LTFU from HIV care in Sibasa. Creswell (2014) notes that a questionnaire is used to measure variables, so that numbered data can be analyzed using statistical procedures.

2.1. Study design:

The researcher adopted a cross-sectional survey study design. Creswell (2014) states that a cross-sectional survey study design means that data is collected at one point in time. Cherry (2019) claims that this allows the researcher to compare many variables at the same time. The survey design is the preferred type of data collection procedure for the proposed study because it is inexpensive, data collection is convenient and the turn-around for data collection is rapid. Due to high representativeness, generalization from the sample to the population can be done (Etikan & Babtope, 2019). Aggarwal and Ranganathan (2019)observes that a descriptive survey means that the investigator does not attempt to determine the cause; but only relates one variable to another and then presents quantitatively what was observed or said. Perceptual factors and their association with non-retention in ART programs will be investigated and findings will be quantitatively presented in the proposed study.

2.2. Study setting

The study was conducted in Sibasa which is situated in Thulamela B Municipality in Thohoyandou in the Vhembe District in the Limpopo Province of South Africa. The Sibasa area has seven primary health care clinics: Tshififi, Dzingahe, Sibasa, Mbilwi, Pfanani, and Magwedzhe clinic and one Community Health Centre, the Thohoyandou Health Centre. All facilities render HIV services. Top causes of death for males and females in the age group between 25 and 64 years is TB, HIV and AIDS and lower respiratory tract Infections(Profile: Vhembe District Municipality 2020) . The employment rate is at 67.20% (Profile: Vhembe District Municipality 2020). The population group is dominated mostly by Black Africans, followed by Indians/Asians, Coloured, and lastly whites. The three commonly spoken official languages are English, Tshivenda and Tsonga. Health service delivery challenges are poor roads infrastructure, network challenges, and shortage of medicines (IDP. Budget 2020/21 – 2022/23).

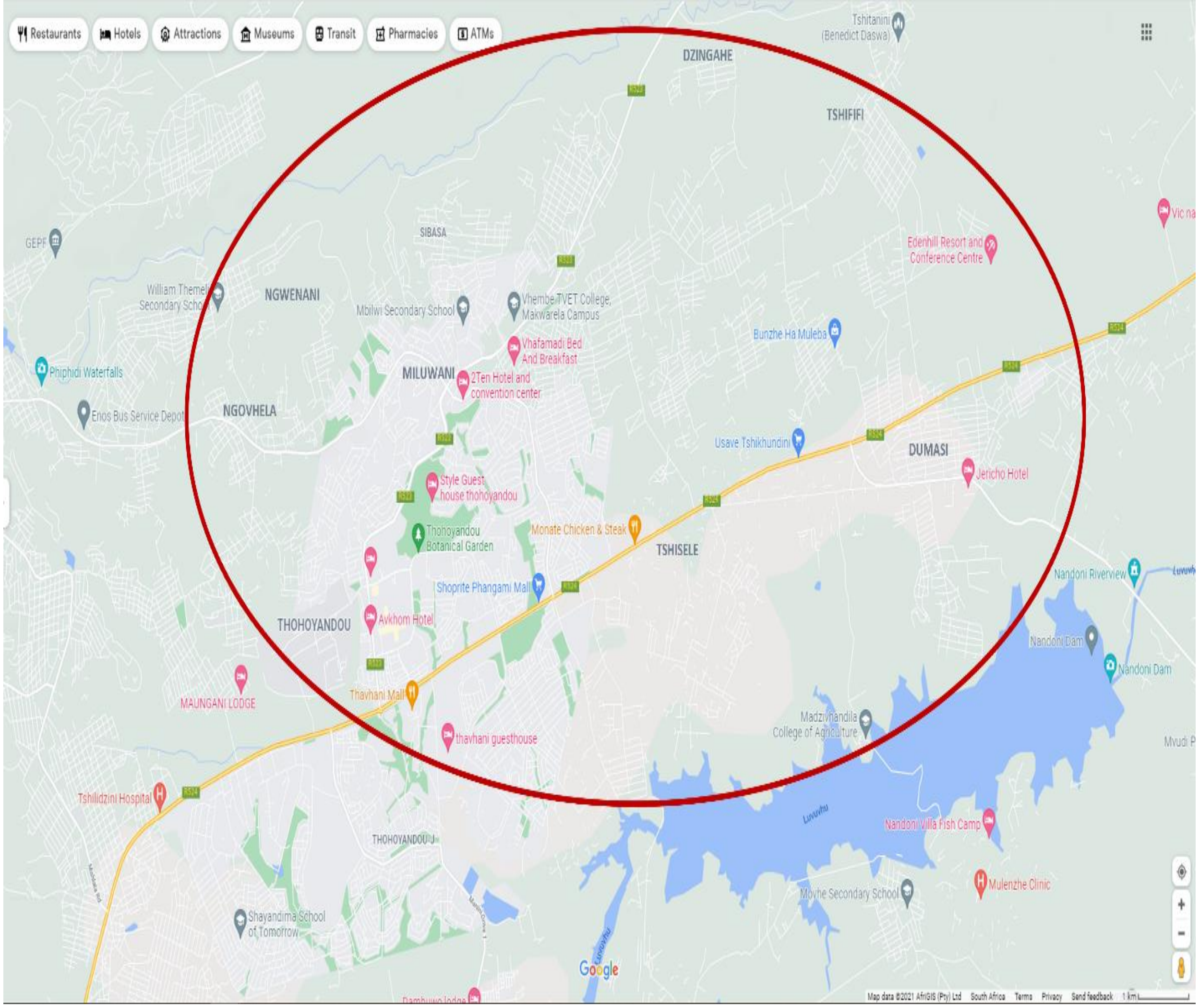

Figure1: Google Maps (https://www.google.com/maps/@-22.9520772,30.4776578,14z) (Accessed 09 September 2021)

2.3. Study population and sampling:

2.3.1. Study population

The study population were adults 18 years and above PLHIV registered on ART in March 2020 and had an outcome of Loss-To-follow-up of six months in Sibasa Local Area. Sibasa had 5810 adults remaining in care and 28.3% of the adult loss-to-follow-up rate at six months during Q2 2020/2021 according to the Thulamela Sub-district report. This constitutes a population of 1644.

Table 1: Lost-to-follow-up rate from seven clinics under Sibasa Local Area

Clinics under Sibasa Local Area	Adult remaining on ART (Q2) 2020/2021	Target for LTFU	Adult lost to follow rate: (Q2) 2020/2021
Dzingahe	607	10%	29.4%
Magwedzha	610	10%	40%
Mbilwi	224	10%	35.7%
Pfanani	739	10%	52.6%
Sibasa	1065	10%	11.1%
Thohoyandou Health Centre	2176	10%	29.8%
Tshififi	389	10%	0%
Total	**5810**	**10%**	**28.3%**

2.3.2. Sampling:

Simple random sampling technique was used since it uses randomization and ensures external and internal validity. It also allows for statistical inferences about the population. A complete list (with patient's names, file number and clinic names) of all (1644) patients were printed from the clinic electronic registers of all seven facilities i.e., sample frame and assigned numbers from 0001 to 1644 sequentially. The intended sample size calculated using Raosoft sample size calculator at the margin of error of 5%, confidence level of 95%, population size of 1644 and the response distribution of 50% is 312 (Raosoft, 2020). Sample size n = 312 patients. An additional 20% of the sample were included to make provision for non-response.

The intended sample size was 312 with addition of 20% to 312 (i.e., 62) making a total of 374. A sample of 374 patients was independently selected using a table of random numbers to obtain a representative sample.

2.3.3. Inclusion and exclusion criteria:

Adults' patients who initiated ART in March 2020 and had an outcome of Loss to follow up of six months were included in the study. Unstable mental health care users, very ill patients and those who refused to sign the consent form on the day of data collection were excluded from this study.

2.4. Measurement instrument:

Perceived factors associated with LTFU were investigated using the instrument adapted from the instrument developed to measure constructs of the Health Belief Model developed by Victoria Lee Champion (Champion 1984). Champion (1984) reported internal consistency reliability coefficients of .77 for the susceptibility scale, .78 for seriousness, 61 for benefits, .76 for barriers and .60 for health motivation using Cronbach's alpha. Construct validity was proved using multiple regression with barrier scale scoring 91.9 and health motivation 49.71. Barrier and health motivation predicted behavior as predicted by the theory.

The questionnaire was in English, and a language practitioner translated it to Tshivenda and Xitsonga and back to English. The questionnaire had the following sections: demographic data, susceptibility factors, seriousness factors and benefit factors, barriers and motivation factors that predicted disengagement from health promoting behavior. Mirotznik et.al. (1998) used the Health Belief Model to explain clinic appointment-keeping for the management of a chronic disease condition. The internal consistency of the instrument was measured using the Cronbach's alpha reliability coefficient. Susceptibility had alpha of 0.85, seriousness 0.94, benefit 0.78, barrier 0.81 and motivation 0.72. The instrument showed greater internal consistency.

2.5. Pretest

The questionnaire was pre-tested on 37 PLHIV, with the same characteristics as the sample who were not part of the study in order to validate it, to check for the correct interpretation of questions, to assess time taken to complete an item as well as the full survey before the study was conducted. The researcher issued the questionnaire to participants to complete.

2.6. Reliability and Validity of the Questionnaire:

As indicated above, the instrument has been reported to be reliable with an internal consistency reliability coefficient of .77 for the susceptibility scale, .78 for seriousness, .61 for benefits, .76 for barriers and .60 for health motivation using the Cronbach's alpha. The Cronbach's alpha of .89 was recorded for the whole instrument. Construct validity was proved using multiple regression with barrier scale scoring 91.9 and health motivation 49.71. Barrier and health motivation predicted behavior as predicted by the theory. Mirotznik et al. (1998) used the instrument for the health belief model to explain clinic appointment-keeping for the management of a chronic disease condition. The internal consistency of the instrument used in this study was measured using the Cronbach's alpha reliability coefficient. Susceptibility had alpha of 0.85, seriousness 0.94, benefit 0.78, barrier 0.81 and motivation 0.72. The instrument showed greater internal consistency.

2.7. Plan for data collection:

The table of random numbers was used to select respondents from the sample frame. A patient's file was retrieved to get the contact numbers as well as the residential address. Respondents were recruited through phone calls and the assistance from community health workers (CHWs).

Respondents were contacted telephonically in advance to make appointments to meet them at the clinics where they collect their treatment from. The study aims at describing perceived factors associated with loss-to-follow-up (disengagement) from ART program. The motive behind including patients to the study is because perceived or perceptual factors are factors that patients regard as causing them to be disengaged from care and to stop taking their ART treatment. Those factors were identified only from patients through administration of a questionnaire developed to measure constructs of health belief model.

The researcher visited the institutions to get information to be used to recruit respondents and again during the time of data collection. The clinic nurses were requested to introduce the researcher to the respondents.

The researcher explained the purpose of the study, the duration the respondent may take to complete the questionnaire. The researcher also explained that participation is voluntary and that respondents may discontinue participation at any time without penalty. Respondents were assured that confidentiality will be maintained by not requesting them to write their names on the questionnaire. The consent and questionnaire forms were not bound together but were kept under lock and key and can only be accessed by the researchers and the supervisor. The consent and questionnaire forms will be kept for 5 years.

The consent form was given to each respondent to complete before participating in the study. Respondent who are illiterate gave verbal consent in the presence of a literate witness who verified and signed the letter of information and consent on behalf of the respondent indicating that informed verbal consent was given. In this study witnesses were clinic nurses; in case the illiterate patient came alone to the clinic or representative since this study targets are HIV positive patients. This was done to maintain confidentiality. The respondents also appended the right thumb print on the consent form. The questionnaire was self-administered but those who cannot read and write were assisted by the researcher.

The researcher read out the questions loud to the respondents and recorded their answers. Their answers were read back to them to confirm if what was documented was what they have answered.

2.8. Plan for data management and analysis:

Descriptive statistics such as frequencies and percentages were used to analyze the data. The analysis was performed using SPSS VERSION 28. Results were presented in the form of frequency tables.

Ethical Considerations:

The following ethical principles were dealt with:

2.9.1. Permission to conduct the study:

The proposal underwent several levels of review and approval to ensure ethical clearance. The Department of Public Health, School of Health Sciences, the Higher Degrees Committee, Executive School Higher Degrees Committee, and the University Ethics Committee were presented with the proposal. Following this, the researcher sent it to the University Higher Degrees Committee for approval. To conduct the study, permission was also obtained from relevant authorities such as the Limpopo Department of Health, Department of Health Vhembe District, and operational managers of the selected clinics.

2.9.2. Informed consent:

For the respondents to make an informed decision and give informed consent; the purpose of the study, explanation of the procedure, benefits of the study and confidentiality were included in the letter of information and consent form. The letter of information and the consent form were in the language understandable to the respondent or representative. The respondent was given sufficient time to read the letter of information and consent form. The consent form was given to each respondent to complete before participating in the study. In case of respondents who were illiterate, verbal consent were given in the presence of a literate witness who verified and signed the letter of information and consent on behalf of the respondent indicating that informed verbal consent was given. In this study the witnesses were the clinic nurses in case the illiterate patient came alone to the clinic or representative since this study targets were HIV positive patients. This was done to maintain confidentiality. The illiterate respondents also appended the right thumb print on the consent form. Al Tajir (2018) notes that respondents have the right to participate and to discontinue whenever they feel like it.

2.9.3. Confidentiality:

Confidentiality was maintained and all documents with participant’s information were kept under lock and key. Under no circumstance shall information provided by the respondents be disclosed to any third party (Al Tajir 2018).

2.9.4. Anonymity:

The questionnaire had instruction informing respondents not to write their names or any identification particulars on it. The consent form and the questionnaire were not bound together and are kept under lock and key (Bos 2020).

2.9.5. Freedom from harm and exploitation:

The questionnaire was given to the supervisor who checked or assessed it in order to exclude or correct questions that may cause emotional harm to the respondent. The researcher did not observe any discomfort associated with participation in the research and therefore no participation was discontinued (Al Tajir 2018).

Delimitation of the study:

The philosophical framework of post positivism influenced the researcher to adopt the quantitative approach and to apply the Health Belief Model throughout the proposed study. The researcher proposed to investigate the influence of perceived susceptibility and severity of complications of HIV as well as benefits and barriers to attending HIV clinics. Due to time constraints, the study was conducted only in the Sibasa Local Area though the challenge of Loss to follow up is also there in other local areas in the Vhembe District. Only adults' patients who are 18 years and above were included in the proposed study. The questionnaire had closed-ended Likert scale response survey excluding open-ended responses. The closed-ended Likert scale generated data at ordinal level, thus allowing statistical analysis of data.

Plan for dissemination and implementation of results:

The findings of the study will be shared with the Department of Health at provincial level, at the district as well the primary health facilities.

If the findings of the study are accepted by the department, strategies will be developed to implement its recommendations.

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SECTION 2: PAPERS/ARTICLES

IMPACT OF LOSS TO FOLLOW-UP FROM ART PROGRAM ON MORBIDITY AND MORTALITY AMONG ADULT PLHIV IN SOUTH AFRICA: A MIXED METHODS SYSTEMATIC REVIEW

Submitted to Journal as:

Netshifhefhe LE, Makhado L & Tshivhase SE. Impact of loss-to-follow-up from ART program on morbidity and mortality among adult PLHIV in South Africa: a mixed methods systematic review. International Journal of Africa Nursing Science **(Under review)**

See **Appendix 6** for Author Guidelines

Impact of loss-to-follow-up from ART program on morbidity and mortality among adult PLHIV in South Africa: a mixed methods systematic review

Netshifhefhe LE, Makhado L, Tshivhase SE

[1]*Department of Public Health, Faculty of Health Sciences, University of Venda, Thohoyandou, Limpopo province, South Africa*

[2]*Office of Executive Dean, Faculty of Health Sciences, University of Venda, Thohoyandou, Limpopo province, South Africa*

Corresponding Author: Netshifhefhe LE, Email: netshifhefhele@gmail.com

Abstract

Background: The success of the Anti-Retroviral program is monitored through retention in care and viral load suppression. Challenges preventing patient retention in care for the long term must be identified and addressed.

Purpose: The purpose of this systematic literature review is to review all studies on factors associated with Loss-to-follow-up from Anti-Retroviral Therapy programs among adults on Anti-retroviral treatment in South Africa.

Inclusion criteria: Qualitative, quantitative, mixed methods, grey, published studies in English from 2017 to 2022 conducted in South Africa were included in the review.

Methods: The following databases were searched; Ebscohost, CINAHL, MEDLINE, Open grey and Google Scholar. This mixed methods systematic literature review has been conducted following the Joanna Briggs Institute methodology for Mixed Methods Systematic Review. A convergent integrated approach to synthesis and integration was followed. Systematic review registration number (Students are advised not to register).

Results: 22 studies reviewed, 18 quantitative studies comprised of 17 cohorts and 01 cluster randomized trial, 03 qualitative studies of which 02 are grey literature and 01 mixed method study. LTFU rate ranged from 20.4% to 47.7%. Only 02 studies reported an LTFU rate of 12%. Barriers associated with loss-to-follow-up are poverty and unemployment leading to financial and transport challenges, mobility often for income generation opportunities, education and family illness, and long waiting times at health facilities. Modifying variables are male gender, age, pregnancy during initiation of treatment, depression, failure to disclose, alcohol abuse, stigma and discrimination and CD4 count. Poor health care worker relationship and lack of knowledge. Not perceiving a direct benefit of treatment due to initiation under universal test and treatment policy.

Conclusions: The bulk of studies reviewed focused on data review and analysis of medical records. There is a need for further studies to investigate patients' perceptions and experiences resulting in loss-to-follow-up from care.

Keywords: Antiretroviral therapy, attrition, default, disengaged and Loss to follow-up.

Introduction

According to the World Health Organization (WHO) report (2012), Loss-to-follow-up (LTFU) refers to patients on antiretroviral therapy (ART) who have not attended a scheduled appointment for more than 90 days. LTFU includes silent transfers, unknown outcomes, dead patients, and those disengaged due to barriers or other reasons. Retention in care and adherence to ART treatment are critical elements of HIV care interventions that have a close association with optimal individual and public health outcomes. The ART program's success is monitored through retention in care and suppressed viral loads.

The ART program aims to increase access to ART treatment for all HIV-infected individuals, improving their quality of life and survival, and minimizing transmission of HIV infection through suppression of viral load (Zingoni et al., 2020). UNAIDS has set an ambitious goal to eliminate the AIDS epidemic by 2030, which includes testing 95% of the population, initiating ART for 95% of HIV-positive individuals, and achieving 95% viral load suppression to break the cycle of HIV transmission (Parekh et al., 2018).

LTFU poses a threat to patient retention and the success of the ART program (Leshargie et al., 2022). Its negative impact includes HIV-related complications, immunological failure, AIDS-related admissions, morbidity, mortality, drug resistance, and the continuous spread of HIV infection (Kebede et al., 2021). Developed and developing countries face the challenge of LTFU. Studies conducted in Croatia, Sri Lanka, and Ethiopia have reported high LTFU rates, and a study in Zimbabwe reported an LTFU rate of 22.71% after the implementation of ART services decentralization to mitigate transport barriers (Zingoni et al., 2020). A study conducted in Myanmar by Aung et al. (2018) reported a decrease in the retention rate from ART initiation over time.

This systematic literature review aims to synthesize findings from available qualitative, quantitative, and mixed methods studies in English or grey literature on factors leading to disengagement from HIV care and LTFU among adult PLHIV on ART in South Africa. The review will highlight patient experiences and ART program challenges contributing to patients defaulting on treatment, which could inform policies and practices.

Review Question

What are the factors associated with LTFU from ART programs in adult PLHIV on ART in South Africa?

Methods

This mixed methods systematic literature review has been conducted following the JBI methodology for MMSR (Lizarondo et al. 2020). The review title and the review protocol have not been registered.

Search strategy

Before conducting this review, various databases were searched, including Cochrane Collaboration, Campbell Collaboration, MEDLINE PROSPERO, PubMed, CINAHL, Joanna Briggs Institute (JBI) Evidence Synthesis, NHS Centre for Reviews and Dissemination, and Google Scholar, on 09 February 2022. The purpose was to determine if any existing or ongoing systematic review had been conducted on factors associated with loss-to-follow-up, but none were found. The search was conducted using keywords contained in the title and abstract, and a full search strategy for EBSCOHost is provided in appendix 1 of the review protocol. Studies published in English between 2017 and 2022 were considered, and the search began on 13 February 2022, and concluded on 07 March 2022. The review protocol was prepared beforehand, which included clarifying the review question using PICO to express the research question, specifying inclusion and exclusion criteria, and conducting a scoping bibliographic search. The process involved screening the title and abstracts, obtaining and selecting articles, appraisal of studies quality, data extraction, analysis and synthesis of results, and report writing and dissemination. A systematic review had previously been conducted on studies published between 2011 and 2015 to describe the variation in definitions and estimate the proportion of patients lost to care across studies.

Inclusion and Exclusion Criteria

The systematic review focused on studies that met the following criteria:

- Population: Studies that included adult PLHIV who were receiving ART.
- Phenomena of Interest: Studies that investigated loss-to-follow-up, defaulter, disengagement, or attrition from the ART program.
- Context: Studies that explored factors related to loss-to-follow-up from the ART program in South Africa.
- Types of studies: The review considered quantitative, qualitative, and mixed methods studies. Mixed methods studies that allowed clear extraction of quantitative or qualitative data were also considered. The review included studies published in English and grey literature from 2017 to 2022.

Exclusion criteria:

- The systematic literature review excluded studies on PLHIV not yet initiated on ART.

Study selection

After conducting the search, a total of 80 references were found and imported into a bibliographic citation management software, EndNote. 17 duplicates were removed, and two reviewers assessed the titles and abstracts of the remaining 63 references against the inclusion criteria. 21 irrelevant references were excluded, and the remaining 42 were evaluated using PICo parameters. 16 references were excluded, leaving 26 studies. The full text of these 26 studies was reviewed against the inclusion criteria by two independent reviewers, and 2 studies were excluded, leaving 24 studies for inclusion in the systematic review. Throughout the screening and selection process, there was agreement between the reviewers. Figure 1 provides reasons for exclusion of the studies that did not meet the inclusion criteria.

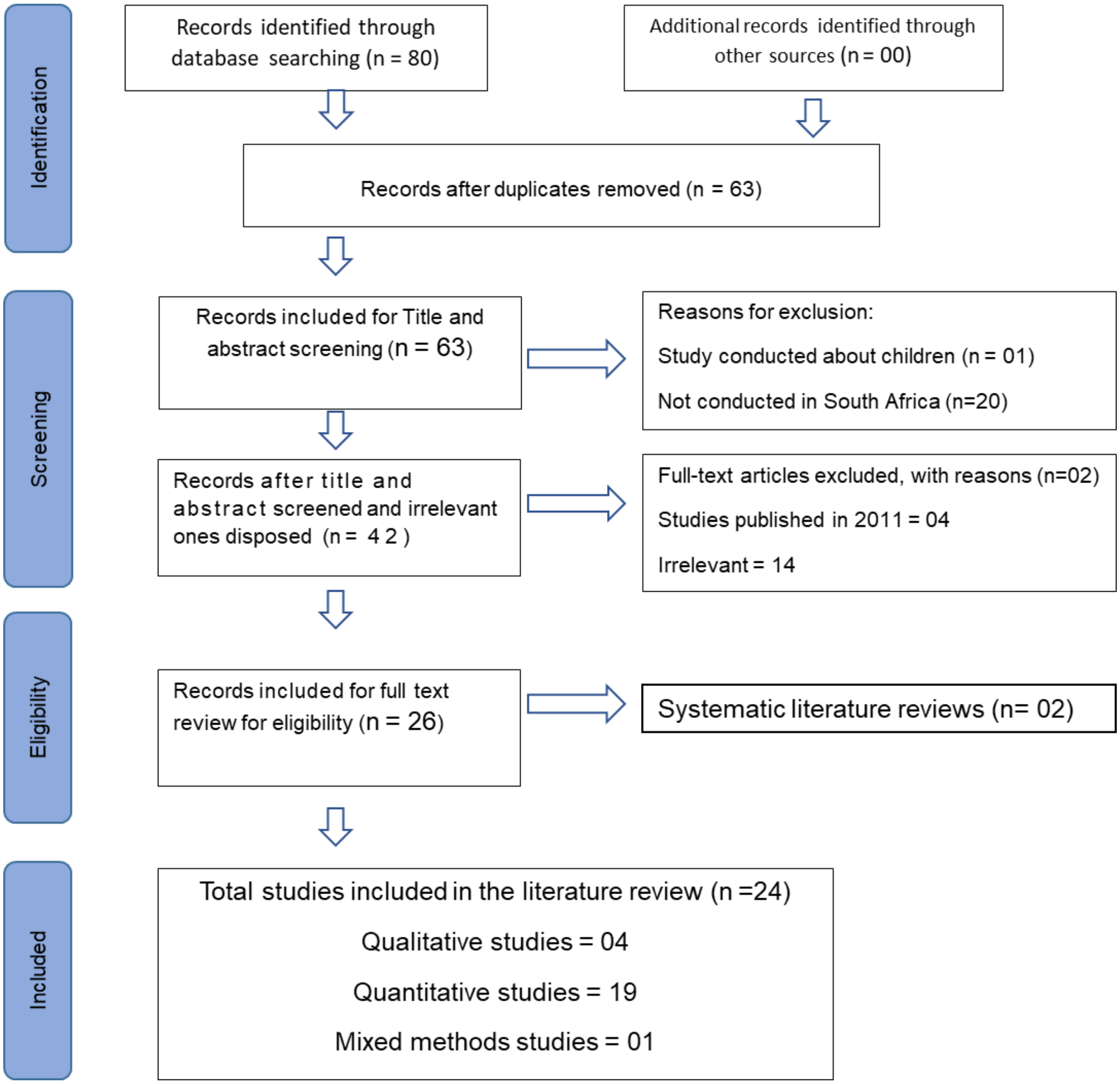

Figure 2. PRISMA 2009 flow diagram (Moher et al. 2009).

Appraisal of Studies Quality/ Assessment of methodological quality

During the appraisal process of the selected studies, two reviewers assessed them independently, and there were no discrepancies or disagreements between them. The appraisal of the studies was performed using the JBI critical appraisal instrument that is specific to the type of research - the JBI critical appraisal instrument for qualitative research was used for the appraisal of qualitative studies, and the JBI critical appraisal instrument for quantitative research was used for the assessment of quantitative studies.

Table 2: Characteristics of included studies

Author	**Type of Study**	**Methodology**	**Country and setting**	**Sample size**	**Participants characteristics**	**Phenomenon of interest**
Stern et al.	Qualitative study	Interview	Three randomly selected primary health care (PHC) facilities are located in Khayelitsha and Khayelitsha hospitals.	20 patients and 9 ART service providers.	20 HIV-infected patients who have defaulted treatment.	Defaulted ART and hospitalized.
Kaplan et al.	Retrospective Cohort conducted from January 2013 to December 2014	Data review	13 ART clinics in Khayelitsha.	39 884	Greater than 10yrs on ART.	Disengagement from care.
Shearer et al.	Retrospective cohort analysis (January 2008 and December 2013)	Cohort	Themba Lethu HIV Clinic	12 291	Between January 2008 and December 2013, patients started on a typical first-line ART treatment.	Patients who underwent the first round of ART were monitored until an early death, loss-to-follow-up, transfer to another facility, or data set closure occurred.
Bassett et al.	Prospective cohort study (longitudinal study)	Cohort	Durban	1887	Newly diagnosed HIV positive and started ART	Perceived barrier and mortality.
Cichowitz et al.	Prospective cohort study (longitudinal study) from February to June 2013	Medical Records review.	Peri-urban community in South Africa, close to Johannesburg	136	Patients enrolling for the start of ART during the research period.	The retention of HIV patients is impacted by mental illness and psychological suffering.
Papavarnavas N.S	Retrospective cohort study (between January 2013 and September 2015)	Electronic database and 29 additional folders.	Groote Schuur Hospital Occupational Health Clinic.	293 HCW	HCWs were considered if they had been present at the OHC and had come into contact with potentially infectious material from patients who were HIV-positive or whose HIV status was unknown. and	Variables identified during the 6-week, 3-month, and 6-month follow-up visits as being related to LTFU.

					had a baseline HIV test result of negative.	
Clouse et al.	Retrospective cohort study	Cohort	Six public clinics in Johannesburg.	788	Women initiating ART during pregnancy	The percentage of women who kept taking their HIV medication after being declared LTFU.
Arnesen, Moll and Shenoi.	Retrospective review/study.	regular medical records have been retrospectively reviewed.	15 basic health clinics and the HIV clinic at Tugel Ferry's Church of Scotland Hospital (COSH) in South Africa (PHCs).	From January 2015 and June 2016, 3242 people visited the COSH central hospital's HIV clinic.	People who stopped taking ART at the HIV clinic in the main hospital	Patients who discontinued ART
Hirasen et al.	Retrospective cohort study	Cohort	Themba Lethu Clinic is located at Helen Joseph Hospital in Johannesburg, South Africa.	3151	As compared to a similar multi-pill ART regimen, patients who are HIV-positive, non-pregnant, and non-TB are initiated on an FDC.	Missed doctor appointments, attrition (combined loss-to-follow-up and mortality), and virologic suppression (viral load 400 copies/mL) by 12 months post-ART commencement were all treatment outcomes.
Onoya et al.	Retrospective cohort study	Cohort	Johannesburg, South Africa.	6306 HIV-positive women aged 15–49.	Prevalence and incident pregnant women.	LTFU, Virological failure.
Bock et al.	Retrospective cohort study	Cohort	3 DOH primary healthcare (PHC) clinics are located in South Africa's Western Cape (WC).	2423	Adult clients having started ART.	Data from the DOH on all adult clients who began ART for HIV between January 2014 and November 2015.
Ambia et al.	Patient's records review.	Cohort	South Africa's Mpumalanga Province	3700	Patients who started receiving ART between 30 April 2014 and 15 July 2017 and were connected to an AHDSS record.	We took into consideration LTFU, death, re-engagement, and migration away from the study site.
Gosset et al.	A cluster-randomized trial	Group-based trajectory modelling	Hlabisa subdistrict, KwaZulu-Natal, in South Africa.	777	ART-eligible patients.	Retention In Care trajectories.

	was conducted between 2012 and 2016.					
Hirasen et al.	Cohort analysis of prospectively collected data	Cohort	Johannesburg, South Africa is home to the Witkoppen Health and Welfare Center and Themba Lethu HIV Clinic.	2410	pre-UTT and UTT groups	LTFU by 12 months.
Dorward et al.	Retrospective cohort analysis	Cohort	Eight public clinics in KwaZulu-Natal	4952	adolescents and adults over 15 who have begun receiving ART.	Compared to those with lower CD4 counts, see how PLHIV commencing ART at CD4 counts >500 cells/L fared after the implementation of Treat All in public-sector settings.
Chauke P	Retrospective cohort study design.	Cohort	In the Gauteng Province of South Africa, six randomly chosen primary healthcare (PHC) facilities are situated in the Ekurhuleni North sub-district.	ART was started in 367 UTT and pre-ART patients in November 2016.	18 years of age or older who began taking ART in November 2016	Rate of LTFU and related variables in ART initiated by patients undergoing UTT at 12 months after ART beginning.
Etoori et al.	Cohort study	Comprehensive record review	The province of Mpumalanga is located in rural north-eastern South Africa.	1017	LTFU	Comparing the actual results of adults who were previously classified as LTFU.
Lilian et al.	Routine data were analysis	Analyzed routine TIER.Net data January 2019 data	Mopani District in Limpopo Province and Johannesburg District in the province of Gauteng	32 290 records	clients starting ART in the districts of Mopani and Johannesburg in the provinces of Limpopo and Gauteng, respectively.	Evaluation of same-day initiation's implementation and its effects on patients' willingness to remain in ART care.
Joseph et al.	Clinic-based prospective cohort	File review.	In six high HIV load areas in South Africa (Sedibeng in Gauteng Province, Alfred Nzo in Eastern Cape Province, Ugu, King Cetshwayo and Harry Gwala in KwaZulu Natal Province, and Gert Sibande in Mpumalanga Province), there	92,609	ART patients who began treatment between September 2016 and May 2018 in six areas with a high HIV prevalence.	LTFU, all-cause mortality.

			are 379 public health facilities, including hospitals.			
Onoya et al.	Prospective cohort study	Cohort	In the Johannesburg health sub-district A, two (of 13) conveniently chosen public-sector PHCs participated in this study.	425	Those with a fresh HIV diagnosis who were at least 18 years old qualified as participants.	The main result was not taking previous ART for at least 90 days and being lost to follow-up (LTFU).
Hannaford et al.	Mixed method study.	Survey and In-depth interview	Church of Scotland Hospital. KwaZulu Natal	102	PLWH who disengaged from ART (minimum 90 days) and subsequently resumed care.	To describe ART disengagement in an underdeveloped rural environment.
Lowane and Lebese.	A qualitative descriptive and contextual study	In-depth interviews	Limpopo Province, South Africa at selected CHCs	16	Trained professional nurses who have completed CCMT training and Nurse-Initiated Management of Antiretroviral Treatment (NIMART).	Professional nurses' perceptions on the causes or consequences of LTFU.
Modipane M.B	Qualitative study.	Face-to-face interview	conducted at the Mashabela, Motetema, Mankotsane, and Moeding clinics in the Sekhukhune district.	30 patients and 08 nurses.	Nurses and LTFU patients	Four nurses from clinics with a high LTFU rate, four nurses from clinics with a low LTFU rate, and patients who are HIV positive and classed as LTFU patients.
Ratshihume P.T	A qualitative explorative cross-sectional study design	In-depth face to -to-face interview	Matoks settlement is located in a small village in the Capricorn area of the province of Limpopo's Molemole municipality.	19 respondents	HIV HIV-positive adult clients	Adult clients at the Matoks clinic who are HIV-positive and have not received treatment in more than two months.

Data extraction

Two evaluators worked independently to extract data from the included studies using a standardized data extraction tool from the Joanna Briggs Institute (JBI). Both qualitative and quantitative data were collected and recorded in an Excel spreadsheet that was developed based on the JBI data extraction tool to aid in data analysis. The extracted data encompassed details on study populations, methods, phenomena of interest, context, and outcomes that were pertinent to the review question.

Data transformation

After the data extraction process, the quantitative data were transformed into qualitative data through a process called "qualitization." This allowed the reviewers to interpret the quantitative results in a narrative format that could help address the review question.

Data synthesis and integration

For this review, a mixed-methods systematic approach was employed, using the convergent integrated approach as per the JBI methodology. Quantitative data was converted into qualitative data, and merged with the qualitative data. The extracted data was then coded and grouped into themes, which were based on the constructs of the Health Belief Model. These constructs were used as a set of themes to organize the codes identified during the analysis of the extracted data.

Results

Analysis and synthesis of results

Most of the studies included in the systematic literature review found high loss-to-follow-up (LTFU) rates ranging from 20.4% to 47.7%, with the highest LTFU rate of 76.6% reported by Gosset et al. (2019). However, two studies reported a lower LTFU rate of 12% (Etoori et al. 2020; Hirasen et al. 2018). A trend of increasing LTFU rates from six months up to five years was also observed in the studies.

LTFU is defined as no contact with health services for more than 90 days after the last missed appointment for an ART refill (Mody et al. 2018). Adherence to medical advice and health service usage are linked to sick role behavior. The Health Belief Model is a useful framework to predict various behaviors, including sick role behavior and clinic utilization. The themes from the HBM were used to analyze findings from studies on the factors contributing to LTFU from the ART program in South Africa in this literature review.

Theme 1: Barriers leading to loss to follow up from ART program:

A study by Stern et al. (2017) reported that a high unemployment rate leads to migration and poverty, which poses challenges for accessing transportation and food needed to take medication. Hannaford et al. (2021) reported comparable results, stating that mobility for income generation opportunities, education, family illness, and financial challenges were major themes contributing to disengagement. Participants also experienced difficulty accessing ART without a formal transfer letter.

Onoya et al. (2021) found that participants who traveled for at least 30 minutes to the diagnosis clinic were more likely to be lost to follow-up compared to those with less than 15 minutes of travel time, while Hannaford et al. (2021) reported that clinics were too expensive to reach due to distance and long waiting times. Similar findings of long waiting times at health facilities were reported by Ratshihume (2018) and Lowane and Lebese (2022).

Lowane and Lebese's (2022) qualitative descriptive and contextual study revealed that the main theme derived from data analysis was the organizational health system and management of the healthcare setting. Lack of patient involvement or engagement, stereotyped appointment date selection, and errors in recording patients' return dates were reported as challenges experienced by people living with HIV on ART.

Hannaford et al. (2021) reported that about 74% of participants in their study were not concerned about ART adverse effects. The only study that reported side effects as the cause of LTFU was the study conducted by Modipane (2020). Hirasen et al. (2018) reported that fixed-dose combination (FDC) had approximately the same risk of attrition by 12 months compared to multi-pill ART. Modipane (2020) reported that healthcare workers failed to maintain confidentiality.

Theme 2: Modifying variables associated with loss to follow up from ART program:

According to Stern et al. (2017), depression, mental health, failure to disclose HIV-positive status to the employer and spouse, stigma, and discrimination are factors that lead to patients being lost to follow-up. Similar findings were reported by Modipane (2020) and Ratshihume (2018) regarding failure or non-disclosure of HIV-positive status to a partner, discrimination, stigma, and self-stigma.

Cichowitz et al. (2017) found that depression and alcohol use disorder were independently associated with disengagement from care in a prospective cohort study. PLWHIV faces a significant level of internalized stigma and impaired quality of life at the time of ART initiation, as reported by Cichowitz et al. (2017).

Several studies (Arnesen et al. 2017; Kaplan et al. 2018; Gosset et al. 2019; Dorward et al. 2020; Hirasen et al. 2020;) suggested that lower CD4 count, male gender, and younger age are factors associated with disengagement or discontinuation or lost from care. However, Bock et al. (2018) reported no significant difference in attrition between men and women. Ratshihume (2018) reported that women were more likely to default than men, and Chauke et al. (2020) found higher LFTU among females and patients aged 18-35. In his retrospective cohort study, Bock et al. (2018) reported that higher attrition was found among those with a baseline CD4 count greater than 500 cells/ µl compared to those with a baseline CD4 count of 0 – 500 cells/ µl. This finding was supported by Gosset et al. (2019) and Chauke et al. (2020).

Women who initiate ART during pregnancy or are pregnant at ART initiation have a higher risk of becoming lost from care after delivery, according to Kaplan et al. (2017), Clouse et al. (2017), and Onoya et al. (2017). Pregnant or breastfeeding women, foreigners, and those who initiated ART most recently were also at increased risk of LTFU, as reported by Ambia et al. (2019). Etoori et al. (2020) found that stopping treatment is more common for women who initiated ART while pregnant.

Other factors associated with care exit or discontinuation are the duration on ART, being newly diagnosed, and those who initiated ART most recently, as reported by Arnesen et al. (2017), Gosset et al. (2019), and Ambia et al. (2019). Patients with moderate and advanced anemia and low BMI are at risk factors for LTFU by 12 months of treatment, according to Hirasen et al. (2020).

Male sex, health care worker category of a doctor, young age, time from exposure to receiving PEP of more than 24 hours, and being an unconfirmed SA citizen were variables associated with LTFU, as reported by Papavarnavas (2019) and Shearer et al. (2017). Employment, transport challenges, religious beliefs, the use of traditional medicine for cure, poor client health provider relationship, discontinuation of social grants, pill burden, and shortage of ARV at the clinic were identified as contributory factors of LTFU, according to studies conducted in Matox and Sekhukhune districts (Ratshihume 2018; Modipane 2020).

Theme 3: Perceived severity (Not perceiving severity of the health problem):

Stern et al. (2017) conducted a study that found that some patients who improve on antiretroviral therapy (ART) may mistakenly believe they are cured and stop taking their medication. Modipane (2020) reported similar findings, stating that some participants in ART programs were lost to follow-up because they felt physically strong and lacked understanding of the importance of ART.

Joseph Davey et al. (2020) compared patients who started ART on the same day as their diagnosis to those who started ART later, and found that same-day initiation was associated with rapid loss-to-follow-up (LTFU) and an increased risk of LTFU. Lilian et al. (2020) reported that 32.2% of patients were lost on the same day of ART initiation.

Hirasen et al. (2020) noted that LTFU was higher under the Universal Test and Treat (UTT) policy compared to previous periods, which was also observed by Chauke et al. (2020) who reported a higher LTFU of 64.1% under the UTT strategy versus 35.9% for pre-ART. Chauke et al. (2020) further found that almost half (49.5%) of patients were lost to follow-up after the first six months of ART initiation.

Hirasen et al. (2020) also commented that under the treat-all policy, patients may start treatment in better health, which could lead to a lack of perceived benefit and discourage consistent engagement in HIV treatment programs.

Theme 4: Benefits of ART

According to Hannaford et al. (2021), in a study conducted in rural South Africa using a mixed method, 99% out of 102 participants expressed their desire to achieve good health. They cited their reasons as wanting to care for their families and having their families provide support for their ART.

Theme 5: Cue to action:

Stern et al. (2017) reported that LTFU can be caused by inadequate understanding of the consequences of discontinuing treatment, poor patient-provider relationships, and distrust between patients and healthcare workers. Similar results were reported in studies conducted by Lowane and Lebese (2022), Modipane (2020), and Ratshihume (2018), which also found that poor relationships between patients and healthcare providers can lead to LTFU. Ratshihume (2018) found that lack of knowledge about HIV, ART, ARV side effects, and insufficient support from family and friends can also contribute to LTFU. Hannaford et al. (2021) further uncovered that study participants had knowledge gaps about HIV transmission and increased tuberculosis risk.

Discussion

The definition of loss-to-follow-up (LTFU) according to the World Health Organization (WHO) includes unascertained death, silent transfers due to unavailability of information, and disengagement from care three months after their last scheduled appointment or drug pick-up. Disengagement refers to avoiding contact with services, either intentionally or unintentionally over a period, as stated in the England NHS disengagement policy (2020). The WHO has set a target of less than 15% for LTFU, while UNAIDS has set the 95-95-95 targets to achieve epidemic control of HIV by 2030, which includes HIV testing of 95% of the population, ART initiation of 95% of those diagnosed, and viral suppression of 95%. However, South Africa is still facing challenges in meeting these targets, with only 92% of people knowing their HIV status, 70% of HIV-positive patients initiated on ART, and only 64% virally suppressed (Hansoti et al. 2021). Policy changes such as the universal-test-and-treat (UTT) policy and same-day initiation policy have been implemented, but LTFU remains a challenge in the implementation of the HIV programme in South Africa.

The Health Belief Model was used as a guide in the conduct of a systematic literature review, as it has been applied to the problem of non-compliance to medical regimens and sick role behavior. Compliance with recommended medical regimens, including clinic use and physician visits, is important, and the Health Belief Model suggests that the benefits must outweigh perceived barriers for patients to engage in health-promoting behavior (University of Twente 2019). Challenges experienced by people living with HIV (PLHIV) on ART include stereotyped appointment date selection, lack of patient involvement or engagement, and errors in recording patients' return dates. Engaging PLHIV in scheduling their appointment dates can improve patient experiences, minimize waiting time, and allow patients to incorporate clinic visits into their busy schedules and personal obligations.

The benefits of taking ART were only acknowledged in one study, and modifying variables as suggested by the Health Belief Model can affect health-related behavior indirectly by affecting perceived seriousness, susceptibility, benefits, and barriers (Puneet et al. 2019). Poor relationships with healthcare workers, lack of information about the consequences of stopping treatment, and lack of knowledge about HIV and AIDS, ART, and ARV side effects were reported as factors contributing to LTFU, and similar findings were reported in studies conducted by Lowane and Lebese (2022), Modipane (2020), and Ratshihume (2018). Hannaford et al. (2021) further revealed that participants had knowledge gaps regarding HIV transmission and increased risk of tuberculosis.

Several studies, including Aliyu et al. (2019), Makurumidze et al. (2020), and Wekesa et al. (2020), have reported that male gender is associated with loss-to-follow-up. Gender is considered a social determinant of health and a driver of health behaviors, and patients' perception of disease, help-seeking behavior, and use of health care are determined by gender constructs (Manandhar, 2018; Mauvais-Jarvis et al., 2020). Literature suggests that males have a higher rate of attrition from ART programs than females. Implementation of Universal Test and Treat (UTT) and Same Day Initiation (SDI) policies may increase attrition due to changing baseline characteristics. Patients who initiate ART while their CD4 count is still high are usually asymptomatic and may not perceive the benefits of ART treatment, leading them to discontinue the treatment.

Young age between 18-35 years is also associated with loss-to-follow-up, consistent with Cassidy et al. (2022), who noted that younger patients with fewer comorbidities are more likely to drop out of care because they do not see an immediate benefit of ART. Patients in this age group may have busy schedules and competing social roles, such as education, employment, cohabitation/marriage, and parenthood. They are also more likely to be employed and may be buying treatment (Joho, 2021).

Initiating ART during pregnancy is associated with an increased risk of loss-to-follow-up, consistent with Cichowitz et al. (2019) and Kelly-Hanku et al. (2020). This could be due to initiation for PMTCT reasons instead of for the mother's own health. Women who are tested during ANC and breastfeeding are initiated the same day, leaving them with insufficient time to process their new HIV diagnosis and failing to disclose their status to their partner. Pregnant women typically start treatment while asymptomatic and may not have a reason to continue taking treatment lifelong once mother-to-child transmission is prevented. Barriers to remaining in care may impede ART continuation (Sasse et al., 2022).

Conclusions and Recommendations

The majority of studies included in this systematic literature review were carried out in Gauteng Province, specifically in Johannesburg at Themba Lethu HIV clinic, Kwazulu Natal, Cape Town at Khayelitsha, and Limpopo at Mathox, Sekhukhune, Mopane and Vhembe district. These studies focused on adults who had been initiated on ART and measured loss-to-follow-up as an outcome. The results of these studies highlighted challenges in ART program effectiveness and patient experiences that contribute to loss-to-follow-up from ART programs. The review found that loss-to-follow-up is more common in males, younger individuals, pregnant women at ART initiation, those with a high CD4 count, and those who are newly diagnosed with HIV. In addition, organizational health system and healthcare facility management contribute to loss-to-follow-up due to poor patient-provider relationships and long waiting times. The data for analysis was predominantly extracted from electronic or hard copies of medical or clinical records and registers, with only a small number of qualitative studies included in the review. This highlights a gap in research on the perceptions and experiences of both patients and staff in relation to loss-to-follow-up from ART programs.

Implications to practice

The loss-to-follow-up from ART programs poses a significant challenge to their effectiveness. To prevent the development of resistant virus strains, it is important to address the challenges associated with stopping and reinitiating treatment for pregnant women and those initiated with high CD4 count. Healthcare facilities need to improve patient engagement and appointment scheduling practices to prevent patients from missing appointments. To sustain engagement after delivery, a strategy to link mothers from the mother-mentor program to general support groups should be developed. An online electronic database and health records system accessible to all healthcare facilities could help address the challenge of mobility without transfer letters and improve access to ART services. Interventions to enhance compliance, such as supervised therapy, improving the nurse-client relationship, and patient education, are also necessary.

Implications for research

More research is required to explore the patient experiences and perceptions, building upon the findings of this literature review and the existing study designs investigating the factors linked to loss-to-follow-up in South Africa.

Conflict of interests

The authors declare no conflict of interest.

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FACTORS CONTRIBUTING TO LOSS-TO-FOLLOW-UP FROM ART PROGRAMS AMONG ADULTS LIVING WITH HIV IN VHEMBE DISTRICT, SOUTH AFRICA

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See **Appendix 6** for Author Guidelines

Factors Contributing to Loss-to-Follow-Up from ART Programs Among Adults Living with HIV in Vhembe District, South Africa

Netshifhefhe LE, Makhado L, Tshivhase SE

[1]*Department of Public Health, Faculty of Health Sciences, University of Venda, Thohoyandou, Limpopo province, South Africa*

[2]*Office of Executive Dean, Faculty of Health Sciences, University of Venda, Thohoyandou, Limpopo province, South Africa*

Corresponding Author: Netshifhefhe LE, Email: netshifhefhele@gmail.com

Abstract

Background: Loss of people living with HIV from care has become a significant concern for the Anti-Retroviral therapy program's long-term success. The program's effectiveness is evaluated based on the retention of patients in care and the suppression of viral loads. This research, which was conducted at seven primary health care facilities in Sibasa Local Area, Limpopo, was guided by the Health Belief Model (HBM) to investigate the perceived factors linked with loss-to-follow-up.

Methods: A cross-sectional study was carried out at seven primary health care facilities in Sibasa Local Area, Limpopo, utilizing a simple random sampling technique. The study recruited adult patients who had initiated ART in March 2020 and experienced a loss-to-follow-up outcome. An adapted structured questionnaire was used to collect data, and SPSS version 28 was used to analyze the data. Descriptive statistics, such as frequencies and percentages, were employed in the data analysis.

Results: The study involved 376 participants who completed the survey. Analysis of the data using descriptive statistics showed that the respondents had a low perception of susceptibility to complications of HIV infection. There was a small difference between those who agreed and disagreed with the perceived severity of the complications of HIV infection. On the other hand, respondents had high perceived benefits and low perceived barriers towards attending and adhering to HIV treatment. Additionally, respondents had a high level of motivation towards improving their general health status and making necessary lifestyle modifications.

Conclusion: According to the study, low perceived susceptibility and severity of HIV-related complications were found to be linked to loss-to-follow-up from ART programs. The study suggests that there is a need to improve health education and raise awareness about the potential complications that can arise from a weakened immune system.

Keywords: Antiretroviral therapy, attrition, default, disengaged and Loss to follow up.

Introductions

Loss-to-follow-up (LTFU) refers to patients who have not attended their scheduled appointment for more than 90 days after their last appointment (Nshimirimana 2022). WHO REPORT (2012) further explained that LTFU includes patients who have been silently transferred, those whose outcomes are unknown, those who have disengaged due to barriers or other reasons, and those who have died.

Inadequate retention and non-adherence to HIV treatment lead to poor viral suppression, increased risks of HIV transmission, drug resistance, and the need to switch to more expensive second and third-line ART drugs, as well as longer hospital stays (Mobula et al. 2015; Mukumbang et al. 2017). Ojukwu (2021) emphasized that LTFU may result in increased morbidity and mortality, disease progression, and fiscal costs for re-hospitalization and treatment for increased morbidity. Optimal outcomes are achieved when patients adhere to treatment and remain in care (Umeokonkwo et al. 2019).

Loss to follow-up (LTFU) from ART programs could prevent the long-term success of HIV treatment (Palacio-Vieira 2021). To encourage countries to improve retention and adherence, UNAIDS has set the 95-95-95 target to be achieved by 2030 (Palacio-Vieira 2021). Retention in care is necessary for patients to achieve viral suppression.

According to Owachi (2018), difficulties in retaining patients in care for lifelong treatment were reported in sub-Saharan Africa, with retention declining from 86.1% at six months to 72.3% at 36 months. The challenge of retaining patients in care is highlighted by the UNAIDS data report for 2021, which showed that the viral load suppression rate among PLHIV in South Africa is only 66% against the set target of 95% (UNAIDS).

Retaining patients in care provides opportunities to monitor response to HIV therapy, prevent HIV-associated complications, conduct scheduled laboratory tests, and provide ancillary services and other monitoring activities as prescribed by healthcare providers, according to Yehia et al. (2015) and Mukumbang et al. (2017).

Studies conducted in South Africa reported loss to follow up rates ranging from 20.4% to 47.7% (Dorward et al. 2020; Onoya et al. 2021). The highest loss to follow up rate of 76.6% at 12 months was reported by Gosset et al. (2019). Etoori et al. (2020) and Hirasen et al. (2018) reported LTFU rates of 12%. A trend of an increasing LTFU rate from six months up to five years was reported. According to the Limpopo Provincial AIDS Council Annual Progress Report (2017), the adult retention in care percentage at 12 months was 66.0% for the province and 67.0% for the Vhembe District in the 2014/2015 fiscal year. LTFU at Thulamela B sub-district in Limpopo Province was 28.6% during the first quarter and 25.7% in the second quarter (Thulamela B Sub-district report Q2 2020/2021).

In a study conducted by Stern et al. (2017), it was found that high unemployment rates contribute to migration and poverty, which in turn lead to transport challenges and food shortages that make it difficult for patients to take medication. Hannaford et al. (2021) reported similar findings, with financial challenges identified as a major contributing factor to disengagement, while mobility was often driven by income generation opportunities, education, and family illness. Onoya et al. (2021) also found that patients who had to travel for at least 30 minutes to the diagnosis clinic were more likely to lose follow-up compared to those with less travel time. Hannaford et al. (2021) suggested that clinics were too expensive to reach due to distance and long waiting times, which was also reported by Ratshihume (2018) and Lowane and Lebese (2022). Additionally, lack of patient involvement or engagement, stereotyped appointment dates selection, and errors in recording patients' return dates were identified as challenges experienced by PLHIV on ART (Lowane and Lebese 2022).

Stern et al. (2017) also found that depression, mental health issues, failure to disclose HIV-positive status to the employer and spouse, and stigma and discrimination contribute to patients' loss of follow-up. Similar findings were reported by Modipane (2020) and Ratshihume (2018). Studies conducted in Matox and Sekhukhune district also reported employment posing difficulty in taking time off for clinic visits during the weekdays, transport challenges due to lack of funds, religious beliefs, use of traditional medicine, and poor client health provider relationship (Ratshihume 2018; Modipane 2020).

In addition, Stern et al. (2017) noted that some patients discontinue taking treatment after feeling better on ART, while Modipane (2020) found that some participants were lost to follow-up because they felt strong physically and lacked understanding of the significance of ART. Hirasen et al. (2020) also suggested that under the treat-all policy, patients may not perceive a direct benefit to treatment, which may discourage consistent engagement in the HIV treatment program. Lack of knowledge about HIV/AIDS, ART, and ART side effects, as well as lack of support from family and relatives, were also reported as factors contributing to loss-to-follow-up (Ratshihume 2018). Hannaford et al. (2021) further revealed that participants had gaps in their HIV knowledge regarding transmission and increased risk of tuberculosis.

According to Mobula et al. (2015), behavioural constraints limit long-term adherence to medications and treatment of chronic diseases. The Health Belief Model (HBM) has been applied to predict various health behaviors, including sick role behavior, which refers to compliance with recommended medical regimens, clinic use, and physician visit for several reasons. Previous studies have focused on facilitators and barriers to non-adherence to treatment, but no study has been conducted in Sibasa Local Area that applies the constructs of the HBM to loss-to-follow-up from ART program.

The researcher intends to investigate the factors that are perceived to contribute to loss-to-follow-up (LTFU) among adult people living with HIV (PLHIV) aged 18 and above who are receiving antiretroviral therapy (ART). The study also seeks to evaluate the perceived level of susceptibility and severity of HIV complications, as well as perceived benefits and barriers to regular attendance at the HIV clinic and adherence to HIV treatment in the Sibasa Local Area. The identification of these factors is essential for the development of targeted intervention strategies to address the specific variables that predict unhealthy behavior, such as disengagement or LTFU from ART care. Thus, the main objective of this study is to describe the perceptual factors associated with LTFU from HIV care among adult patients in the Sibasa Local Area.

Methods

Study Design and Setting

A descriptive cross-sectional survey study design using a quantitative approach was conducted. The study was conducted in Sibasa Local Area which is situated in Thulamela B Municipality in Thohoyandou in the Vhembe District in the Limpopo Province of South Africa. The Sibasa local area has six primary health care clinics: Tshififi, Dzingahe, Sibasa, Mbilwi, Pfanani, and Magwedzha clinic and one Community Health Centre, the Thohoyandou Health Centre.

Study Population:

The study population were 18 years adults, above PLHIV registered on ART in March 2020 with an outcome of Loss-To-follow-up in Sibasa local Area. Sibasa local area had 5810 adults remaining in care and 28.3% of the adult loss-to-follow-up rate at six months during Q2 2020/2021 according to the Thulamela Sub-district report. This constitutes a population of 1644.

Sample Size and Sampling Procedure

Sample Size: The researcher used the Raosoft sample size calculator to determine the sample size, based on a 5% margin of error, 95% confidence level, population size of 1644, and response distribution of 50%. The calculated sample size was 312 patients. To account for potential non-response, an additional 20% was added to the sample size, resulting in a total of 374 patients. A representative sample of 374 patients was then selected independently using a table of random numbers.

Sampling Procedure: Simple random sampling technique was used. A complete list with patient's names, file number and clinic names of all 1644 patients were printed from the clinic electronic registers i.e., sample frame and assigned numbers from 0001 to 1644 sequentially.

The Inclusion Criteria and Exclusion Criteria

Adult patients-initiated ART in March 2020 and had an outcome of Loss to follow were included in the study.

Unstable mental health care users, extremely ill patients and those who refused to sign the consent form on the day of data collection were excluded from this study.

Measurement instrument

The researchers used an adapted tool based on the Health Belief Model to measure different concepts, including susceptibility, seriousness, benefit, barrier, and motivation for general health. To assess the reliability of the instrument, the researchers used Cronbach's alpha coefficient. The results indicated that the tool had high internal consistency, with susceptibility having an alpha of 0.85, seriousness 0.94, benefit 0.78, barrier 0.81, and motivation 0.72. The participants responded to the sub-scales on a 5-point Likert scale, with 5 indicating strong agreement and 1 representing strong disagreement.

Data Analysis

Data was analyzed using descriptive statistics i.e., frequencies and percentages. The analysis was performed using SPSS VERSION 28. Results were presented in the form of frequency tables.

Ethical Approval

The study received approval from the University of Venda's Ethics Committee (Ethical clearance NO: FHS/22/PH/02/3003). Prior to conducting the study, permission was sought from the Limpopo Department of Health, Department of Health Vhembe District, and

Operational Managers of the selected clinics. Respondents were informed about the importance of maintaining confidentiality and were asked to complete consent forms before participating in the study. They were also informed that participation was voluntary, and they could withdraw at any time without any consequences.

Results

A total of 376 individuals participated in the study. The study included PLHIV ranging in age from 18 to 82 years old, with a large number falling between the ages of 39-51 (n=130, 34.6%) and 52-82 years (n=135, 35.9%). The majority of participants were female (n=277, 73.7%) and African (n=370, 98.4%). A total of 149 participants (39.6%) were married, while 146 (38.8%) were single. The majority of participants identified as Christians (n=297, 79.0%). Approximately 204 participants (54.3%) had attained a secondary education, while 99 (26.4%) had a tertiary education. (Refer to Table 1 for further details.)

Table 3: Demographic Characteristics

Variable	**Attributes**	**Frequency**	**%**
Age	18-29 years	35	9.3
	30-38 years	76	20.2
	39-51 years	**130**	**34.6**
	52-82 years	**135**	**35.9**
Gender	Male	99	26.4
	Female	**277**	**73.7**
Race	African	**370**	**98.4**
	White	3	.8
	Indian/Asian	3	.8
Marital status	Single	**146**	**38.8**
	Married	**149**	**39.6**
	Divorced	28	7.4
	Widowed	45	12.0
	Separated	8	2.2
Religion	None	**33**	**8.8**
	Christianity	**297**	**79.0**
	Traditional African Religions	**44**	**11.7**

	Hinduism	1	.3
	Other	1	.3
Education	Primary Education	73	19.4
	Secondary Education	**204**	**54.3**
	Tertiary Education	**99**	**26.4**

Perceived susceptibility

Respondent's perception were ranging from strongly disagree, disagree, neutral, agree and strongly agree. SD represent strongly disagree, D represent disagree, N represent neutral, A represent agree and SA represent strongly agree as displayed in table 4 below. . The majority of the participants had a perception of low susceptibility towards experiencing complications of HIV infection. However, the mean value indicated that the perception towards susceptibility ranged from low to moderate, with some participants having a high perception of susceptibility towards HIV infection complications (as shown in Table 4 below).

Table 4: Perceived Susceptibility.					
	SD	**D**	**N**	**A**	**SA**
My chances of getting complications of HIV infection are great.	**64 (17.0)**	**177(47.1)**	18(4.8)	66(17.6)	51(13.6)
My physical health makes it more likely that I will get complications of HIV infection.	**78(20.7)**	**162(43.1)**	18(4.8)	73(19.4)	45(12.0)
I feel that my chances of getting complications of HIV infection in the future are good.	**78(20.7)**	**184(48.9)**	25(6.6)	52(13.8)	37 (9.8)
There is a good possibility that I will get complications of HIV infection.	**69(18.4)**	**192(51.1)**	14(3.7)	59(15.7)	42(11.2)
I worry a lot about getting complications of HIV infection.	**62(16.5)**	**140(37.2)**	13(3.5)	95(25.3)	66(17.6)
Within the next year I will get complications of HIV infection.	**92(24.5)**	**187(49.7)**	14(3.7)	43(11.4)	40(10.6)
	N	**Min**	**Max**	**Mean**	**SD**
Perceived Susceptibility	376	6.00	30.00	**15.3989**	**6.22472**

Perceived seriousness

Table 3 indicates that there was a close distribution between the Agree and Disagree options in terms of the perceived seriousness of HIV complications. However, when combining the Agree and Strongly Agree responses, it can be seen that a majority of participants held a high perception of the seriousness of HIV complications. The mean score for perceived seriousness was relatively high (38.18) with a standard deviation of 13.65. Nonetheless, it is concerning that some PLHIV did not perceive the complications of HIV as being serious.

Table 5: Perceived Seriousness

	SD	**D**	**N**	**A**	**SA**
The thought of complications of HIV infection scares me.	40(10.6)	**104(27.7)**	8(2.1)	**138(36.7)**	86(22.9)
When I think about the complications of HIV infection, I feel nauseous.	44(11.7)	**110(29.3)**	11(2.9)	**132(35.1)**	79(21.0)
If I had complications of HIV infection, my career would be endangered.	58(15.4)	**103(27.4)**	10(2.7)	**129(34.3)**	76(20.2)
When I think about complications of HIV infection, my heart beats faster.	51(13.6)	**108(28.7)**	10(2.7)	**122(32.4)**	85(22.6)
Complications of HIV infection would endanger my marriage (or a significant relationship).	54(14.4)	**109(29.0)**	13(3.5)	**121(32.2)**	79(21.0)
Complications of HIV infection are hopeless diseases.	42(11.2)	**98(26.1)**	14(3.7)	**138(36.7)**	84 (22.3)
My feelings about myself would change if I got complications of HIV infection.	62(16.5)	**101(26.9)**	12(3.2)	**128(34.0)**	73(19.4)
I am afraid to even think about the complications of HIV infection.	44(11.7)	**102(27.1)**	12(3.2)	**137(36.4)**	81(21.5)
My financial security would be endangered if I got complications of HIV infection.	64(17.0)	**112(29.8)**	11(2.9)	**112(29.8)**	77(20.5)
Problems I would experience from complications of HIV infection would last a long time.	57(15.2)	**114(30.3)**	13(3.5)	**110(29.3)**	82(21.8)
If I got complications of HIV infection, it would be more serious than other diseases.	68(18.1)	**119(31.6)**	13(3.5)	**99(26.3**)	77(20.5)
If I had complications of HIV infection, my whole life would change.	51(13.6)	**124(33.0)**	10(2.7)	**113(30.1)**	78(20.7)
	N	**Min**	**Max**	**Mean**	**SD**

Perceived Seriousness	376	12.00	60.00	**38.1782**	**13.65**

Perceived benefits

The results indicated that participants highly perceived the benefits of attending and adhering to HIV treatment, as shown in Table 4. The study found that attending HIV clinic and adhering to treatment can prevent complications and bring about many advantages.

Table 6: Benefits

	SD	D	N	A	SA
Attending an HIV clinic regularly and adhering to HIV treatment prevents future problems for me.	18(4.8)	26(6.9)	4(1.1)	**142(37.8)**	**186(49.5)**
I have a lot to gain by attending the HIV clinic regularly and adhering to HIV treatment.	8(2.1)	11(2.9)	5(1.3)	**128(34.0)**	**224(59.6)**
Attending an HIV clinic regularly and adhering to HIV treatment can help me prevent HIV complications.	3(.8)	18(4.8)	4(1.1)	**139(37.0)**	**212(56.4)**
If I attend the HIV clinic regularly and adhere to HIV treatment, I may prevent complications of HIV infection.	4(1.1)	15(4.0)	6(1.6)	**140(37.2)**	**211(56.1)**
I would not be so anxious about complications of HIV infection if I attend an HIV clinic regularly.	15(4.0)	32(8.5)	7 (1.9)	**156(41.5)**	**166(44.1)**
	N	**Min**	**Max**	**Mean**	**SD**
Perceived Benefits	376	5.00	25.00	21.6622	3.54104

The high mean score (21.66; SD=3.54) suggested that participants had a high perception of the benefits of attending HIV clinic regularly and adhering to HIV treatment, according to the study findings.

Perceived barriers

The study findings indicated that only one barrier was identified by the participants, which was the need to sacrifice some time to attend HIV clinic regularly. The majority of the participants (n=197, 52.4%) reported this barrier. The mean score of the perceived barriers was low (19.27; SD 7.47) suggesting that the participants had a low perceived barrier towards attending HIV clinic regularly, as shown in Table 5.

Table 7: Barriers

	SD	D	N	A	SA
It is embarrassing for me to attend HIV clinic regularly.	**154(41.0)**	**143(38.0)**	10(2.7)	25(6.6)	44(11.7)
For me to attend HIV clinic regularly, I have to give up quite a bit.	65(17.3)	104(27.7)	10(2.7)	**115(30.6)**	**82(21.8)**
Attending HIV clinic regularly can be difficult.	**101(26.9)**	**170(45.2)**	17(4.5)	42(11.2)	46(12.3)
Attending HIV clinic regularly is time-consuming.	**120(31.9)**	**174(46.3)**	8(2.1)	35(9.3)	39(10.4)
My family will make fun of me if I attend HIV clinic.	**140(37.2)**	**159(42.3)**	9(2.4)	34(9.0)	34(9.1)
The practice of attending HIV clinic regularly interferes with my activities.	**88(23.4)**	**176(46.8)**	12(3.2)	62(16.5)	31(9.9)
Attending HIV clinic would require starting a new habit, which is difficult.	**70(18.6)**	**173(46.0)**	18(4.8)	80(21.3)	35(9.3)
I am afraid I would not be able to attend HIV clinic regularly.	**94(25.0)**	**181(48.1)**	14(3.7)	49(13.0)	37(9.8)
	N	**Min**	**Max**	**Mean**	**SD**
Perceived Barriers	375	8.00	42.00	**19.2720**	**7.47120**

Perceived motivation

The majority of PLHIV showed high levels of perceived motivation to improve their health. This was demonstrated by the number of participants who reported that they eat a well-balanced diet (Agree: n=136, 36.2%; Strongly Agree: n=208, 55.3%) and always follow medical orders, believing it would benefit their health (Agree: n=140, 37.2%; Strongly Agree: n=212, 56.4%).

Table 8: Motivation

	SD	D	N	A	SA

I eat a well-balanced diet.	6(1.6)	12(3.2)	13(3.5)	**136(36.2)**	**208(55.3)**
I always follow medical orders because I believe they will benefit my state of health.	9(2.4)	8(2.1)	6(1.6)	**140(37.2)**	**212(56.4)**
I frequently do things to improve my health.	6(1.6)	9(2.4)	5(1.3)	**165(43.9)**	**190(50.5)**
I take vitamins when don't eat good meals.	20(5.3)	49(13.0)	11(2.9)	**168(44.7)**	**126(33.5)**
I search for new information related to my health	11(2.9)	21(5.6)	11(2.9)	**167(44.4)**	**165(43.9)**
I have the recommended yearly physical exams in addition to visits related to illness.	39(10.4)	82(21.8)	8(2.1)	**140(37.2)**	**106(28.2)**
I exercise regularly - at least three times a week	24(6.4)	34(9.0)	17(4.5)	**140(37.2)**	**160(42.6)**
	N	**Min**	**Max**	**Mean**	**SD**
Perceived Motivation	374	8.00	40.00	**31.8369**	**5.41942**

The mean score of 31.83 (SD=5.42) suggested that the participants had a high level of perceived motivation to improve their health and adopt healthy lifestyle practices (refer to Table 6).

Discussion

The Health Belief Model was used in this study to guide the research. This model is a framework that aims to encourage individuals to take positive actions for their health, using the desire to avoid negative health outcomes as a motivating factor. Constructs from the Health Belief Model were utilized to describe the perceived factors associated with disengagement from the ART program, including perceived susceptibility, perceived severity, perceived barriers, perceived benefits, and general motivation to improve overall health.

The study revealed a low perception of susceptibility to complications of HIV infection among the participants. This finding is consistent with the results of a previous study conducted by Agustin (2018) on 284 HIV and AIDS patients at Dr. Moewardi Hospital in Surakarta, Central Java. In that study, the non-adherent group (71.6%) reported a low perception of susceptibility to complications of HIV infection. Similarly, a study conducted on hypertensive patients by Joho (2021) showed that the majority of the non-compliant group (55.2%) reported a low perception of susceptibility to complications of hypertension. However, in both studies, the adherent groups reported a high perception of susceptibility to the respective health conditions.

The Health Belief Model served as the framework for this study. Its purpose is to motivate individuals to engage in positive health actions by using the desire to avoid negative health outcomes as a primary motivation. Constructs from the Health Belief Model, including perceived susceptibility, perceived severity, perceived barrier, perceived benefits, and general motivation towards improving general health status, were used to describe factors associated with loss-to-follow-up (disengagement) from ART program.

The low perception of susceptibility to complications of HIV infection may indicate denial of the risk of developing complications of HIV. This can affect decision-making and lead to a lack of engagement in healthy behaviors. An individual's subjective assessment of risk depends on their level of knowledge about HIV infection. According to Sukeri (2020), low perceived susceptibility is a cause for concern as it may contribute to a lack of motivation to prevent complications of HIV disease.

It is concerning that patients who are LTFU are non-adherent and do not see the need for continuous engagement in care. There is a need to make them aware of the complications that may arise due to a weakened immune system. The level of perceived severity in this study was somewhat ambiguous, with respondents expressing mixed feelings about the severity of complications of HIV infection. This may be due to the perception that HIV complications are less severe than those of other chronic diseases. Hing (2019) reported that 45% of participants perceived HIV as less dangerous or less severe than chronic conditions such as hypertension.

Interestingly, respondents perceived more benefits, despite not honoring their scheduled clinic visits and not adhering to treatment. They also perceived fewer barriers to attending HIV clinic regularly and adhering to HIV treatment, except for the need to give up a bit to attend HIV clinic. Barriers and benefits determine the likelihood of action. Our study found few minor obstacles against retention in HIV care, which contradicts the findings of several other studies. Studies conducted in Zambia, Kwabwe district (Mukumbang, 2017), and the United States (Yehia, 2015; Naanyu, 2020; Wessinger, 2017) reported various barriers, such as long waiting times, long travel distances, non-disclosure of HIV status, alcohol, stigma, mobility, depression, competing life activities, expensive and unreliable transportation, unprofessional providers, lack of money and food, denial, and disclosure. Our study reported a low perceived barrier, which conflicts with the majority of previous studies conducted (Ratshihume, 2018; Lowane & Lebese, 2022; Hannaford et al., 2021). The reason for this discrepancy is unclear.

The Health Belief Model suggests that in order for individuals to engage in health-promoting behavior, they must have a high perceived susceptibility to the complications of a disease, a high perceived severity of the disease, fewer barriers, and more perceived benefits. In this study, respondents reported high perceived motivation towards improving their overall health status and engaging in healthy behaviors such as physical activity and healthy eating. This suggests that they are aware of the health benefits of such behaviors. However, despite their high motivation, they still struggle with adhering to their prescribed treatment and scheduled clinic visits. The perceived benefits of engaging in a health-promoting behavior are important motivators, and a study conducted in Trans Nzoia County showed that the popular perceived benefits included relief from symptoms, longer life, weight gain, renewed energy, and positive behavior change (Naanyu 2020).

The results of this study are in contrast to the assumptions of the HBM and findings of previous research. The study was conducted in a specific context, which could explain the differences in perceptions of barriers and benefits to attending HIV clinics regularly among respondents from Sibasa Local area. Additionally, the adapted instrument used in this study has not been tested in this area before, which could have contributed to response bias and resulted in conflicting results compared to other studies. However, the findings do add new insights to the field by highlighting the lack of knowledge about the potential complications of HIV infection among patients, which could contribute to low perceived susceptibility and severity.

Previous research has also identified barriers to regular attendance at HIV clinics, such as long waiting times, travel distances, stigma, lack of disclosure, and mobility issues (Mukumbang, 2017; Yehia, 2015). Similarly, studies on other chronic conditions have shown low perceived severity of complications among patients with hypertension (Joho, 2021).

Therefore, it can be concluded that low perceived susceptibility and severity of complications of HIV infection may be associated with LTFU from ART programs in the Sibasa Local Area. Further studies are needed to assess patients' knowledge of the potential complications of HIV infection and to identify effective strategies to improve perceptions of susceptibility and severity, ultimately improving retention in care.

Strength:

The study's strength lies in its use of cross-sectional study design, random sampling and the application of the Health Belief Model to investigate HIV clinic attendance. As a result, this study contributes to the existing knowledge in this field.

Limitation:

One significant challenge encountered in the study was the unavailability of some respondents as some of the phone numbers provided were no longer working. To locate these individuals, the phone numbers of their next of kin were used, and community health workers assisted in tracking down others at their homes. The researcher was aware that it is possible that some of the respondents could have not disclosed their HIV positive status to their next of kin. As part of preparation done before starting Anti-retroviral treatment i.e. at initial assessment; patients are asked if it is fine with them to be visited at home. This information is documented in the standardized clinical stationary for HIV. Only those who agreed to home visit were visited by the community health worker. The reason cited for the call was to check if the potential respondent have another alternative phone number or could have changed the address in order to update the information kept in the documents. It was also learnt that some of the patients have died and they were not reported at the facility that they have passed on. Confidentiality was maintained.

In addition, some of the participants had already returned to care. To replace those who could not be located, random numbers were used to select new participants.

Another limitation was that the questionnaire used a Likert scale format, which limited the elaboration or explanation of responses. Additionally, it should be noted that the study was conducted specifically in the Sibasa local area, and therefore, the results cannot be generalized to other areas without caution.

Conclusion

This study aimed to investigate the perceptual factors associated with loss-to-follow-up (LTFU) from the ART program in Sibasa Local Area. The study found that patients' perceptions, particularly their level of susceptibility and severity to complications of

HIV infection, as well as their perception of barriers and benefits, were significant factors in their engagement or disengagement from the ART program. However, the study had limitations such as difficulty in locating respondents and using a Likert scale questionnaire. Therefore, future research should further investigate these limitations and contributory factors to LTFU from the ART program to develop appropriate intervention strategies to reduce LTFU and achieve the UNAIDS target of the third 95% by 2030.

This study investigated perceptual factors related to loss-to-follow-up (LTFU) from ART program in Sibasa Local Area. The findings showed that there was low perception of susceptibility and severity of complications of HIV, low perceived barriers, high perceived benefits, and high motivation towards good general health and lifestyle. The study suggests that health education on consequences of disengagement from HIV program should be reinforced, and further research is needed to assess the level of knowledge related to complications of HIV infection. The study contributes to the existing knowledge and recommends further research using qualitative or mixed-method study designs.

Acknowledgement

We want to appreciate Ms Maamba T (defaulter tracer) and all the lay counsellors for their efforts of tracing patients back to the facility and the facility Operational Managers for supporting the study.

Conflict of interest

The author declares no conflict of interest.

Reference

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Section 3: Conclusion, Implications, Recommendations, and limitations

Introduction

The discontinuation of HIV treatment could hinder its long-term success, and the only way to control and stop the spread of HIV is through adopting behavioral changes. This study aimed to explore the perceived factors associated with loss-to-follow-up from the ART program among adult PLHIV aged 18 and above in Sibasa. As far as we know, this is the first study to focus on perceived factors associated with loss-to-follow-up from the ART program among this group in the Sibasa Local Area. This section covers the introduction, conclusion of the systematic literature review, conclusion of the article, general conclusion, recommendations, and summary of the entire study.

Manuscript 1: Impact of loss-to-follow-up from ART program on morbidity and mortality among adult PLHIV in South Africa: a mixed methods systematic review: Conclusion

Most studies reviewed were conducted in Gauteng Province; Johannesburg, mostly at Themba Lethu HIV clinic, KwaZulu Natal, Cape Town at Khayelitsha, Limpopo at Mathox, Sekhukhune, Mopane and Vhembe district. Studies were conducted amongst adults initiated on ART and had an outcome of loss-to-follow-up. The analysis of papers included in this systematic literature review revealed patients' factors, health care providers factors, health system factors and organizational factors as challenges that are contributing to loss-to-follow-up from ART programs. General findings from this review revealed that male gender, young age, pregnancy at ART initiation, high CD4 count and being newly diagnosed with HIV are associated with loss-to-follow-up from ART programs. The organizational health system and management of healthcare facilities contribute to loss-to-follow-up due to poor patient-provider relationships and long waiting times. The bulk of the study reviewed extracted data for analysis from electronic or hard copies of medical or clinical records and registers. Given that only four reviewed studies were qualitative, therefore there is a gap marked by very few studies conducted to assess the perceptions and experiences of patients and staff.

Manuscript 2: Factors Contributing to Loss-to-Follow-Up from ART Programs Among Adults Living with HIV in Vhembe District, South Africa: Conclusion

Loss to follow-up (LTFU) from ART program depends on the perception held by individual patient. The how susceptibility and severity to complications of HIV infection as well as how barriers and benefits are perceived influence engagement or disengagement from ART program. Loss to follow-up is a challenge that affects the health system, individual patient, and public health. Identification of contributory factors to loss-to-follow-up is necessary, so that the appropriate intervention strategies can be developed and implemented to help address the challenge. This study revealed that there is low perception of susceptibility and severity of complications of HIV. We therefore recommend that health education related to the consequences of disengagement from HIV should be strengthened. Reduction of loss-to-follow-up from ART will assist with achieving the third 95% of the UNAIDS target by 2030. Threat about complication of diseases depends on the knowledge held regarding that particular disease. It is recommended that further research be done to assess the level of knowledge related to complications of HIV infection.

General conclusion

The systematic literature review asked what factors contribute to loss-to-follow-up (LTFU) from ART programs among adult PLHIV in South Africa. The review found that male gender, young age, pregnancy at ART initiation, high CD4 count, and being newly diagnosed with HIV are associated with LTFU. Poor patient-provider relationships and long waiting times due to organizational health system and management of health care facilities also contribute to LTFU.

The study aimed to describe perceived factors associated with LTFU from ART programs among adult PLHIV in Sibasa. Surprisingly, respondents did not perceive HIV complications as severe, and they believed they were not at risk of getting complications of HIV even when not adhering to their treatment. They perceived fewer barriers and more benefits to attending the clinic regularly and adhering to HIV treatment. Respondents had a high level of motivation towards attaining good general health and a healthy lifestyle.

However, the study's findings contradict the systematic literature review's results as previous studies have reported many barriers experienced by patients. The respondents in this study might not perceive barriers to attending the HIV clinic regularly because of the context in which the study was conducted. The sample had respondents who were self-transferred to other facilities or were on the Central Chronic Medicines Dispensing and Distribution (CCMDD) program. The study highlights the need for further research to assess the level of knowledge related to complications of HIV infection and the association of low perception of susceptibility and severity to complications of HIV and high CD4 count, being newly diagnosed, pregnant at ART initiation, and young age at ART initiation.

Overall, the study reveals that there are ART program effectiveness challenges and patient experience challenges contributing to LTFU from ART programs. Patients reported several challenges, such as lack of patient involvement or engagement, stereotyped appointment dates, errors in recording patients' return dates, healthcare workers failing to maintain confidentiality, clinics being too expensive to reach due to distance and extensive waiting times, high unemployment rates, mobility often for income generation opportunities, education and family illness, and financial challenges.

Implications for practice

The effectiveness of ART programs is weakened by loss-to-follow-up, especially for patients with high CD4 count and pregnant women. To prevent development of resistant strains of the virus, the challenge of stopping treatment and reinitiating again must be addressed. Appointment scheduling practices and patient engagement must be improved to ensure patients do not miss their appointments. Allowing patients to collect their treatment on weekends may improve retention in HIV programs without requiring additional resources. Pregnant women are enrolled in a Mother-Mentor program, and a strategy must be developed to sustain their engagement after delivery. An online electronic database accessible to all health care facilities can improve access to ART services. Interventions to enhance compliance include supervised therapy, improving the nurse-client relationship, patient education, and individualized conversations to uncover barriers to retention in HIV care. Male patients may benefit from being attended by male health care providers.

Implications for research

Most of the research analyzed in the review utilized record reviews or data analysis to examine the factors linked to loss-to-follow-up in South Africa. However, more research is required to explore the experiences and opinions of patients using survey or mixed methods research.

Recommendations

Based on the systematic literature review and survey, the following recommendations are suggested:

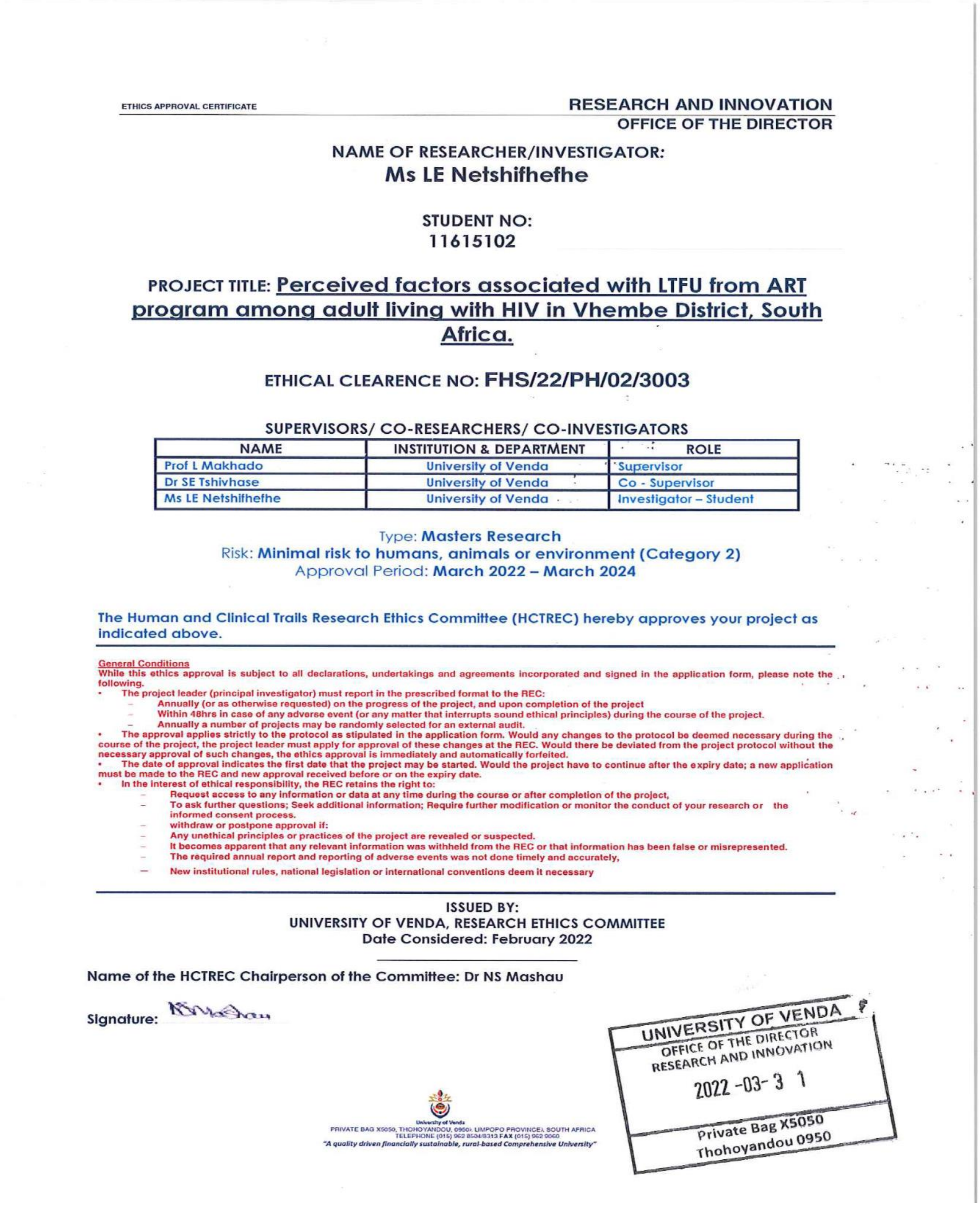
- Policy makers should develop an online electronic database/register and electronic health records system accessible to all healthcare facilities to address mobility challenges and improve access to ART services.
- Local health authorities should strengthen health education on the consequences of disengagement from HIV programs, re-assess appointment scheduling practices, allow patients to collect treatment on weekends, and link mothers from the mother-mentor program to general support groups for sustained engagement after delivery. Interventions to enhance compliance include supervised therapy, improving the nurse-client relationship, and patient education.
- For future studies, it is recommended to assess the level of knowledge related to complications of HIV infection, investigate experiences and perceptions of patients using qualitative or mixed methods, and conduct research in other places to verify or negate the findings of this study.

Summary

This section of the mini dissertation presented a conclusion for all the manuscripts included in the study. The conclusion was supported by implications for practice and research, and recommendations were provided based on the findings.

Appendices

Appendix 1: Ethics Clearance Certificate (University of Venda)



ETHICS APPROVAL CERTIFICATE

RESEARCH AND INNOVATION
OFFICE OF THE DIRECTOR

NAME OF RESEARCHER/INVESTIGATOR:
Ms LE Netshifhefhe

STUDENT NO:
11615102

PROJECT TITLE: Perceived factors associated with LTFU from ART program among adult living with HIV in Vhembe District, South Africa.

ETHICAL CLEARENCE NO: FHS/22/PH/02/3003

SUPERVISORS/ CO-RESEARCHERS/ CO-INVESTIGATORS

NAME	INSTITUTION & DEPARTMENT	ROLE
Prof L Makhado	University of Venda	Supervisor
Dr SE Tshivhase	University of Venda	Co - Supervisor
Ms LE Netshifhefhe	University of Venda	Investigator – Student

Type: **Masters Research**
Risk: **Minimal risk to humans, animals or environment (Category 2)**
Approval Period: **March 2022 – March 2024**

The Human and Clinical Trails Research Ethics Committee (HCTREC) hereby approves your project as indicated above.

General Conditions

While this ethics approval is subject to all declarations, undertakings and agreements incorporated and signed in the application form, please note the following.

- The project leader (principal investigator) must report in the prescribed format to the REC:
  - Annually (or as otherwise requested) on the progress of the project, and upon completion of the project
  - Within 48hrs in case of any adverse event (or any matter that interrupts sound ethical principles) during the course of the project.
  - Annually a number of projects may be randomly selected for an external audit.
- The approval applies strictly to the protocol as stipulated in the application form. Would any changes to the protocol be deemed necessary during the course of the project, the project leader must apply for approval of these changes at the REC. Would there be deviated from the project protocol without the necessary approval of such changes, the ethics approval is immediately and automatically forfeited.
- The date of approval indicates the first date that the project may be started. Would the project have to continue after the expiry date; a new application must be made to the REC and new approval received before or on the expiry date.
- In the interest of ethical responsibility, the REC retains the right to:
  - Request access to any information or data at any time during the course or after completion of the project,
  - To ask further questions; Seek additional information; Require further modification or monitor the conduct of your research or the informed consent process.
  - withdraw or postpone approval if:
  - Any unethical principles or practices of the project are revealed or suspected.
  - It becomes apparent that any relevant information was withheld from the REC or that information has been false or misrepresented.
  - The required annual report and reporting of adverse events was not done timely and accurately,
  - New institutional rules, national legislation or international conventions deem it necessary

ISSUED BY:
UNIVERSITY OF VENDA, RESEARCH ETHICS COMMITTEE
Date Considered: February 2022

Name of the HCTREC Chairperson of the Committee: Dr NS Mashau

Signature:

UNIVERSITY OF VENDA
OFFICE OF THE DIRECTOR
RESEARCH AND INNOVATION
2022 -03- 3 1
Private Bag X5050
Thohoyandou 0950

University of Venda
PRIVATE BAG X5050, THOHOYANDOU, 0950, LIMPOPO PROVINCE, SOUTH AFRICA
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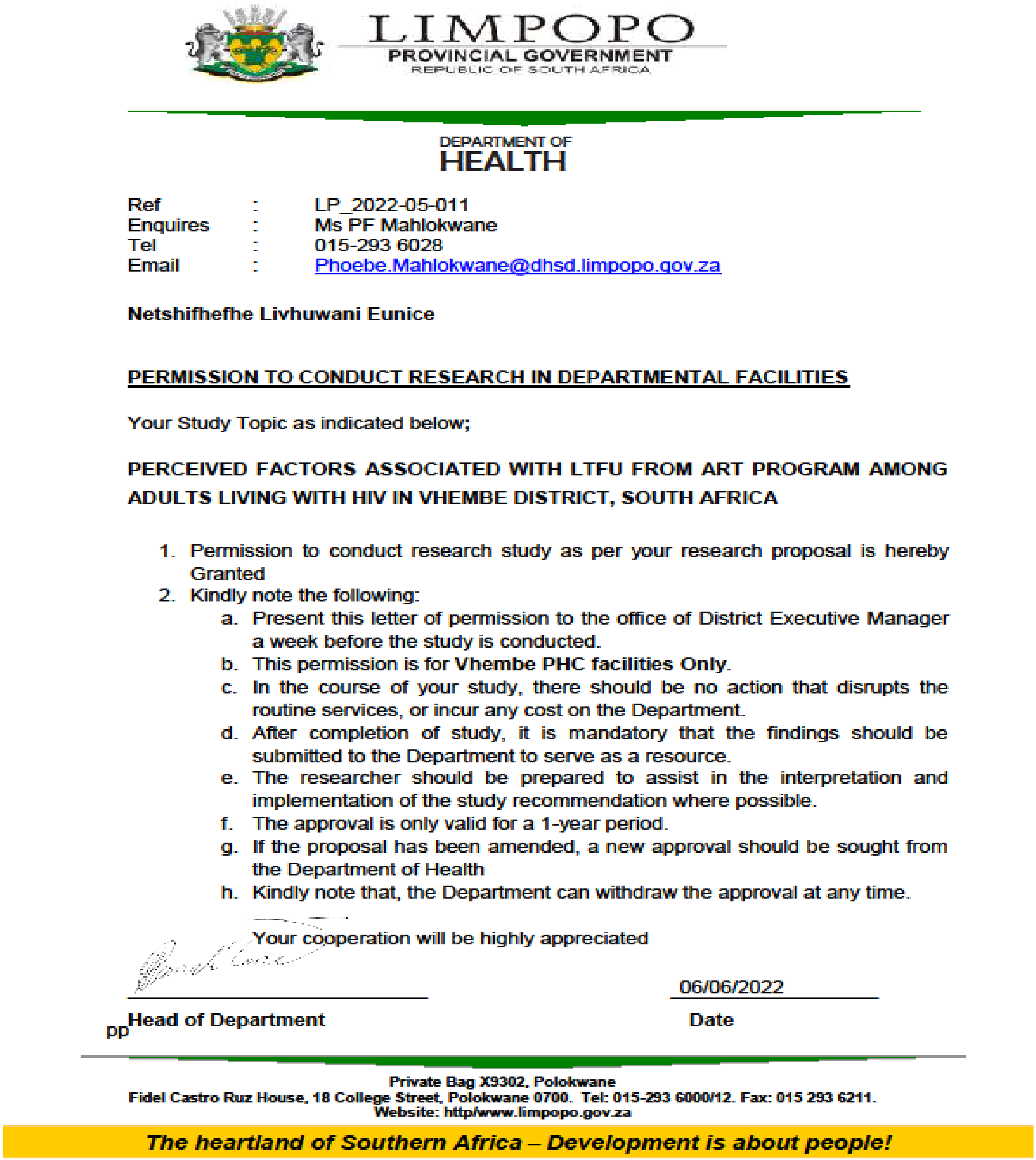
Appendix 2: Permission from the Limpopo Department of Health



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
HEALTH

Ref : LP_2022-05-011
Enquires : Ms PF Mahlokwane
Tel : 015-293 6028
Email : Phoebe.Mahlokwane@dhsd.limpopo.gov.za

Netshifhefhe Livhuwani Eunice

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES

Your Study Topic as indicated below;

PERCEIVED FACTORS ASSOCIATED WITH LTFU FROM ART PROGRAM AMONG ADULTS LIVING WITH HIV IN VHEMBE DISTRICT, SOUTH AFRICA

1. Permission to conduct research study as per your research proposal is hereby Granted
2. Kindly note the following:
   a. Present this letter of permission to the office of District Executive Manager a week before the study is conducted.
   b. This permission is for **Vhembe PHC facilities Only**.
   c. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
   d. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
   e. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
   f. The approval is only valid for a 1-year period.
   g. If the proposal has been amended, a new approval should be sought from the Department of Health
   h. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

06/06/2022

pp **Head of Department** **Date**

Private Bag X9302, Polokwane
Fidel Castro Ruz House, 18 College Street, Polokwane 0700. Tel: 015-293 6000/12. Fax: 015 293 6211.
Website: http/www.limpopo.gov.za

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Appendix 3: Univen Information Sheet

Information sheet

RESEARCH ETHICS COMMITTEE

UNIVEN Informed Consent

ANNEXURE B

LETTER OF INFORMATION

Title of the Research Study: Perceived factors associated with loss to follow-up (LTFU) from ART program among adults living with HIV in Vhembe District, South Africa.

Principal Investigator/s/ researcher : Netshifhefhe Livhuwani Eunice,
Bachelor of Science

Co-Investigator/s/supervisor/s : (Prof. Makhado L, PHD) and
(Dr Tshivhase S.E, PHD)

Brief Introduction and Purpose of the Study: Once initiated on anti-retroviral treatment, people living with HIV must be retained in care. The proposed study will describe perceived factors associated with loss to follow-up (disengagement) from ART program among adult people who are 18 years and above living with HIV and are on ART in the Sibasa Local Area.

Outline of the Procedures: Respondents will be contacted telephonically in advance to make appointments to meet them at the clinics where they collect their treatment. Nurses will be requested to introduce the researcher to the respondents. The researcher will inform respondents about the purpose of the study, the number of respondents expected to participate, and the expected duration to complete the questionnaire. Participants will also be informed that participation is voluntary and that they may discontinue participation at any time without penalty. Respondents will also be assured that confidentiality will be maintained and will be requested to complete consent forms before participating in the study. In case the respondent is illiterate, verbal consent will be given in the presence of a literate witness who will verify and sign the letter of information and consent on behalf of the respondent indicating that informed verbal consent was given. In this study the witness will be the clinic nurse in case the illiterate patient came alone to the clinic or representative since this study targets are HIV positive patients. This will be done to maintain confidentiality. The respondent will also append the right thumb print on the consent form.

Adults who are 18 years and above who initiated ART in March 2020 and have had an outcome of loss to follow up of more than 90 days will be included in the study. Children, mental health care users who are not stable and very ill patients will be excluded from this study.

The questionnaire will be self-administered but those who cannot read and write will be assisted by the researcher. The researcher will read out the questions to them and record their answers.

Respondents will not have to write their names on the questionnaire. The consent form and the questionnaire form will not be bound together and will be kept under lock and key and accessed only by the researcher and the supervisor. All information, questionnaires, and informed consent documents will be handed over to the supervisor to be kept safely in the department of public health. All documents will be stored in a lockable cupboard. Only the supervisor and the researcher will have access to those documents. Data will be kept for 5 years.

Risks or Discomforts to the Participant: The adopted questionnaire will be given to the supervisor to check questions that may cause emotional harm to the respondent.

Benefits: If findings of this study are accepted; intervention strategies will be developed that may inform new nursing practices that will benefit participants. The researcher will also fulfil a Master degree requirements.

Reason/s why a Participant May Be Withdrawn from the Study: Participation will be discontinued if the researcher observes any discomfort associated with participation in the research. Respondents have the right to participate and to discontinue whenever they feel like it *and there will be no adverse consequences for the participants should they choose to withdraw.*

Remuneration: *Participants will not receive any monetary or other types of remuneration.*
Costs of the Study: Participants *will not be expected to cover any costs towards the study except the cost of coming to the clinic.*

Confidentiality: All documents with participant's information will be locked up and access will be limited to the researcher and the supervisor. Under no circumstance shall information provided by the respondent be disclosed to any third party.
Research-related Injury: Participation will be discontinued if the researcher observes any discomfort associated with participation in the research. The respondent will be referred to other members of the multi-disciplinary team for further assistance depending on the need identified.

Persons to Contact in the Event of Any Problems or Queries:

(Prof. Makhado L , supervisor and Dr. Tshivhase S.E, co-supervisor). Please contact the researcher: Netshifhefhe L.E (tel no. 072 661 3302), Prof Makhado L (tel no. 061 147 2002) and Dr. Tshivhase S.E (tel no. 082 441 5959), or the University Research Ethics Committee Secretariat on 015 962 9058. Complaints can be reported to the Director: Research and Innovation, Prof. GE Ekosse on 015 962 8313 or Georges Ivo.Ekosse@univen.ac.za

General:
Potential participants must be assured that participation is voluntary and the approximate number of participants to be included should be disclosed. A copy of the information letter should be issued to participants. The information letter and consent form must be translated and provided in the primary spoken language of the research population

Appendix 4: Informed Consent form

CONSENT

Statement of Agreement to Participate in the Study:

- I hereby confirm that I have been informed by the researcher, Netshifhefhe Livhuwani Eunice, about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: FHS/22/PH/02/3003,
- I have also received, read and understood the above written information (*Participant Letter of Information*) regarding the study.
- I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.
- In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.
- I may, at any stage, without prejudice, withdraw my consent and participation from the study.
- I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.
- I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

Full Name of Participant	Date	Time	Signature
I, …………………….	**……………**	**…………**	**…………………..**

(*Name of researcher*) herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

Full Name of Researcher
……………………. Date**……………….** Signature**…………………**

Full Name of Witness (If applicable)

……………………. Date ………………. Signature…………………..

Full Name of Legal Guardian (If applicable)

………………… Date……………… Signature…………………….

Appendix 5: Questionnaire

Measurement instrument

Title: Clinic attendance questionnaire

My name is Netshifhefhe L.E and I am conducting a study under the University of Venda.

The purpose of this research is to identify factors related to clinic attendance.

Do not write your name anywhere on this questionnaire. Your response will be confidential. Participation in this study is voluntary. You do not have to answer questions that make you uncomfortable.

Please hand over the questionnaire to the researcher after completion.

Thank you for your cooperation.

RESEARCH QUESTIONNAIRE:

Section A: Demographic variables (data):

Please circle *the most appropriate response.*

1. Age (yrs.)

- *a) 18 – 29*
- *b) 30 – 38*
- *c) 39 – 51*
- *d) 52 - 82*

2. Race

- *a) Black*
- *b) White*
- *c) Coloured*
- *d) Indian/Asian*

3. Marital status

a) *Single*
b) *Married*
c) *Divorced*
d) *Widowed*
e) *Separated*
f) *Other*

4. Religion

a) *None*
b) *Christianity*
c) *Traditional African religions*
d) *Islam*
e) *Hinduism*
f) *Judaism*
g) *Other*

5. Education

a) *Primary*
b) *Secondary*
c) *Tertairy*

6. Gender

a) *Male*
b) *Female*

Read the following information before answering the questions

Complications of HIV infection refers to conditions listed below.

1. *Tuberculosis (TB).*
2. *Cryptococcal meningitis.*
3. *Candidiasis (thrush).*
4. *Pneumocystis pneumonia (PCP).*
5. *Cytomegalovirus.*
6. *Toxoplasmosis.*

Indicate your agreement and disagreement with the following statements by circling *your response:*

	Section B: Susceptibility	***Strongly agree***	***Agree***	***Neutral***	***Disagree***	***Strongly disagree***
1.	My chances of getting complications of HIV infection are great.	5	4	3	2	1
2.	2. My physical health makes it more likely that I will get complications of HIV infection.	5	4	3	2	1
3.	I feel that my chances of getting complications of HIV infection in the future are high.	5	4	3	2	1
4.	There is a high possibility that I will get complications of HIV infection.	5	4	3	2	1
5.	I worry a lot about getting complications of HIV infection.	5	4	3	2	1
6.	Within the next year, I may get complications of HIV infection.	5	4	3	2	1
	Section C: Seriousness					
7.	The thought of having HIV complications infection scares me.	5	4	3	2	1
8.	Think about HIV infection complications makes me nauseous.	5	4	3	2	1
9.	If I get HIV infection complications, my career would be endangered.	5	4	3	2	1
10.	10. My heart beats faster when I think about HIV infection complications	5	4	3	2	1
11.	HIV infection complications would endanger my marriage (or a significant relationship).	5	4	3	2	1
12.	HIV infection complications are disheartening.	5	4	3	2	1
13.	HIV infection complications would change my self-perception.	5	4	3	2	1
14.	Thinking about HIV infection complications scares me.	5	4	3	2	1
15.	HIV infection complications would endanger my financial security.	5	4	3	2	1
16.	HIV infection complications would cause melong lasting problems.	5	4	3	2	1
17.	HIV infection complications ofare more serious than those of other diseases.	5	4	3	2	1
18.	HIV infection complications would change my whole life.	5	4	3	2	1
	Section D: Benefits					
19.	Attending HIV clinic regularly and adhering to HIV treatment prevents future problems for me.	5	4	3	2	1
20.	I have a lot to gain by attending HIV clinic regularly and adhering to HIV treatment.	5	4	3	2	1
21.	Attending HIV clinic regularly and adhering to HIV treatment can help me prevent HIV complications.	5	4	3	2	1

22.	If I attend HIV clinic regularly and adhere to HIV treatment, I may prevent HIV infection complications.	5	4	3	2	1
23.	I would not be so anxious about complications of HIV infection if I regularly attend an HIV clinic.	5	4	3	2	1
	Section E: Barriers					
24.	It is embarrassing for me to regularly attend an HIV clinic.	5	4	3	2	1
25.	In order for me to attend an HIV clinic regularly, I have to give up quite a lot.	5	4	3	2	1
26.	Attending an HIV clinic regularly can be difficult.	5	4	3	2	1
27.	Attending an HIV clinic regularly is time-consuming.	5	4	3	2	1
28.	My family would make fun of me if I attend an HIV clinic.	5	4	3	2	1
29.	The practice of attending an HIV clinic regularly interferes with my activities.	5	4	3	2	1
30.	Attending an HIV clinic would require starting a difficult new habit.	5	4	3	2	1
31.	I am afraid I would not be able to regularly attend an HIV clinic.	5	4	3	2	1
	Section F: **Motivation:**					
32.	I eat a well-balanced diet.	5	4	3	2	1
33.	I always follow medical orders because I believe they will benefit my health.	5	4	3	2	1
34.	I frequently do things to improve my health.	5	4	3	2	1
35.	I take vitamins when I do not eat good meals.	5	4	3	2	1
36.	I search for new information related to my health.	5	4	3	2	1
37.	I have the recommended yearly physical examinations in addition to visits related to illness.	5	4	3	2	1
38.	I have the recommended periodic dental examination in addition to the visits for a specific problem.	5	4	3	2	1
39.	I exercise regularly - at least three times a week.	5	4	3	2	1

Appendix 6: Author Guidelines; Add journal

International Journal of Africa Nursing Sciences (IJANS) Elsevier.

Introduction

Dr Hester Klopper, Editor, welcomes manuscripts for consideration for publication in the journal.

Submission checklist

You can use this list to carry out a final check of your submission before you send it to the journal for review. Please check the relevant section in this Guide for Authors for more details.

Ensure that the following items are present:

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- E-mail address

- Full postal address

All necessary files have been uploaded:

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- All figures (include relevant captions)

- All tables (including titles, description, footnotes)

- Ensure all figure and table citations in the text match the files provided

- Indicate clearly if color should be used for any figures in print

Graphical Abstracts / Highlights files (where applicable)

Supplemental files (where applicable)

Further considerations

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- Permission has been obtained for use of copyrighted material from other sources (including the Internet)

- A competing interests statement is provided, even if the authors have no competing interests to declare

- Journal policies detailed in this guide have been reviewed

- Referee suggestions and contact details provided, based on journal requirements

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Before You Begin

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Reporting sex- and gender-based analyses

Reporting guidance

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Authors should include the Clinical Trial Registration number in the Conflict of Interest statement (see above) at original submission stage, and will be required to transfer the number into the manuscript file for revised articles.

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Examples: Reference to a journal publication: Van der Geer, J., Hanraads, J. A. J., & Lupton, R. A. (2010). The art of writing a scientific article. *Journal of Scientific Communications*, 163, 51-59.

Data references

For reference style 5 APA:[dataset] Oguro, M., Imahiro, S., Saito, S., Nakashizuka, T. (2015). Mortality data for Japanese oak wilt disease and surrounding forest compositions. Mendeley Data, v1. http://dx.doi.org/10.17632/xwj98nb39r.1.

Reference to a book: Strunk, W., Jr., & White, E. B. (2000). The elements of style. (4th ed.). New York: Longman, (Chapter 4).

Reference to a chapter in an edited book: Mettam, G. R., & Adams, L. B. (2009). How to prepare an electronic version of your article. In B. S. Jones, & R. Z. Smith (Eds.), *Introduction to the electronic age* (pp. 281-304). New York: E-Publishing Inc.

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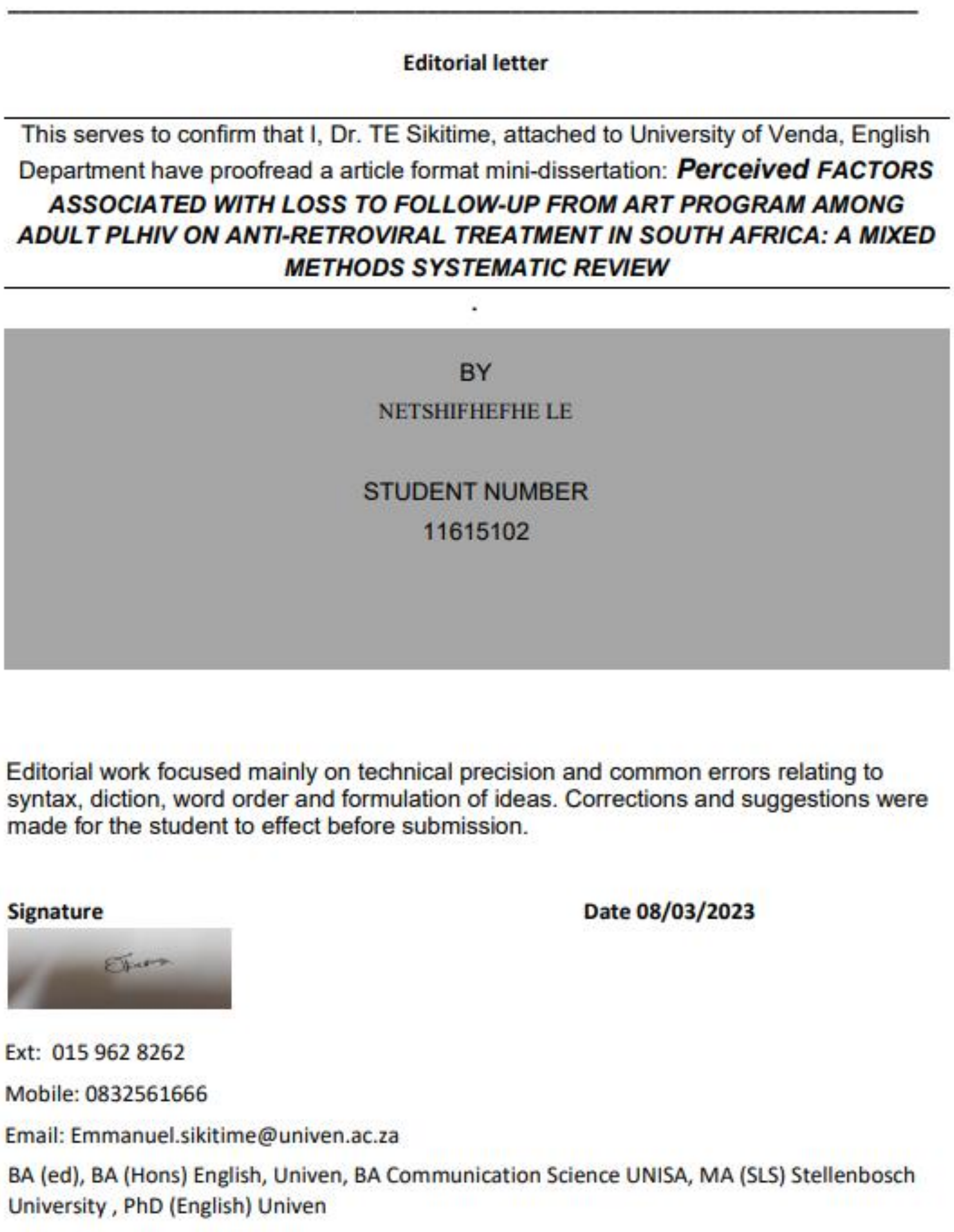

Editorial letter

This serves to confirm that I, Dr. TE Sikitime, attached to University of Venda, English Department have proofread a article format mini-dissertation: ***Perceived FACTORS ASSOCIATED WITH LOSS TO FOLLOW-UP FROM ART PROGRAM AMONG ADULT PLHIV ON ANTI-RETROVIRAL TREATMENT IN SOUTH AFRICA: A MIXED METHODS SYSTEMATIC REVIEW***

.

BY
NETSHIFHEFHE LE

STUDENT NUMBER
11615102

Editorial work focused mainly on technical precision and common errors relating to syntax, diction, word order and formulation of ideas. Corrections and suggestions were made for the student to effect before submission.

Signature **Date 08/03/2023**

Ext: 015 962 8262

Mobile: 0832561666

Email: Emmanuel.sikitime@univen.ac.za

BA (ed), BA (Hons) English, Univen, BA Communication Science UNISA, MA (SLS) Stellenbosch University , PhD (English) Univen