MINI-DISSERTATION

Profile of selected cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province

.

By

MATHEBULA RUDY LONDILE

Submitted in partial fulfilment of the requirements for the degree of

MASTER OF PUBLIC HEALTH

In the

DEPARTMENT OF PUBLIC HEALTH

At the

FACULTY OF HEALTH SCIENCES

At the

UNIVERSITY OF LIMPOPO

(School of Health Care Sciences)

SUPERVISOR: Dr E Maimela

CO-SUPERVISOR: Prof L Skaal

2019

DEDICATION

I dedicate this thesis to my late father, Cedric *Elliot Mathebula* and my mother *Elsie Judith Mathebula* who always wanted to see me achieve great things in life. To the Almighty God, let all the glory be unto You.

DECLARATION

I declare that **PROFILE OF SELECTED CARDIOVASCULAR RISK FACTORS AMONG HIV PATIENTS ON ART IN BUSHBUCKRIDGE SUB-DISTRICT**, hereby submitted to the University of Limpopo, for the degree of Master of Public Health, is my own work and that all the sources that I have used or quoted have been indicated and acknowledged by means of complete references and that this work has not been submitted before any other degree at any institution.

---------- ----------

Rudy Londile Mathebula (Miss) Date

Acknowledgements

I want to thank the following persons for their respective contributions to this dissertation:

- My husband, Akani Chabangu, for his unconditional love, support and encouragement.
- My son Vuako Chabangu, for his support and understanding.
- A special thank you to my supervisor, Dr Eric Maimela for his guidance, support and encouragement.
- My joint supervisor, Prof Linda Skaal, for her support and guidance.
- Rixile ART patients for their willingness to participate in this study.
- The Mpumalanga province: Department of Health, for giving me permission to conduct the study.

ABSTRACT

The purpose of this study was to profile selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district. Quantitative, cross-sectional research was conducted to describe cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge Sub-district. Data collection was done using researcher-administered questionnaires. Adult HIV patient on ART participated in the study (n=328). The study has highlighted cardiovascular disease risk factors and prevalence of cardiovascular disease risk factors among HIV patients on ART. The findings revealed the prevalence of hypertension is 34.6% among HIV patients on ART and men had a higher prevalence compared to women. There is an increase in body mass index and it is seen mostly among women. Alcohol consumption is highest in the young adults (18 to 24 years) both men and women. Health promotion and policymaking interventions need to improve strategies on management and prevention of cardiovascular disease risk factors.

Key concepts

HIV, ART, cardiovascular disease risk factors, prevalence, body mass index, Bushbuckridge.

Table of Contents

LIST OF FIGURES

LIST OF TABLE

CHAPTER ONE

1. INTRODUCTION

According to the World Health Organization (WHO) cardiovascular disease (CVD) is a major public health problem responsible for 17.5 million deaths globally each year. The global deaths are estimated to be 31% of all deaths worldwide with an alarming 75% of these deaths occurring in low-income and middle-income countries (WHO 2016). There are nine most attributable traditional modifiable CVD risk factors, including smoking, history of hypertension or diabetes, obesity, unhealthy diet, lack of physical activity, excessive alcohol consumption, raised blood lipids and psychosocial factors and the first eight risk factors excluding psychosocial factors account for 61% of CVD deaths globally (Cappucio & Miller 2016).

Cardiovascular diseases are a widely recognised complication of HIV infection. Most of the traditional risk factors of CVDs present in the general population are also present among the HIV-infected population (Nsagha, Nguedia, Njunda, Tanue, Kibu, Ayima & Ngowe 2015). cohort study conducted in Latin American countries, found that the prevalence of certain CVD traditional risk factors such as smoking and dyslipidaemia are higher in HIV infected individuals compared to the general population the latter as a direct result from HIV infection itself or due to exposure of antiretroviral drugs (Cahn, Leite, Rosales, Cabello, Alvarez, Seas, Carcamo, Cure-Bolt, L'ltalien, Mantilla, Deibis, Zala & Suffert 2010).

Several studies in Africa cited a high burden of hypertension, obesity and hypercholesterolaemia among HIV patients on ART (Muhammad, Sani & Okeahialam 2013; Divala, Amberbir, Ismail, Beyene, Garone, Pfaff, Singano, Akello, Joshua, Nyirenda, Matengeni, Berman, Mallewa, Chinombas, Kayange, Allain, Chan, Sodhi & Van Oosterhout 2016). HIV and Antiretroviral therapy (ART) seem to be causally linked with early CVD even after controlling for CVD traditional risk factors and age (Deeks & Phillips 2009).

The risk of CVD events is higher in untreated HIV than treated HIV infection. This may be attributable to inflammation which is increased in untreated infection. However, some ART drugs do have a direct effect on CVDs, such as prolonged exposure to the ART drug-class protease inhibitors (Lopinavir, Ritonavir etc.) which

is associated with hyperlipidaemia, insulin resistance and a high rate of CVD events. Nucleoside reverse transcriptase inhibitors (NRTI) have pro-inflammatory effect especially Abacavir therefore increases the risk of CVD events (Deeks & Phillips 2009; Friis-Møller, Thièbaut, Reis, Weber, D' Arminio Monforte, De Wit, El-Sadihr, Fontas, Worm, Kirk, Phillips, Sabin, Lundgren & Law 2010).

2. Problem statement

The introduction of effective antiretroviral therapy (ART) by government has substantially reduced AIDS-related mortality in many countries. In light of this, the non-HIV-related mortality, such as that attributable to CVD, has become increasingly important for the estimated 33.3 million people living with HIV (PLHIV) (Islam, Wu, Jansson & Wilson 2012). The increased CVD risk factors such as hypertension, diabetes, smoking and obesity among HIV-infected adults are not only observed in developed countries but also in Africa which is becoming a major challenge to African health (Deeks, Lewin & Havlir 2013).

The researcher has observed according to the annual statistics compiled by dietitians for ART patients; from 2014 to 2016, the number of people with one or two of the CVD risk factors namely smoking, diabetes, obesity and hypertension have increased from 207 to 457 respectively. The increase in CVD risk factors among HIV patients on ART further places a burden on these patients on managing two or more chronic conditions.

3. LITERATURE REVIEW

This chapter will discuss the traditional risk factors of CVD among HIV patients, on ART and some studies compared this population with HIV patients not on ART and general population.

Introduction

Cardiovascular diseases are a major public health problem accountable for 17.5 million deaths globally each year, which is estimated to be 31% of all deaths worldwide with an alarming 75% of these deaths occur in developing countries (WHO 2016). Boccara (2010) stated that in the United States, CVDs particularly coronary heart disease- related morbidity has become the third most common cause

of death in HIV infected populations; and the causes of death in HIV-infected populations are similar to those of uninfected population which are cardiovascular disease, renal failure, non-AIDS related neoplastic disease and hepatitis. Globally, 36.7 million people were living with HIV in 2015, 17.2 million were in Sub-Saharan Africa and 10.3million of people living with HIV were on antiretroviral therapy in Sub-Saharan Africa (UNAIDS 2015).

The use of antiretroviral therapy among HIV infected population has improved the quality and life expectancy (Rooyen, Fourie, Steyn, Koekemoer, Huisman, Schutte, Malan, Glyn, Smith, Mels & Schutte 2014). Improved life expectancy exposes them to the effects of aging, including influence of environmental risk factors known to act in general population and contributing to the occurrence of obesity, diabetes mellitus and cardiovascular disease (Nsagha et al 2015). With regard to HIV prevalence South Africa is the most affected country in Sub-Saharan Africa (Rooyen et al 2014) with an estimated 12.7% of the population are affected and 7.03 million being in the age group 15-49 years (StatsSA 2016). Mpumalanga province has the second highest HIV prevalence (23.1%) in the country in 2015 (StatsSA 2016).

3.2. Cardiovascular disease risk factors

The population at risk of CVD is mostly attributable to nine modifiable traditional factors, which are smoking, history of hypertension or diabetes, obesity, unhealthy diet, lack of physical activity, excessive alcohol consumption, raised blood lipids and psychosocial factors and the first eight risk factors excluding psychosocial factors account for 61% of CVD deaths globally. There are also non-modifiable risk factors which include age, sex and ethnicity (Cappucio & Miller 2016).

3.2.1 Age

As the HIV-infected population ages, this causes increase in metabolic and cardiovascular disease morbidities, thus CVD is now recognized as the main cause of death in HIV-infected patients more than 55 years of age (Currier 2009). In addition, Guaraldi, Orlando, Zona, Menozzi, Carli, Garlossi, Berti, Rossi, Roverto and Palella (2011) also found that frequently observed age-related non-communicable diseases such as diabetes mellitus, hypertension, cardiovascular disease were

significantly more common in HIV-infected population than in the general population and the apparent age group was ranging from 40 years to 60 years.

In contrast to the above observation, Durand, Sheely, Baril, Lelorier and Trembley (2011) found that a higher risk of coronary artery disease admission was found in younger HIV infected patients.

3.2.2 Gender

HIV-infected females seem to be at increased CVD risk. HIV-infected females have approximately double the relative risk of acute myocardial infarction than their male counterparts. Meanwhile absolute CVD rates remain lower for women (Kaplan et al 2007).

3.2.3 Ethnicity

In a study conducted by Rooyen et al (2014) in South Africa, it was discovered that black Africans had lower HDL-C levels compared to whites, which increased risk for developing CVD.

3.2.4 Smoking

The Center for Disease Prevention and Control (CDC) (2008) reported that smoking is a major risk factor for peripheral vascular and CHD, increasing the risk for CVD complications including myocardial infarction and stroke.

Two studies done in the United States found that rates of smoking in HIV-infected populations are consistently high and exceeded those for age-matched general population, thus increase predicted coronary heart disease risk (Durand et al., 2011; Kaplan, Kingsley, Sharrett, Li, Lazar, Tien, et al., 2007; Regan, Meigs, Grinspoon & Triant 2016).

3.2.5 Dyslipidaemia

Initiation of highly active antiretroviral therapy (HAART) usually results in increased lipid profile. Protease Inhibitors (PI) tend to induce greater increase in total cholesterol (TC), low-density lipoprotein (LDL) and triglycerides (TG). Protease inhibitors-induced cholesterol changes - partly explain the increased CHD risk observed in HIV-infected population receiving HAART. Prevalence of dyslipidaemia whether it is genetically determined or influenced by ART or HIV infection is

constantly higher in the HIV-infected population (Lampe, Duprez, Kuller, Tracy, Otvos, Stroes, Cooper, Hoy, Paton, Friis- Møller, Neuhaus, Liappis & Phillips 2010; Tadewes, Addis, Ambachew & Banerjee 2012). Zhou, Kodogo, Chokuona, Gomo, Oektedalen and Stray-Pederson (2015) stated that whether ART contributes to increased CVD risk remains uncertain, because the mechanism of how HIV infection or HAART induce these lipid abnormalities are unknown.

3.2.6 Body mass index and waist circumference

A study conducted by Ogunmola, Oladusu and Olamogegun (2014) in Nigeria found a high prevalence of obesity in the general population compared to HIV-infected population and stated that this may be due to epidemiological transition and that being obese is associated with wealth and being healthy. A cohort study conducted in 20 countries (Europe, United States and Australia) found that when comparing HIV-infected on HAART and those not on HAART, there was a slightly higher prevalence of obesity among those not on HAART. HAART was associated with the presence of lipodystrophy and highest risk was among participants on a regimen containing all three drug classes however it is not an indication for obesity (Friss-Møller, Weber, Rass, Thiebaut, Kirk, d'Armino Monforte, Pradler & Worfeldt 2003). Although obesity might have a protective effect on HIV disease progression and AIDS-related deaths; it has harmful health consequences such as CVD (Shan, Alio, Hall & Luque 2012).

3.2.7 Hypertension

A study done by Bloomfield et al (2011) cited that blood pressure was found to be high in the participants that had a higher CD4 count; the reason could be due to improved general health and nutritional status. They further on added that the prevalence of hypertension was commonly seen among young men than older age groups. The rationale could be that specific effects of HIV on vascular system are more noticeable in patients with few traditional CVD risk factors such as age.

3.2.8 Type 2 diabetes mellitus

All HAART regimens were associated with an increased risk of diabetes when comparing HIV-infected on HAART with HIV-infected not on HAART. Even after readjustment of other factors, current treatment with a regimen containing NNRTI,

NRTI and PI remained slightly independently associated with presence of diabetes (Friss-Moller, et al 2003).

3.2.9 Dietary intake

A study done by Mashinya, Alberts, van Geertruyden and Colebunders (2014) found that most of the participants stated non-availability of fruits and vegetables as reasons for low intake; low intake of fruits and vegetables remains a major challenge as it increases the risk of CVD and mortality. Mashinya et al (2014) further cited that high levels of TG were associated with low fruits and vegetable intake.

3.3. Association between CVD and HIV/ART

In addition, Nsagha and colleagues (2015) found that highly-active retroviral therapy (HAART) has been associated with an intense reduction in morbidity and mortality from HIV/AIDS; however it also caused increased prevalence of CVD risk factors namely obesity, diabetes mellitus, hypertension, hypertriglyceridemia and low high-density lipoprotein cholesterol (HDL) among these populations.

3.4. Conclusion

CVD risk factors among HIV-infected participants tend to be more lifestyle-related. Dyslipidaemia and impaired glucose tolerance; may be associated with atherosclerosis development (Periard, Gavassini, Taffe, Chevalley, Senn, Chapius-Taillard, de Vallière, Hayoz & Tarr, 2008). Therefore, most of the traditional risk factors of CVDs such as age, smoking, a higher BMI found in the general population is also found in the HIV-infected population (Nsagha et al 2015).

4. PURPOSE OF THE STUDY

4.1. Aim of the study

To profile selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district.

4.2. Objectives of the study

- To determine the socio-demographic factors of HIV patients on ART in Bushbuckridge sub-district

- To determine the prevalence of selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district
- To explore the association between socio-demographic factors and selected cardiovascular risk factors among HIV patients on ART in Bushbuckridge sub-district.

5. RESEARCH QUESTION

What is the profile of selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district?

6. METHODOLOGY

6.1. Research design

The study will use a quantitative approach, cross-sectional design, which will be used to describe cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge Sub-district (Creswell 2008:145).

Quantitative research uses a fixed design that organizes in advance the research question and a detailed method of data collection and analysis (Creswell 2008: 145). Cross-sectional design is used to describe attitudes or other characteristics of a particular population but it will not address the cause of the phenomenon being studied (Creswell, 2008:145).

6.2. Sampling

6.2.1 Study site

The study will be done in health facilities in Bushbuckridge sub-district. Bushbuckridge sub-district is in Mpumalanga province. Bushbuckridge is a rural sub-district, with mostly black people residing in the sub-district; the common languages spoken are Northern Sotho, Xitsonga and isiSwati. For the purpose of this study; the researcher will focus on Acornhoek area (municipality) in Bushbuckridge sub-district. The dominant language spoken in Acornhoek is Xitsonga, will be the language used to translate the consent form, information letter and questionnaire. Acornhoek has a level one district hospital (Tintswalo hospital), with 16 feeder clinics. For the purpose of this study, the study site will be Rixile ART clinic in the hospital.

6.2.2 Population

The study population will be adults who are HIV positive and on ART in Acornhoek town of Bushbuckridge sub-district.

6.2.3 Sampling method and sampling size

Rixile ART clinic on a monthly basis sees approximately 2888 adult ART patients. According to Krejcie and Morgan (1970) table for determining sample size, for a population of 2800 the sample population should be 338 and additional 10% (34) to account for spoiled questionnaires. The total sample population is 372 (see annexure 3).

6.2.4 Sampling method

Simple random sampling technique will be used. In which each adult HIV patient on ART have an equal probability of being selected (Creswell, 2008:147).

The lottery method will be used; the researcher will identify HIV patients who meet the inclusion criteria, the participants will be allocated numbers and their numbers will be placed in a bowl and the researcher will draw the numbers. If their number gets drawn those patients will be taking part in the study. Data will be collected over a period of a month and will only draw 20 participants per day.

6.2.5 Inclusion criteria

To ensure inclusion in the study the participants must meet the following criteria; HIV positive patients on ART, self-dependent (walking by themselves without support etc.) and not very ill. HIV positive adults 18 years and older will be included because most of the CVDs risk factors occur in adults

6.2.6 Exclusion criteria

The study will exclude HIV positive patients who are initiated on ART on the day of data collection. Also exclude those who are very ill and not able to walk by themselves. HIV positive individuals less than 18 years will not participate because CVDs risk factors are mostly seen in adults.

6.3. Data collection

6.3.1Data collection instrument

The study will use a researcher-administered questionnaire that has been adapted from World Health Organization stepwise approach to chronic disease risk factor surveillance (WHO STEPS) questionnaire of which the researcher or research assistant will ask the participants and complete the forms (see Annexure 6, annexure (a) is in English and (b) is in Xitsonga) (WHO 2013).

6.3.2 Data collection procedure

The participants will be read the information letter (see annexure 4 (a) is in English and (b) translated into Xitsonga), those who agree to participate will be given consent form (see annexure 5 (a) in English and (b) translated into Xitsonga) to read and fill in. The questionnaire will have two sections, section A and section B. Of which section A include socio-demographic information, anthropometric assessment at baseline (will look at the file on the initial visit) and current measurement on the day of data collection; and how long they have been on ART. Section B includes questions regarding the risk factors of cardiovascular disease, each risk factor having a set of questions; due to financial and time constraints lipid profile and blood glucose test will not be assessed in this study. The WHO STEPS questionnaire will be modified to suit the study by removing questions for diabetes and dyslipidaemia and include ART duration and regimen that the patients are on.

Hence only selected CVDs risk factors will be assessed such as obesity and overweight by measuring weight with minimal clothing, height no shoes or a hat on and calculate BMI if a BMI is above 30kg/m2 is categorized as obese and a BMI between 25-29,9kg/m2 is overweight. Abdominal obesity waist circumference should be measured using a tape measure, measuring the centre between the hip bone and the bottom ribs. Waist circumference measure that indicates a risk factor for cardiovascular disease should be greater than 88cm for females and 102cm for males. Blood pressure will be measured the normal blood pressure is 120/80mmHg, pre-hypertension 120-139/85-89mmHg stage 1 hypertension 140-159/90-99mmHg and stage 2 hypertension greater than 160/100mmHg. Dietary intake, smoking, alcohol consumption and physical activity will also be assessed.

6.4. Data analysis

The data will be double checked by researchers for completeness before it can be entered into a data base. The questionnaires will be coded for identification to avoid repetition of data. The data from the questionnaires will be entered into a computer software Microsoft excel, then imported to Statistical Packages for the Social Sciences (SPSS) version 24.0 for analysis. The entered data will be double checked and duplicated to ensure correctness and accuracy. Regression analysis will be used to analyse data for the association between socio-demographic variables, selected CVD risk factors and ART. To illustrate the data, the frequency of the participants' response will be presented in tables and graphs. The data analysis will be performed on the basis of the study objectives.

6.5. Reliability and validity

6.5.1 Pilot study

A pilot study is a small-scale study using a small sample of the population (Teijlingen & Hundley 2001). The pilot study will be carried out by using 10 of the HIV infected patients on ART at one of the feeder clinics which is not included the sample size. A simple random sampling method will be used to select the participants. The pilot study is to test the reliability and validity of the questionnaire.

6.5.2 Reliability

Reliability is the degree of stability exhibited when a measurement is repeated under identical conditions (Leedy & Ormrod 2010). The researcher and the researcher assistants will familiarise themselves with the questionnaire.

6.5.3 Validity

Validity is a way to find out how well a tool measures what it is set out to measure (Leedy & Ormrod 2010). The questionnaire that is used is adapted from WHO which has been used in previous studies it has been validated for content and construct validity.

6.6. Bias

Bias is defined as any tendency which prevents impartial consideration of a question. In research it occurs when systematic error is introduced into sampling or testing by

selecting or encouraging one outcome or answer over others (Pannucci & Wilkins 2010). The types of biases possible to arise from the study are researcher bias, measurement bias, respondent bias.

6.6.1 The researcher bias

Researcher bias includes characteristics and/or behaviour of the researcher which may influence the data; including omission of questions, inconsistent instructions, and assuming answers (Pannucci & Wilkins 2010). To minimise researcher bias, the researcher and researcher assistant (fellow dietitians) are well-trained and will administer the questionnaire in uniform. The researcher and researcher assistants should dress appropriately not to intimidate the participants in any way that they may not feel comfortable and give answers which they think the researchers will like to hear.

6.6.2 The measurement bias

Measurement bias is introduced by the use of incorrect equipment; including poor questionnaire design (Pannucci & Wilkins 2010). To minimise measurement bias, the study will use an existing questionnaire that has been used before and validated and modified to suit the current study. Instructions will be made clear and simple. The blood pressure (BP) machines used may not give correct readings will minimise it by taking two readings of a patient and the readings shouldn't vary by more than 5mmHg, if its more than 5mmHg then will take additional until differential measurement narrows. The weighing scale will be calibrated by using an object with a known weight and placed on a flat surface. The researcher and researcher assistant should ensure all participants have taken off their shoes and hats.

6.6.3 The respondent bias

The respondent bias is error introduced by the participants when answering questions asked (Pannucci & Wilkins 2010). To minimize respondent bias, the researcher will use English and Xitsonga languages for the questionnaires, give clear instructions to complete the questionnaire.

7. ETHICAL CONSIDERATION

Prior to conducting the study, the research proposal will be submitted to School of Health Care Sciences Research Committee for approval and Turfloop Research Ethics Committee (TREC) for ethical clearance. The clearance letter obtained from TREC will be used to seek permission from the provincial Department of Health, Chief Executive Officer (CEO) of Tintswalo Hospital and operational manager of the clinic (pilot study). (See permission letters in annexure 8 and 9 D).

7.1. Informed consent

All individuals have a right to decide for themselves whether or not to participate in the study and to continue or stop participating at any time without negative consequences. The participants will be given a consent form to sign after the researcher/researcher assistants have informed the participants about the aim, objectives and procedure of the study. (See consent form is attached in annexure 5).

7.2. Confidentiality and anonymity

All information will be kept confidential. The documents will be kept in a locked drawer at the public health unit in University of Limpopo, where only authorised personnel will have access to the documents only. Anonymity of participants will be maintained by not using names when analysing data and the self-administered questionnaires will be linked by identifier numbers. In case the researcher/researcher assistants want to verify something with the participant, the participant will be linked with the code and the register will be kept in a safe place (see annexure 7).

7.3. Beneficence

This study would improve the services that HIV infected patients receive and it would motivate health care professionals to screen HIV infected patients on cardiovascular disease risk factors.

7.4. Non-maleficence

The study is non-invasive thus no physical harm is anticipated. Harm will be avoided to participants. The researcher and the research assistants will be competent thus minimising harm and manage risk as they arise and information letter will be provided to the participants (see annexure 4).

8. SIGNIFICANCE OF THE STUDY

Studies have projected that annual global CVDs will increase from 16.7 million in 2002 to 23.9 million by 2030. The HIV pandemic has contributed significantly to mortality rates in many countries over the past three decades. However, the introduction of antiretroviral therapy (ART) by government has substantially reduced AIDS-related mortality in many countries and mortality in this population is attributable to non-HIV related conditions such as CVDs (Islam, Wu, Jansson & Wilson 2012).

This study would guide policymakers on reducing and preventing complications of cardiovascular disease risk factors among HIV patients given antiretroviral therapy thus would lead to the update of the People Living with HIV/AIDS (PLWHA) policy. The study would further motivate for lifestyle modification and health promotion interventions among HIV patients as in the general population regarding CVD risk factors. Prevention of these CVD risk factors through health promotion and early screening would reduce the burden caused by the CVD risk factors than treating CVD risk factors. Therefore, it would relief the health system in expenditure of non-communicable disease medication.

CHAPTER TWO
LITERATURE REVIEW

This chapter will discuss the traditional risk factors of CVD among HIV patients, on ART and some studies compared this population with HIV patients not on ART and general population.

2.1 Introduction

Cardiovascular diseases are a major public health problem accountable for 17.5 million deaths globally each year, which is estimated to be 31% of all deaths worldwide with an alarming 75% of these deaths occur in developing countries (World Health Organization 2015). Boccara (2010) stated that in the United States, CVD particularly coronary heart disease- related morbidity has become the third most common cause of death in HIV infected population; and the causes of death in HIV-infected population are similar to those of uninfected population which are cardiovascular disease, renal failure, non-AIDS related neoplastic disease and hepatitis.

HIV and AIDS continue to be major public health problems both in developed and developing countries (Nsagha, Assob, Njunda, Tanue, Kibu, Ayima & Ngowe 2015). Globally, 36.7 million people were living with HIV in 2015, 17.2 million were in Sub-Saharan Africa and 10.3million of people living with HIV were on antiretroviral therapy in Sub-Saharan Africa (UNAIDS 2015). The use of antiretroviral therapy among HIV infected population has improved the quality and life expectancy (Rooyen, Fourie, Steyn, Koekemoer, Huisman, Schutte, Malan, Glyn, Smith, Mels & Schutte 2014). Improved life expectancy exposes them to the effects of aging, including influence of environmental risk factors known to act in general population and contributing to the occurrence of obesity, diabetes mellitus and cardiovascular disease (Nsagha, et al. 2015).

In South Africa, cardiovascular diseases such as hypertension, atherosclerosis and heart failure are increasing among the black population (Rooyen et al. 2014). With

regard to HIV prevalence South Africa is the most affected country in Sub-Saharan Africa (Rooyen, et al. 2014) with an estimated 12.7% of the population are affected and 7.03 million been in the age group 15-49 years (Statistics South Africa 2016). Mpumalanga province has the second highest HIV prevalence (23.1%) in the country in 2015 (StatsSA, 2016). Approximately 1.8 million HIV infected people in South Africa by 2011 (Kanabus 2016).

2.2 Cardiovascular disease risk factors

The population at risk of CVD is mostly attributable to nine modifiable traditional factors, which are smoking, history of hypertension or diabetes, obesity, unhealthy diet, lack of physical activity, excessive alcohol consumption, raised blood lipids and psychosocial factors and the first eight risk factors excluding psychosocial factors account for 61% of CVD deaths globally. There are also non-modifiable risk factors which include age, sex and ethnicity (Cappucio & Miller 2016).

2.2.1 Age

As the HIV-infected population ages, this causes increase in metabolic and cardiovascular disease morbidities, thus CVD is now recognized as the main cause of death in HIV-infected patients more than 55 years of age (Currier, 2009). In addition, Guaraldi, Orlando, Menozzi, Carli & Garlossi (2011) concur with Currier (2009), as they also found that frequently observed age-related non-communicable diseases such as diabetes mellitus, hypertension, cardiovascular disease were significantly more common in HIV-infected population than in the general population and the apparent age group was ranging from 40 years to 60 years. In contrast to the above observation, Durand, Sheely, Baril, Lelorier & Trembley (2011) found that a higher risk of coronary artery disease admission was found in younger HIV infected patients.

2.2.2 Gender

HIV-infected females seem to be at increased CVD risk. HIV-infected females have approximately double the relative risk of acute myocardial infarction than their male counterparts. Meanwhile absolute CVD rates remain lower for women (Kaplan, et al. 2007).

2.2.3 Ethnicity

In a study conducted by Rooyen et al. (2014) in South Africa, found that black Africans had generally low levels of HDL-C compared to whites, in their study they discovered that black Africans had lower HDL-C levels which is regarded as an increased risk for developing CVD.

2.2.4 Smoking

The Center for Disease prevention and Control (CDC) (2008) reported that smoking is a major risk factor for peripheral vascular and CHD, increasing the risk for CVD complications including myocardial infarction and stroke. A study done in the United States found that rates of smoking in HIV-infected populations are consistently high and exceeded those for age-matched general population (Durand *et al*., 2011). In addition, another study in the United States stated that many HIV-infected populations had individual modifiable risk factors for coronary heart disease, with a high prevalence of smoking especially HIV-infected adults thus increased predicted coronary heart disease risk (Kaplan, Kingsley, Sharrett, Li, Lazar, Tien, *et al*.,2007).

A study conducted by Regan, Meigs, Grinspoon & Triant (2016) in the United States also concur with the above mentioned studies that smoking among HIV-infected population has been linked to an increase risk of CVD, with an attributable risk of 25%.

In a study cited in Lifson, Neuhaus, Arribas, Van den Berg-Wolf, Labriola & Read (2010), showed that current smokers, in the HIV-infected population had significantly higher rate of CVD mortality than did non-smokers. The CDC (2008) further on stated that smoking cessation has increasingly become a recognized priority among HIV-infected population.

2.2.5 Alcohol consumption

Alcohol consumption is associated with CVDamong HIVinfected people. Moreover, unlike in HIVuninfected people, there are no data yet to suggest that moderate alcohol consumption may reduce the risk of CVD among HIVinfected people. The mechanisms by which alcohol influences cardiovascular risk among those infected with HIV are not clear; however, it is likely that both traditional risk factors for example increased blood pressure and dyslipidemia (Freiberg & Kraemer 2010).

2.2.6 Dyslipidaemia

Initiation of highly active antiretroviral therapy (HAART) usually results in increased lipid profile. Protease Inhibitors (PI) tend to induce greater increase in total cholesterol (TC), low-density lipoprotein (LDL) and triglycerides (TG). Protease inhibitors-induced cholesterol changes - partly explain the increased CHD risk observed in HIV-infected population receiving HAART. Prevalence of dyslipidaemia whether it is genetically determined or influenced by ART or HIV infection is constantly higher in the HIV-infected population (Lampe, Duprez, Kuller, Tracy, Otvos, Stroes, Cooper, Hoy, Paton, Friis- Møller, Neuhaus, Liappis & Phillips 2011; Tadewes, Addis, Ambachew & Banerjee 2012).

In a study conducted by Rooyen and colleagues (2014), it was found that in South Africa, people living with HIV illustrate dyslipidaemia characterized by low high-density lipoprotein (HDL) and high TG levels. Black Africans generally illustrate lower TG and higher HDL than whites; however, the HDL levels seen in black African HIV-infected participants, were below the general level thus increasing risk of developing CVD.

Zhou, Kodogo, Chokuona, Gomo, Oektedalen & Stray-Pederson (2015) stated that whether ART contributes to increased CVD risk remains uncertain, because the mechanism of how HIV infection or HAART induce these lipid abnormalities are unknown. Armstrong, Liu, Grinspoon, Spiegelman, Guerino, Njekelela et al. (2011) concur with Zhou et al. (2015) that HIV-infected participants on HAART tend to have higher LDL and TC levels. A study conducted in Tanzania, cited that the prevalence of dyslipidaemia in developing countries is high in the HIV-infected population and also noted significant difference in the type and extent of dyslipidaemia based on the degree of immunosuppression (Armstrong et al. 2011).

2.2.7 Body mass index and waist circumference

A study conducted by Ogunmola, Oladusu & Olamogegun (2014) in Nigeria found a high prevalence of obesity in the general population compared to HIV-infected population and stated that this may be due to epidemiological transition and that being obese is associated with wealth and being healthy. In a cohort study

conducted in 20 countries (Europe, United States and Australia) found that when comparing HIV-infected on HAART and those not on HAART; there was a slightly higher prevalence of obesity among those not on HAART. HAART was associated with the presence of lipodystrophy and highest risk was among participants on a regimen containing all three drug classes however it is not an indication for obesity (Friss-Møller, Weber, Rass, Thiebaut, Kirk, d'Armino Monforte, Pradler & Worfeldt 2003).

In a study conducted in Nigeria, found that there was higher prevalence of obesity and increased waist circumference among HIV patients on HAART (Muhammad, Sanu & Okeahialam 2013). In a cross-sectional study conducted in Latin America, demonstrated that female Latin American HIV-infected patients on ART had higher prevalence rate of abdominal obesity than males (Alvarez, Salazer, Galindez, Rangel, Castaneda, Lopardo, Cuhna, Roldan, Sussman, Gutierrez, Cure-Bolt, Seas, Carcamo & Castrillo 2010). Although obesity might have a protective effect on HIV disease progression and AIDS-related deaths; it has harmful health consequences such as CVD (Shah, Alio, Hall & Luque 2012).

2.2.8 Hypertension

In a study conducted by Friss-Moller, et al (2003), found that more than 8% of the HIV-infected study participants had hypertension, especially those on regimens containing NNRTI, PI or both drug classes. After readjustment of other factors which were associated with the presence of hypertension, the association with ART disappeared or reversed. Hence a strong correlation can be established between hypertension and other factors such as age, sex and BMI.

A study done by Bloomfield, et al (2011), cited that blood pressure was found to be high in the participants that had a higher CD4 count; the reason could be due to improved general health and nutritional status. They further on added that the prevalence of hypertension was commonly seen among young men than older age groups. The rationale could be that specific effects of HIV on vascular system are more noticeable in patients with few traditional CVD risk factors such as age.

2.2.9 Type 2 diabetes mellitus

All HAART regimens were associated with an increased risk of diabetes when comparing HIV-infected on HAART with HIV-infected not on HAART. Even after readjustment of other factors, current treatment with a regimen containing NNRTI, NRTI and PI remained slightly independently associated with presence of diabetes (Friss-Moller, et al, 2003).

2.2.10 Dietary intake

A study done by Mashinya, Alberts, Van Geertruyden & Colebunders (2014) found that most of the participants stated non-availability of fruits and vegetables as reasons for low intake; low intake of fruits and vegetables remains a major challenge as it increases the risk of CVD and mortality. Mashinya, et al. (2014) further cited that high levels of TG were associated with low fruits and vegetable intake.

2.3 Association between CVD and HIV/ART

In addition, Nsagha and colleagues (2015) found that highly-active retroviral therapy (HAART) has been associated with an intense reduction in morbidity and mortality from HIV/AIDS; however, it also causes increased prevalence of CVD risk factors namely obesity, diabetes mellitus, hypertension, hypertriglyceridemia and low high-density lipoprotein cholesterol (HDL) among this population. Muhammad and colleagues (2013) found that the prevalence of diabetes mellitus among HAART patients, however it may not be clear if HIV increases the risk of insulin resistance, protease inhibitors have been found to induce insulin resistance over a short treatment course thus this attribution may be associated with HIV and increased risk of insulin resistance. In Sub-Saharan Africa, NRTI-containing HAART regimens are used and high prevalences of hypertension and obesity were found among HAART recipients therefore the HAART regimens significantly affect the cardiovascular disease risk factors (Muhammad et al. 2013).

2.4 Conclusion

CVD risk factors among HIV-infected participants tend to be more lifestyle-related, dyslipidaemia and impaired glucose tolerance; may be associated with atherosclerosis development (Periard, Gavassini, Taffe, Chevalley, Senn, Chapius-

Taillard, de Vallière, Hayoz & Tarr 2008). Therefore, most of the traditional risk factors of CVDs such as age, smoking, a higher BMI found in the general population is also found in the HIV-infected population (Nsagha et al. 2015).

CHAPTER THREE

3.1. INTRODUCTION

This chapter will discuss the research design used, selection method of sample size, data collection and analysis. Including challenges encountered during data collection.

3.2. RESEARCH DESIGN

The study used a quantitative approach, cross-sectional design, which was used to describe cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge Sub-district (Creswell 2008:145). Quantitative research uses a fixed design that organizes in advance the research question and a detailed method of data collection and analysis (Creswell 2008: 145). Cross-sectional design is used to describe attitudes or other characteristics of a particular population but it will not address the cause of the phenomenon being studied (Creswell, 2008:145).

3.2.1. Sampling

3.2.1.1. Population

The study population were adults who are HIV positive on ART in Acornhoek town of Bushbuckridge sub-district.

3.2.1.2. Sampling method and sampling size

Simple random sampling was used in which each adult HIV patient on ART had an equal probability of being selected into a study (Creswell, 2008:147). The lottery method was used; the researcher identified HIV patients who met the inclusion criteria in the waiting area before they entered consulting rooms, the participants were allocated numbers and their numbers were placed in a plastic bag and drawn.

When their number were drawn those patients took part in the study. Data was collected over a period of a month (only weekdays days were utilised).

3.2.1.3. Ethical issues related to sampling

Informed consent

All individuals had a right to decide for themselves whether or not to participate in the study and to continue or stop participating at any time without negative consequences. Thorough information was given to the participants on the purpose of the study and that information given will not affect the service they receive at the facility. The participants were given a consent form to sign after the researcher has informed them about the study.

Confidentiality and anonymity

Anonymity will be kept by after they complete the consent form the questionnaire did not have their name on it only a participant code of which will not be linked to the participant. All information is kept confidential after it was completed. The documents are kept in a safe place where only authorised personnel will have access to the documents only.

3.2.1.4. Sample

Rixile ART clinic on a monthly basis sees approximately 2888 ART patients. According to Krejcie & Morgan (1970) table for determining sample size, for a population of 2800 the sample population should be 338 and additional 10% (34) to account for spoiled questionnaires. The total sample population is **372**. The sample size obtained was **332,** some of the participants refused to take part, others decided in the middle of completing the questionnaire to discontinue, by the time of study the clinic had started referring patients to their nearby clinics as they were overwhelmed in the face of staff shortage and a new programme has been introduced in the clinic called central chronic medicine dispensing and distribution (CCMDD) whereby some patients are on the programme only collect medication in an area convenient to them thus less clinic visits and patients were missed. These could be the reason to not meeting the Target sample size.

3.2.2. Data collection

3.2.2.1. Data collection approach and method

The study used a questionnaire, a researcher-administered questionnaire. Which was completed by the researcher after asking the participants questions.

3.2.2.2. Development and testing of the data collection instrument

The researcher-administered questionnaire was adapted from World Health Organization stepwise approach to surveillance (WHO STEPS) which has been validated, the researcher saw no need to still test it before the pilot study and actual study.

3.2.2.3. Characteristics of the data collection instrument

The questionnaire had two sections, section A and section B, of which section A included socio-demographic information, anthropometric assessment at baseline (looked at the file on the initial visit) and current measurement on the day of data collection; and how long they have been on ART. Section B included questions regarding the risk factors of cardiovascular disease, each risk factor having a set of questions; due to financial constraints and time consuming lipid profile and blood glucose test were not assessed in this study hence only selected CVDs risk factors were assessed such as obesity, hypertension, dietary intake, smoking, alcohol consumption and physical activity. During data collection it was difficult to measure the amount of time patients found themselves doing activities this led to the risk factor being omitted during data analysis. Having had a pedometer or accelerometers would have been useful.

3.2.2.4. Data collection process

Data collection occurred for a duration of a month (only weekdays as the clinic operates on weekdays only), so that some participants are not repeated, in a day the researcher could see 25 participants who voluntarily agreed to participate in the study. After completion of consent form, participants were asked socio-demographic information, thereafter the researcher asked to take anthropometric measurements. The participants were weighed using an electric digital scale without shoes, jackets only with minimal clothing. Height was also measured whereby the participants were

standing upright and recorded on the space provided thereafter the BMI was calculated. Waist circumference was also measured using a measuring tape with their t-shirts or shirts on. The blood pressure was measured twice to minimise instrument bias thereafter recorded. Duration on ART has been asked followed by which regimen they were on which is indicated in the file. Those who were seen by the researcher needed not to have their vitals taken as researcher did that and was allowed to write on the file for that day. After section A was completed questions followed on the selected risk factors such as smoking, alcohol consumption, dietary intake and physical activity. After completion participants were thanked and they proceeded to the consulting rooms to be assisted further.

3.2.2.5. Ethical considerations related to data collection

The ethical approval to conduct the current study was obtained from the University of Limpopo research committee called “Turfloop Research Ethics Committee” (TREC) and the reference number allocated to this study by the research ethics committee was: TREC/242/2017: PG. The Department of Health in Mupumalanga Province had also given approval to conduct the study. This research was guided by the principles of respect for people, beneficence and justice. The participants were given respect in the form of recognition of participants’ rights, including the right to be informed about the study, the right to freely decide whether to participate in a study and the right to withdraw from the study at any time without penalty, using informed consent.

Confidentiality and anonymity

All information collected for the purpose of this current study has been kept confidential and the documents are kept in a safe place where only authorised personnel will have access to them when permitted to do so. Anonymity of participants was maintained by not using names when analysing data and the self-administered questionnaires will be linked by identifier numbers.

Beneficence

The results of this study is useful in making nurses aware of the importance of calculating and interpreting BMI in order to promote weight loss, manage and prevent non-communicable diseases.

Non-maleficence

The study was non-invasive thus no physical harm was anticipated. Harm was avoided to participants. As the measurements undertaken were their normal vitals that they take every time they visit the facility the only thing that could probably be their first exposure to it was the measuring tape for measuring waist circumference as some seemed a bit uncomfortable especially men. The researcher was competent thus minimising harm and managed risk as they arose and the information letter was provided to the participants

3.2.3. Data analysis

The data was double checked by researcher for completeness before it was entered into a data base. The questionnaires were coded for identification to avoid repetition of data. The data from the questionnaires was entered into a computer software Microsoft excel, then imported to Statistical Packages for the Social Sciences (SPSS) version 24.0 for analysis with the help of the supervisor. The entered data was double checked and duplicated to ensure correctness and accuracy. Upon data analysis the physical activity and dietary intake data did not yield any results thus they were removed and not analysed. To illustrate the data, the frequency of the participants' response is presented in tables and graphs. The data analysis was performed on the basis of the research question.

Logistic regression

The factors associated with cardiovascular disease risk factors such as smoking, alcohol use, hypertension, overweight, obesity and abnormal waist circumference were investigated using regression analysis to estimate odds ratios (OR) and 95% confidence intervals (CI) (Kavishe et al., 2015). The descriptive characteristics were tabulated separately by age, gender, educational level, marital status and work status to determine the predictors of cardiovascular disease risk factors (Gaziano et al., 2008, Hamburg et al., 2008). The binary logistic regression analysis was carried out using a dependent variable (1 = yes, 0 = no) while other factors were independent variables. In this study, the independent variables were age, gender, educational status, marital status and work status respectively. The dependent

variables were smoking, alcohol use, hypertension, overweight, obesity and abnormal waist circumference respectively.

3.3. INTERNAL AND EXTERNAL VALIDITY OF THE STUDY

Pilot study

A pilot study is a small-scale study using a small sample of the population, but not the same group who will be part of the sample. The pilot study was carried out by using 10% of the HIV infected patients on ART at a feeder clinic which was not included in the sample size. A simple random sampling method was used to select the participants. The pilot study was carried out to test the validity of the questionnaire.

Reliability

Reliability is the degree of stability exhibited when a measurement is repeated under identical conditions (Leedy & Ormrod, 2010). Reliability was maintained by checking completed questionnaires for completeness and accuracy; thus yielding stable scores when repeated. The pilot study was conducted to ensure reliability.

Validity

Validity is a way to find out how well a survey measures what it is set out to measure (Leedy & Ormrod, 2010). The questionnaire was reviewed by the supervisor to test content validity. The chi-square for data analysis was used to test construct validity (hypothesis). The pilot study was conducted in order to test the validity.

CHAPTER FOUR

4.1. INTRODUCTION

This chapter will include presentation of findings, interpretation of those findings and discussion of the overall findings.

4.2. DATA MANAGEMENT AND ANALYSIS

After data collection, the data was entered on Microsoft Excel 2013. Data was double checked for correct entry and duplicated. The data was imported into Statistical Packages for the Social Sciences (SPSS) version 24.0 where it was

analysed thereafter imported to a Microsoft Word 2013 in forms of tables, graphs and pie chart for results to be interpreted.

4.3. RESEARCH RESULTS

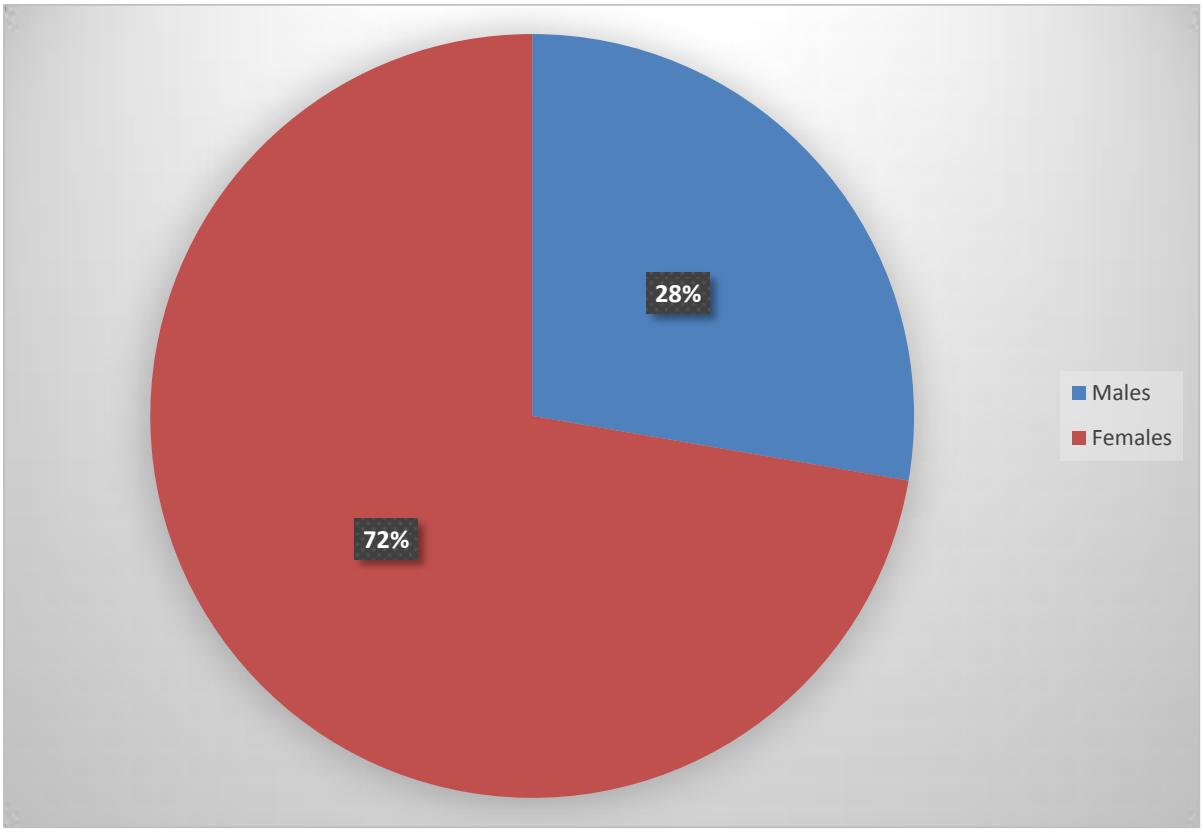
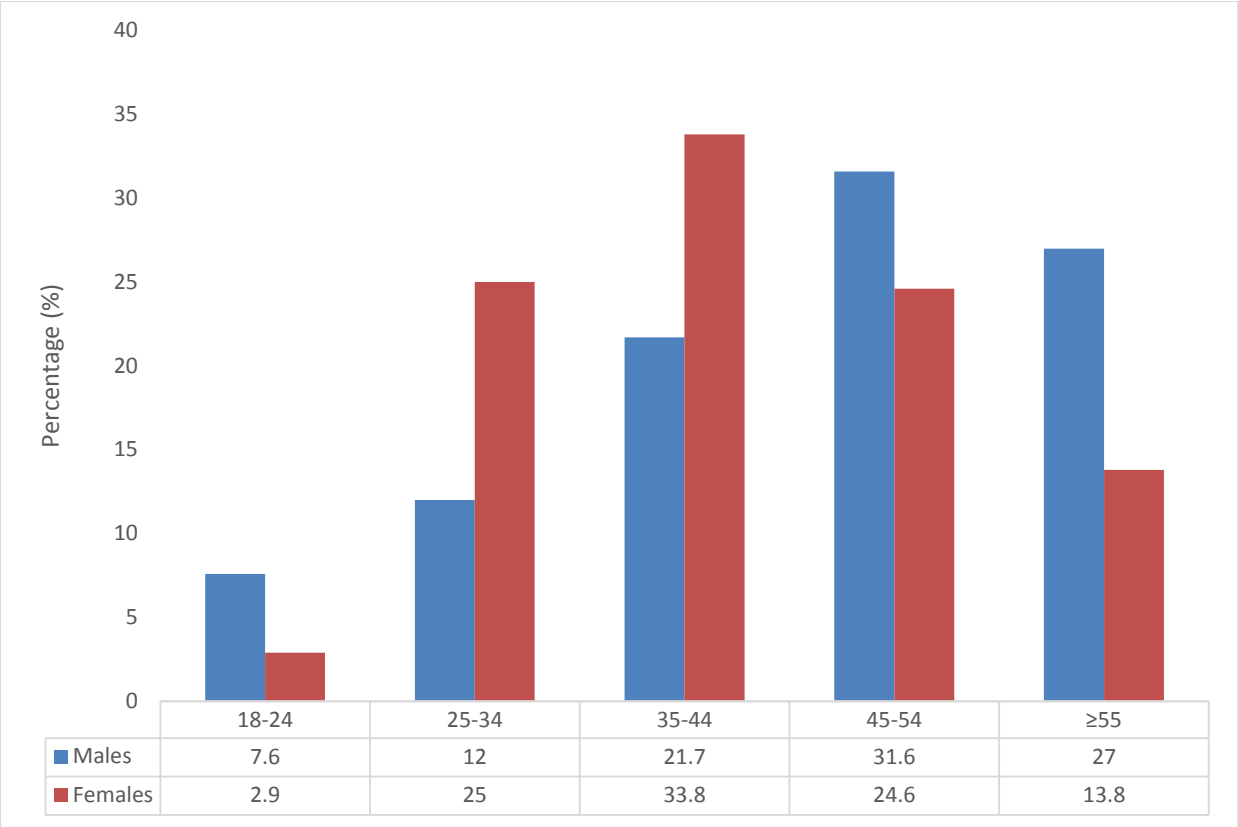


Figure 4.1: Gender distribution of participants

A total of 332 participants took part in the current study and majority (72%) of the participants were females as compared to males as presented in figure 4.1 above.



	18-24	25-34	35-44	45-54	≥55
Males	7.6	12	21.7	31.6	27
Females	2.9	25	33.8	24.6	13.8

Figure 4.2: Age distribution of participants

The overall age distribution among participants increased with increasing age from 4.2% in age group 18 – 24 years to 30.4% in age group 35 – 44 years then dropped to 26.5% and 17.5% in age groups 45 – 54 years and above 55 years respectively. In gender distribution, 7.6% was recorded in age group 18 – 24 years in males to 31.6% in age group 45 – 54 years then dropped to 27%. In females a similar trend was witnessed, from 2.9% in age group 18 – 24 years to 33.8% in age group 25 – 44 years but then dropped to 24.6% and 13.8% in age groups 45 -54 years and above 55 years respectively as presented in figure 4.2 above.

Table 4.1: Socio-demographic information

	Males (n=92)	Females (n=240)	P-value
	n (%)	n (%)	
18-24	7 (7.6)	7 (2.9)	
25-34	11 (12)	60 (25)	
35-44	20 (21.7)	81 (33.8)	0.001
45-54	29 (31.6)	59 (24.6)	
≥55	25 (27)	33 (13.8)	
Employment status	n (%)	n (%)	P-value
Employed	33 (35.9)	62 (25.8)	
Self- employed	15 (16.3)	15 (6.3)	
Unemployed	41 (44.6)	159 (66.3)	0.001
Student	3 (3.3)	4 (1.7)	
Marital status	n (%)	n (%)	P-value
Single	13 (14.2)	110 (45.8)	
Married	47 (51.1)	42 (17.5)	
Co-habiting	19 (20.7)	29 (12.1)	
Divorced	4 (4.4)	14 (5.8)	< 0.000
Separated	5 (5.4)	15 (6.3)	
Widowed	4 (5.4)	30 (12.5)	
Educational status	n (%)	n (%)	P-value
No formal school	31 (33.7)	72 (30)	
Primary school	41 (44.6)	104 (43.3)	
Secondary school	18 (19.6)	55 (23)	0.855
Tertiary	2 (2.2)	8 (3.3)	
Post-graduate	0 (0.0)	1 (0.3)	

Table 4.1 above presents the socio-demographic characteristics of the participants in the current study. The majority of study participants were females n=240 (72%) and there was a statistical significance difference (*p-value 0.001*) between the age groups. The socio-demographic information indicates that 44.6% of males were unemployed as compared to 66.3% of females and approximately 36% of males were employed as compared to 26% of females. Majority of females were single at 45.8% and males who were married contributed 51.1%. lastly majority of the participants had a primary school level of education followed by no formal school.

Table 4.2: Baseline and current body mass index and blood pressure for males and females separately

	Males (n=92)		P-value	Females (n=240)		P-value
	Initial	Current		Initial	Current	
BMI	n (%)	n (%)		n (%)	n (%)	
Underweight	11 (12)	10 (7.5)		31 (12.9)	18 (7.5)	
Normal	66 (71.7)	60 (65)		126 (52.5)	108 (45)	0.006
Overweight	12 (13)	19 (20.7)	0.590	48 (20)	52 (21.7)	
Obesity	3 (3.3)	3 (3.3)		35 (14.6)	62 (25.8)	
Blood pressure	n (%)	n (%)	P-value	n (%)	n (%)	P-value
Hypotension	2 (2.2)	0 (0.0)		9 (3.8)	4 (1.67)	
Normal	66 (71.7)	54 (58.7)		170 (70.8)	159 (66.2)	
Pre-hypertension	18 (19.6)	23 (25)	0.026	41 (17.1)	54 (22.5)	0.038
Stage 1 hypertension	6 (6.5)	8 (8.7)		12 (5.0)	21 (8.7)	
Stage 2 hypertension	0 (0.0)	7 (7.6)		8 (3.3)	2 (0.83)	

The overall prevalence of overweight at the initiation of ART amongst the participants was 18.1% and obesity was 11.5% as compared to the BMI at the time of the study which was 21.4% overweight and 19.6% obese. Comparing the baseline and current body mass index at time of study for males in Table 4.2 above, it results revealed that there is no significant difference, however overweight percentage increased from 13% to 20.7%. The baseline and current body mass index at time of study for females shown that there is a significant difference at p-value 0.006. Obesity increased from 14.6% to 25.8%. The blood pressure among males indicated a significant difference at p-value 0.026 and stage 2 hypertension category increased from 0% to 7.6%. The blood pressure among females also indicated a significant difference at p-value 0.038 and pre-hypertension increased from 17.1% to 22.5% whereas stage 2 hypertension dropped from 3.3% to 0.8%.

Table 4.3: Overall prevalence of selected risk factors stratified by gender

Risk factor	Overall %(95%CI)	Males % % (95%CI)	Females %(95%CI)
Hypertension (BP>140/90mmHg)	34.6 (29.5 – 39.8)	41.3 (31.2 – 51.5)	32.1 (26.1 – 38.0)
Pre-hypertension	23.2 (18.6 – 27.8)	25.0 (16.1 – 33.9)	22.5 (17.2 – 27.8)
Stage 1 hypertension	8.7 (5.7 – 11.8)	8.7 (2.9 – 14.5)	8.8 (5.2 – 27.8)
Stage 2 hypertension	2.7 (0.9 – 4.5)	7.6 (2.1 – 13.0)	0.8 (-0.03 – 2.0)
Overweight (BMI kgm^2 ≥25 to ≤29.9)	21.4 (17.0 – 25.8)	20.7 (12.3 – 29.0)	21.7 (16.4 – 26.9)
Obesity (BMI kgm^2 ≥30)	19.6 (15.3 – 23.9)	3.3 (-0.04 – 6.9)	25.8 (20.3 – 31.4)
Waist circumference	31.9 (26.9 – 37.0)	4.4 (0.1 – 8.6)	42.5 (36.2 – 48.8)
Smoking	10.8 (7.5 – 14.2)	32.6 (22.9 – 42.3)	2.5 (0.5 – 4.5)
Alcohol	21.7 (17.2 – 26.1)	39.1 (29.1 – 49.2)	15.0 (10.5 – 19.5)

As presented in Table 4.3 above, the overall prevalence of hypertension was found to be 34.6% and males had the highest prevalence at approximately 41% as compared to 32% of females. In breaking down hypertension into different stages, the overall prevalence of per-hypertension was high at 23.2% and males had a prevalence of 25% as compared to 22.5% of females. Stage 1 hypertension had an overall prevalence of approximately 8.7% and both males and females had the same prevalence. Stage 2 hypertension had the lowest overall prevalence of 2.7% and males had a prevalence of 7.6 which is 6.8% higher than females.

The overall prevalence of overweight was 21.4% and females had a slight higher prevalence than males at 21.7% and 20.7% respectively. Obesity had an overall prevalence of 19.6% and females had a higher prevalence than males with 22.5%. The overall prevalence of abnormal waist circumference was 31.9and females had a higher prevalence of 42.5% as compared to 3.3% of males. The overall prevalence of smoking 10.8% and males had a higher prevalence at 32.6% as compared to 2.5% of females. Lastly, the overall prevalence of alcohol consumption was 21.7% and similarly to smoking, males had a high prevalence at 39.1% as compared to 15% in females.

Table 4.4: Prevalence of selected cardiovascular disease risk factors stratified by age group

	Age in years				
	18-24 % (95% CI)	25-34 % (95% CI)	35-44 % (95%CI)	45-54 % (95% CI)	≥ 55 % (95% CI)
	Females (n=240)				
Risk factors					
Overweight	-	25.0 (13.9 – 36.1)	25.0 (15.2 – 34.2)	22.0 (11.3 – 32.8)	12.1 (0.8 – 23.5)
Obesity	28.6 (-7.8 – 64.9)	26.7 (15.3 – 38.0)	17.3 (8.9 – 25.6)	28.8 (17.1 – 40.5)	39.4 (22.4 – 56.4)
Hypertension	28.6 (-7.8 – 64.9)	20.0 (9.7 – 30.3)	22.2 (13.1 – 31.4)	49.2 (36.2 – 62.1)	48.5 (31.1 – 65.9)
Waist circumference	42.9 (3.1 – 82.7)	41.7 (29.0 – 54.3)	32.1 (21.8 – 42.4)	44.1 (31.2 – 56.9)	66.7 (50.3 – 83.1)
Smoking	-	-	1.2 (-0.1 – 3.7)	1.6 (-0.2 – 5.0)	12.1 (0.1 – 23.5)
Alcohol consumption	57.1 (17.3 – 96.9)	25.0 (13.9 – 36.1)	12.3 (5.1 – 19.6)	10.2 (2.4 – 17.9)	3.0 (-2.9 – 8.9)
	Males (n=92)				
Risk factors					
Overweight	-	9.1 (-8.9 – 27.1)	20.0 (1.8 – 38.2)	20.7 (5.5 – 35.9)	32.0 (13.1 – 50.9)
Obesity	-	9.0 (-8.9 – 27.1)	5.0 (-4.9 – 14.9)	-	4.0 (-3.9 – 11.9)
Hypertension	-	45.5 (14.2 – 76.7)	35.0 (13.3 – 56.7)	37.9 (19.7 – 56.1)	60.0 (40.1 – 79.9)
Waist circumference	-	9.1 (-0.9 – 27.1)	-	-	12.0 (-1.2 – 25.2)
Smoking	14.3 (-14.1 – 42.7)	45.5 (14.2 – 76.7)	30.0 (9.1 – 50.9)	41.4 (22.9 – 59.9)	24.0 (6.7 – 41.3)
Alcohol consumption	57.1 (17.0 – 97.3)	54.5 (23.3 – 85.8)	45.0 (22.3 – 67.7)	41.4 (22.9 – 59.9)	20.0 (3.8 – 36.2)

Table 4.4 above illustrates the prevalence of selected cardiovascular disease risk factors stratified by age groups. The results of the current study reveals that, the prevalence of overweight in females was found to be high in age groups 25 – 34 years and 35 – 44 years at 25% then decreased with age at age 45 – 54 years and above 55 years at 22% and 12.1% respectively. In males, the prevalence of overweight showed an increasing trend from 9.1% at age 25 – 34 years to 32% at age group above 55 years. At the age group 18 – 24 years' obesity was found to be high at 28.6% the decreased at age groups 25 – 34 years and 35 – 44 years to be at 26.7% and 17.3 respectively in females. An increasing trend of obesity was also recorded in females at age 45 – 54 years and above 55 years at 28.8% and 39.4% respectively. In males, the prevalence of obesity showed a decreasing trend from 9% at age group 25 – 34 years to 4% at age group above 55 years.

Hypertension in the current study has shown a fluctuating trend in both females and males. It was highest in males at age 45 – 54 years at 60%, then 45.5%, 37.9% and 35% at age group 25 – 34 years, 45 – 54 years and 35 – 44 years respectively. Hypertension was highest in females 49.2% then dropped to 48.5% at age group above 55 years and at age group 18 – 24 years it was 28.6%, then 20% and 22.2% at age groups 25 – 34 years and 35 – 44 years respectively.

The prevalence of abnormal waist circumference was found to high in females as compared to males. It has increased with age 32.1%, 44.1% and 66.7%, at age groups 35 – 44 years, 45 – 54 years and above 55 years respectively. Smoking was more prevalent in males than females but in females it was increasing with age whereas in males it had a fluctuating trend. In females there were only smokers from the age group 35 – 44 years at 1.2% then increased to 12.1% at age group above 55 years. The highest prevalence of smoking in males was 45.5% at age group 25 34 years followed by 41.4% age group 45 – 54 years and the lowest prevalence was 14.3% at age group 18 – 24 years. Alcohol consumption in both genders decreased with increasing age from 57.1% at age group 18 – 24 years to 3% age group above 55 years in females and 57.1% at age group 18 – 24 years to 20% at age group above 55 years in males.

Table 5**:** Logistic regression to determine predictors of selected cardiovascular disease risk factors

Variables	**Smoking**	**Alcohol consumption**	**Hypertension**	**Overweight**	**Obesity**	**Waist Circumference**
Age						
18 – 34 years	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)
≥35 years	1.5 (0.5 – 4.8) [a]	0.3 (0.2 – 0.6)**	1.6 (0.9 – 3.0) [a]	1.5 (0.8 – 3.1) [a]	0.7 (0.4 – 1.4) [a]	0.97 (0.53 – 1.78) [a]
Gender						
Female	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)
Male	22.5 (7.8 – 64.7)***	4.0 (2.1 – 7.7)***	1.4 (0.9 – 2.4) [a]	0.9 (0.5 – 1.9) [a]	0.08 (0.02 – 0.3)***	0.06 (0.02 – 0.2)***
Educational status						
High	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)
Low	0.9 (0.6 – 1.5) [a]	0.7 (0.5 – 1.1) [a]	0.8 (0.6 – 1.1) [a]	1.6 (1.2 – 2.3)**	0.7 (0.5 – 1.0) [a]	1.1 (0.8 – 1.6) [a]
Marital status						
Married	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)
Single	1.5 (0.4 – 5.4) [a]	0.9 (0.4 – 1.9) [a]	0.8 (0.4 – 1.5) [a]	0.8 (0.4 – 1.7) [a]	0.7 (0.3 – 1.5) [a]	0.8 (0.4 – 1.6) [a]
Cohabiting	1.8 (0.6 – 5.6) [a]	0.9 (0.4 – 2.1) [a]	o.8 (0.3 – 1.7) [a]	0.3 (0.1 – 1.0)*	0.7 (0.2 – 1.9) [a]	0.7 (0.3 – 1.9) [a]
Divorced	6.2 (1.2 – 31.8)*	0.7 (0.2 – 3.1) [a]	1.5 (0.5 – 4.2) [a]	0.2 (0.02 – 1.2) [a]	3.1 (0.9 – 10.4) [a]	1.6 (0.5 – 5.1) [a]
Separated	1.3 (0.2 – 7.9) [a]	0.2 (0.02 – 1.4) [a]	1.5 (0.5 – 4.0) [a]	0.8 (0.2 – 2.6) [a]	0.6 (0.2 – 2.6) [a]	1.1 (0.4 – 3.7) [a]
Widowed	1.1 (0.2 – 6.6) [a]	0.4 (0.1 – 1.6) [a]	1.8 (0.8 – 4.3) [a]	1.0 (0.4 – 2.6) [a]	1.0 (0.3 – 2.9) [a]	1.6 (0.6 – 4.1) [a]
Work status						
Working	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)	Reference (1)
Not working	_	2.8 (0.7 – 10.8) [a]	-	0.08 (0.02 – 0.3) [a]	1.2 (0.3 – 5.1) [a]	0.8 (2.1 – 2.9) [a]

Values are reported as odds ratios (95%CI); * significant *at p<0.05;* ** significant *at p<0.005;* *** significant *at p<0.001*, [a]Not significant

The predictors of selected cardiovascular disease risk factors

Table 4.5 above presents the predictors of selected cardiovascular disease risk factors using multivariate logistic regression. Therefore, the findings of the current study show that older people were 1.5 times more likely to be smokers than younger people but not statistically significant. However, males were 22.5 times more likely to be smokers than females (*p<0.*001). With regard to alcohol consumption, older people were found to be 0.3 times less likely to consume alcohol as compared to young people, however, males were 4 times more likely to consume alcohol as compared to females. The participant who were divorced were 6.2 times more likely to smoke than married participants (*p<0.05*).

Older people and males were 1.6 and 1.4 times more likely to be hypertensive than young ones and females respectively however, these were not statistically significant. Older people were found to be 1.5 times more likely to be overweight, 0.7 times less likely to be obese and 0.97 times less likely to be having abnormal waist circumference as compared to younger people but this however, was not statistically significant. Males were found to be 0.9 times less likely to be overweight which was not statistically significant but with regard to obesity, males were statistical significantly (*p<0.001*) 0.08 times less likely to be obese and 0.06 (*p<0.001*) to be having abnormal waist circumference as compared to females. Participants with low educational level were found to be 1.6 times more likely to be overweight than educated people (Table 4.5).

CHAPTER FIVE: DISCUSSION

5.1. INTRODUCTION

The advances and successes in the management of HIV disease and antiretroviral therapy (ART) have led to a prolonged disease-free survival in a substantial majority of HIV-infected individuals (Duprez et al., 2013). The success of antiretroviral therapy has led some people to now ask whether the end of AIDS is possible (Currier et al., 2008). Cardiovascular diseases (CVD) are now a leading cause of death among HIV-infected individuals and rates of CVD appear to be increased in HIV versus non-HIV infected groups (Duprez et al., 2013). For patients who are motivated to take therapy and who have access to lifelong treatment, AIDS-related illnesses are no longer the primary threat, but a new set of HIV-associated complications have emerged, resulting in a novel chronic disease that for many will span several decades of life.

Treatment does not fully restore immune health; as a result, several inflammation-associated or immunodeficiency complications such as cardiovascular disease and cancer are increasing in importance (Deeks et al., 2013). HIV and ART can contribute to an altered risk of CVD in 3 principal ways (Currier et al., 2008) been: (i) HIV may serve as a marker to identify a subgroup of the general population with an altered prevalence of traditional cardiovascular risk factors, unrelated to HIV or ART (eg, HIV-infected patients may have higher smoking rates); (ii) HIV or ART may affect the risk of developing a traditional cardiovascular risk factor (eg, HIV or ART may worsen dyslipidemia); and (iii) HIV or ART may affect the pathogenetic process that leads to CVD in ways other than via an effect on traditional risk factors (eg, through effects on inflammation or endothelial function). The aim of the current study was to profile selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district.

5.2. RESEARCH DESIGN AND METHOD

The methodology employed in the current study was retrospective quantitative cross-sectional in nature. The study used a questionnaire which was adapted from World Health Organization stepwise approach to surveillance (WHO STEPS) which has been validated and used in several studies globally (WHO 2015).

5.3 The profile of selected cardiovascular disease risk factors

A number of studies have shown that there may be increased risk of CVD in HIV-infected versus uninfected populations (Currier et al., 2008). As in other studies (Tate et al., 2012; Kavishe et al., 2015), majority of the participants in the current study were females. The age distribution of participants in the current study increased with increasing age which concurs with a study conducted in Uganda (Kavishe et al., 2015).

An increasing trend in the overall prevalence of overweight at the initiation of ART amongst the participants in the current study was noted which concurs with a study conducted by Tate et al (2012) in Birminghamin. Remarkably, a greater proportion of females than males were overweight and obese at baseline and during the conduct of the study which in agreement with the findings from other studies (Tate et al., 2012; Muhammad, Sanu & Okeahialam 2013). The highest prevalence of a higher waist circumference (abdominal obesity) (66.7%) is among females in the age category ≥55 years, surprisingly the age category 18 to 24 years among females have a prevalence of 42.9%. The latter, could be due to sedentary lifestyles and dietary patterns that young adults are in engaged in. The current results coincide with a study conducted by Alvarez et al (2010). Although obesity might have a protective effect on HIV disease progression and AIDS-related deaths; it has harmful health consequences such as CVD (Shah, Alio, Hall & Luque 2012). These results show that epidemiologic transition may not only occur in developed countries but also in developing countries. This shows that HIV patients on HAART should not be encouraged to consume energy-dense foods higher than the general population as they are also prone to obesity as in the general population.

Hypertension, diabetes, and dyslipidaemia are also more common in HIV infected people (Deeks & Phillips, 2009). In the current study the overall prevalence of hypertension was 34.6%, this is lower than that found in Cameroon of 38% among HIV patients on HAART (Dimala, Atashili, Mbuagbaw, Wilfred & Monekosso 2016). In this study, Men had the highest prevalence of hypertension than women. The prevalence of hypertension among men and women in the current study were 41.3% and 32.1% respectively which concurs with a study conducted in Kenya were males had a higher hypertension prevalence of 11.2% as compared to 7.4% of females (Bloomfield et al., 2011). Our study findings again revealed that the highest prevalence of hypertension (60%) was among males in the age category ≥55 years which differs from a study by Bloomfield et al (2011) where they found younger men had a higher prevalence than older age. The rationale could be that older men may not be able to control their blood pressure and stress levels better than their counterparts of the same age.

This study also found that the overall prehypertension prevalence is 23.2% which was found to be higher than the findings from a study done in three regions of Brazil where it was found that the prevalence of prehypertension was between 3% to 15% (Feliciano-Alfonso et al., 2010). Prehypertension is independently associated with risk of CHD, which has been described in subjects not infected with HIV, more studies need to be done in order to find out if prehypertension and HIV are dependently associated with risk of CVD or not. In this study, the chances of having a high prevalence rate of hypertension were predicted by increasing BMI. Increasing BMI has been shown to be a predictor of hypertension in a study conducted in Nigeria (Muhammad, Sani & Okeahialam 2013).

Through observation most of the elderly men are staying alone no one to look after men especially after they are diagnosed with HIV. Women also accept conditions or changes in their lifestyle better than men. To support the above statement, blood pressure taken when HAART was initiated and at time of study showed that stage 2 hypertension (≥160/100mmHg) increased from 0% to 7.6% for men and for women, however

decreased from 3.3% to 0.83%. These findings concurred with that of two African studies which showed a higher prevalence of hypertension with HAART (Muhammad et al 2013; Dimala et al 2016), thus supporting the fact that HAART could possibly be linked to hypertension in these patients.

The overall smoking rate is 10.8% and according to South African National Health and Nutrition Examination Survey (SANHANES) report of 2013, the prevalence of smoking in South Africa is estimated to be 16%. The highest prevalence of smoking (45.5%) among males in the age category 25 to 34 years and in females highest (12%) in the age category ≥55 years. In our study, the overall alcohol consumption is 21.7% and it is highest (57%) in the age category 18 to 24 years in both males and females. In a study conducted in the United States of America, discovered that the prevalence of alcohol consumption in people living with HIV/AIDS was higher than the general population in the same region (da Silva, Mendoza-Sassi, da Mota, Nader & de Martinez 2017). Many studies have found that people with HIV experience age-related comorbid disease, organ system functional decline, and frailty at an earlier age than demographically similar control subjects. This is likely to be accentuated among those consuming harmful amounts of alcohol (High et al., 2012). Specifically, our study findings revealed that patterns of heavy consumption continue into middle and drops at older ages as compared to other studies (Braithwaite et al., 2008; Justice et al., 2010).

The predictors of selected cardiovascular disease risk factors

A study conducted in Tanzania (Kagaruki et al., 2014) showed that older age (AOR = 3.42, 95% CI 2.06-5.70) was a risk factors that predicted the prevalence of hypertension among participants on ART which contradicts to the current study findings as it was revealed that older age was not significantly the risk factors that predicted hypertension and overweight. Hypertension was not significantly associated with any of the socio-demographic factors as opposed to a study conducted in Saudi Arabia (Saeed et al., 2011) wherein there was a significant association between hypertension and gender, age, educational level, and participants' occupation or work status. Male gender has

been found to be significantly associated with smoking (AOR = 22.5, 95% CI 7.8 – 64.7) and alcohol consumption (AOR = 4.0, 95% CI 2.1 – 7.7) in ART patients in the current study which is similar to other studies (Braithwaite et al., 2008; Justice et al., 2010).

5.3. CONCLUDING REMARKS

The risk of developing chronic cardiovascular and pulmonary diseases is increasingly recognized as a major public health problem in individuals infected with HIV. This study has shown that CVD risk factors among HIV patients are common as in the general population.in the era of epidemiologic transition obesity has become prevalent. Increase in BMI is associated with hypertension which is a leading cause of CVD. Women who participated in the current study presented with a higher BMI and waist circumference than men thus increasing their risk of cardiovascular diseases. Hypertension and prehypertension were more prevalent in this study of which could be attributed to increased BMI. Smoking was more prevalent in males middle-aged men and surprisingly also present in older women (≥55 years of age). Alcohol consumption is more prevalent in young adults both men and women, thus may increase their risk of cardiovascular disease later in life.

The profile of patients in infected with HIV and on ART is changing and this will have major implications for clinical care. As the age distribution is increasing it will result in an increased burden of age-related NCDs (higher than that of uninfected individuals), increased burden of polypharmacy, and an increasing proportion of patients who might have potential complications with their HIV treatment. The ageing HIV-infected population will put new demands on the health-care systems, which will have important implications for the health of HIV-infected patients in clinical care. Care management for HIV-infected individuals will increasingly need to draw on a wide range of medical disciplines, including geriatric medicine, cardiology, and oncology. Evidence-based changes to screening and monitoring protocols for NCDs in HIV-infected patients will be important to ensure continued high-quality care. HIV treatment and other guidelines are

continuously evolving, and future guidelines will have to account for the changing demographics and complex changes in patient profiles and needs identified here.

5.4. LIMITATIONS OF THE STUDY

The limitations of this study include its cross-sectional design because this does not allow establishing a causal relationship, between the risk factors and HIV infection and/or ART. Only selected CVD risk factors were determined which excluded diabetes mellitus and dyslipidaemia which have been found in previous studies that there is an association with HIV infection and/or ART in establishing CVD. Some risk factors had to be excluded during analysis such as physical activity and fruit and vegetable consumption as participants had given incomplete and inaccurate responses. The clinical outcomes of the participants such as viral load suppression and CD4 count were not available to make associations with the occurrence of the selected risk factors for NCD's.

5.5. RECOMMENDATIONS

Much attention is turning to cardiovascular diseases because patients treated with antiretroviral drugs now live longer and have to deal with the complications of ageing. Also, HIV infected adults generally have higher rates of certain cardiovascular risk factors. Therefore, future studies should be conducted in different provinces, that problems encountered during the study encountered could be overcome in other ways. The research populations for future studies can be defined differently.

Careful analysis of existing and novel epidemiologic data should be encouraged with an aim to identify those areas in which the presence of HIV infection clearly plays a role in the pathogenesis, expression, or severity of cardiovascular disease, and to identify diseases in which HIV positive persons are a significant proportion of the overall affected population. These efforts will also allow focus on cardiovascular disease risk factors of relatively high prevalence so that successful interventions will impact a substantial population. Health promotion interventions need to be put and revision of

people living with HIV/AIDS (PLWHA) policies and framework not only focusing on underweight and AIDS-related issues also include management and prevention of CVD risk factors.

5.6. Contributions of the study and implications for health care

The study will contribute in the body of knowledge and would guide policymakers on reducing and preventing complications of cardiovascular disease risk factors among HIV patients given antiretroviral therapy thus would lead to the update of the People Living with HIV/AIDS (PLWHA) policy. The study would further motivate for lifestyle modification and health promotion interventions among HIV patients as in the general population regarding CVD risk factors. Prevention of these CVD risk factors through health promotion and early screening would reduce the burden caused by the CVD risk factors than treating CVD risk factors. Therefore, it would relief the health system in expenditure of non-communicable disease medication. In conclusion, the current study, could contribute in the initiation and strengthening of interventions for minimizing preventable NCD risks which should be considered when initiating ART among PLWHIV. Thus, regular monitoring of NCD risk factors is of paramount importance among ART patients

LIST OF REFERENCES

Alvarez, C, Salazar, R, Galindez, J, Rangel, F, Castaneda, ML, Lopardo, G, Cuhna, CA, Roldan, Y, Sussman, O, Gutierrez, G, Cure-Bolt, N, Seas, C, Carcamo C & Castrillo, M. 2010. Metabolic syndrome in HIV-infected patients receiving antiretroviral therapy in Latin America. *Braz J Infect Dis*; 14(3):256-263.

Armstrong, C, Liu, E, Grinspoon, S, Okuma, J, Spiegelman, D, Guerino, C, Njekelela, M, Fawzi, W & Hawkins, C. 2011. *Dyslipidaemia in an HIV-positive, antiretroviral treatment-naïve population in Dar es Salaam, Tanzania*. J Acquir Immune Defic Syndr 57(2):141-145. From: https://**www**.ncbi.nlm.nih.gov/pub**med**/21436713 (Accessed 25 January 2017).

Bloomfield, GS, Hogan, JW, Keter, A, Sang E, Carter, EJ, Valazquez, EJ & Kimaiyo, S. 2011. *Hypertension and obesity as cardiovascular risk factors among HIV seropositive patients in Western Kenya*. PLoS ONE 6(7): e22288. From: https://www.ncbi.nlm.nih.gov/pubmed/21779407 (Accessed 25 January 2017).

Bloomfield, G.S., Khazanie, P., Morris, A., Rabadán-Diehl, C., Benjamin, L.A., Murdoch, D., Radcliff, V.S., Velazquez, E.J. and Hicks, C., 2014. HIV and non-communicable cardiovascular and pulmonary diseases in low-and middle-income countries in the ART era: what we know and best directions for future research. Journal of acquired immune deficiency syndromes (1999), 67(0 1), p.S40.

Boccarra, F. 2010. Acute coronary syndrome in HIV-infected patients. Does it differ from that in the general population. *Archives of Cardiovascular Disease* 103(11-12):567-569. Accessed from: https://www.ncbi,nlm.nih.gov>pubmed (Accessed date: 22 January 2017)

Braithwaite, R.S., Conigliaro, J., McGinnis, K.A., Maisto, S.A., Bryant, K. and Justice, A.C., 2008. Adjusting alcohol quantity for mean consumption and intoxication threshold improves prediction of nonadherence in HIV patients and HIV-negative controls. *Alcoholism: Clinical and Experimental Research*, *32*(9), pp.1645-1651.

Cappucio, FP & Miller, MA. 2016. *Cardiovascular disease and hypertension in Sub-Saharan Africa, risk and intervention*. Intern Emerg Med 11:299-305. From: https://www.ncbi.nlm.nih.gov/pubmed/27001886 (Accessed 14 February 2017).

Centers for disease control and prevention. (2008). *Morbidity and mortality weekly report* 57(45):1221-1248. From: https://www.**cdc**.gov/mmwr/index**2008**.html (Accessed 24 January 2017)

Deeks, SG. Lewin, SR & Havlir, D. 2013. *The end of AIDS: HIV infection as a chronic disease*. The Lancet 382: 1525-1533. From: https://www.ncbi.nlm.nih.gov/pubmed/24152939 (Accessed 13 February 2017)

Deeks, SG & Phillips, AN. 2009.*HIV infection, antiretroviral treatment, ageing and non-AIDS related morbidity*. BMJ 338: a3172. From: https://www.ncbi.nlm.nih.gov/pubmed/19171560 (Accessed 13 February 2017)

De Silva, CM, Mendoza-Sassi, RA, Da Mota, LD, Nader MM & De Martinez, AMB. 2017. *Alcohol use disorders among people living with HIV/AIDS in Southern Brazil: prevalence risk factors and biological markers outcomes*. BMC Infectious Diseases. 17:263.

Dimala, CA, Atashili, J, Mbuagbaw, JC,Wilfred, A & Monekosso, GL. 2016. *Prevalence of Hypertension in HIV/AIDS Patients on Highly Antiretroviral Therapy (HAART) Compared with HAART-Naïve Patients at the Limbe Regional Hospital, Cameroon*. PLoS ONE 11(2): e0148100. doi:10.1371/journal.pone.0148100.

Duprez, D.A., Neuhaus, J., Kuller, L.H., Tracy, R., Belloso, W., De Wit, S., Drummond, F., Lane, H.C., Ledergerber, B., Lundgren, J. and Nixon, D., 2012. Inflammation, coagulation and cardiovascular disease in HIV-infected individuals. *PloS one*, *7*(9), p.e44454.

Durand, M, Sheehy, O, Baril, J, Lelorier, J & Tremblay, CL. 2011. *Association between HIV infection, antiretroviral therapy, and risk of acute myocardial infarction: A cohort and nested case-control study using Quèbec's public health insurance database.* J. Acquir Immune Def Syndr 57:245-253. From: https://www.ncbi.nlm.nih.gov/pubmed/21499115 (Accessed 22 January 2017)

Feliciano-Alfonso, J.E., Mendivil, C.O., Ariza, I.D.S. and Pérez, C.E., 2010. Cardiovascular risk factors and metabolic syndrome in a population of young students from the National University of Colombia. *Revista da Associação Médica Brasileira*, *56*(3), pp.293-298.)

Freiberg, MS & Kraemer, KL.2010. *Modeling HIV and alcohol's effects*. Alcohol research & health 33(3):237-246.

Friis-Møller, N, Weber, R, Reiss, P, Thièbaut, R, Kirk, O, d'Armino Monforte, A, Pradier, C, Morfeldt, L, Mateu, S, Law, M, El-Sadr, W, De Wit, S, Sabin, CA, Phillips, AN & Lundgren,JD. 2003. *Cardiovascular disease risk factors in HIV patients- associated with antiretroviral therapy. Results from the DAD study*. AIDS 17(8):1179-1193. From: https://**www**.ncbi.nlm.nih.gov/pubmed/14627784 (Accessed 28 January 2017)

Friis-Møller, N, Thièbaut, R, Reiss, P, Weber, R, d'Armino Monforte, A, De Wit, S, El-Sadr, W, Fontas, E, Worm, S, Kirk, O, Phillips, AN, Sabin, CA, Lundgren, JD & Law MG. 2010. *Predicting the risk of cardiovascular disease in HIV-infected patients: the data collection on adverse effects of Anti-HIV drugs study*. European Journal of Cardiovascular prevention and rehabilitation 00(00):1-12. From: https://**www**.ncbi.**nlm**.nih.gov/pubmed/20543702 (Accessed 24 January 2017)

Gaziano, T.A., Young, C.R., Fitzmaurice, G., Atwood, S. and Gaziano, J.M., 2008. Laboratory-based versus non-laboratory-based method for assessment of cardiovascular disease risk: the NHANES I Follow-up Study cohort. *The Lancet*, *371*(9616), pp.923-931.

Hamburg, N.M., Keyes, M.J., Larson, M.G., Vasan, R.S., Schnabel, R., Pryde, M.M., Mitchell, G.F., Sheffy, J., Vita, J.A. and Benjamin, E.J., 2008. Cross-sectional relations of digital vascular function to cardiovascular risk factors in the Framingham Heart Study. *Circulation*, *117*(19), p.2467.)

High, K.P., Brennan-Ing, M., Clifford, D.B., Cohen, M.H., Currier, J., Deeks, S.G., Deren, S., Effros, R.B., Gebo, K., Goronzy, J.J. and Justice, A.C., 2012. HIV and aging: state of knowledge and areas of critical need for research. A report to the NIH Office of AIDS Research by the HIV and Aging Working Group. *Journal of acquired immune deficiency syndromes (1999)*, *60*(Suppl 1), pp.S1-18.

Islam, FM, Wu, J, Jansson, J. & Wilson, D.P., 2012. *Relative risk of cardiovascular disease among people living with HIV: a systematic review and meta-analysis*. HIV medicine, *13*(8), pp.453-468). From: https://www.ncbi.nlm.nih.gov/pubmed/22439731 (15 February 2017)

Justice, A., Sullivan, L., Fiellin, D. and Veterans Aging Cohort Study Project Team, 2010. HIV/AIDS, comorbidity, and alcohol: Can we make a difference?. *Alcohol Research & Health*, *33*(3), p.258.

Kagaruki, G.B., Mayige, M.T., Ngadaya, E.S., Kimaro, G.D., Kalinga, A.K., Kilale, A.M., Kahwa, A.M., Materu, G.S. and Mfinanga, S.G., 2014. Magnitude and risk factors of non-communicable diseases among people living with HIV in Tanzania: a cross sectional study from Mbeya and Dar es Salaam regions. *BMC Public Health*, *14*(1), p.904.

Kaplan, RC, Kingsley, LA, Sharrett, AR, Li, X, Lazar, J, Tien, PC, Mack, WJ, Cohen, MH, Jacobson, L & Gange, SJ. 2007. *Ten- year predicted coronary heart disease risk in HIV-infected men and women*. Clinical infectious disease 45:1074-1081. From: https://www.ncbi.nlm.nih.gov/pubmed/17879928 (Accessed 23 January 2017)

Kavishe, B., Biraro, S., Baisley, K., Vanobberghen, F., Kapiga, S., Munderi, P., Smeeth, L., Peck, R., Mghamba, J., Mutungi, G. and Ikoona, E., 2015. High prevalence of hypertension and of risk factors for non-communicable diseases (NCDs): a population

based cross-sectional survey of NCDS and HIV infection in Northwestern Tanzania and Southern Uganda. *BMC medicine*, *13*(1), p.126

Klug, EQ, Raal, FJ, Marais, AD., Taskinen, MR., Dalby, AJ., Schamroth, C, Rodepoort, N, Junklow, D, Blom, DJ, Catsicas, R & Webb, DA. 2015. South African dyslipidaemia guideline consensus statement. *South African Family Practice* 57(2):22-31. From: https://www.ncbi.nlm.nih.gov/pubmed/22380916 (Accessed 28 January 2017)

Lampe, FC, Duprez, DA, Kuller, LH, Tracy, R, Otvos, J, Stroes, E,Cooper, DA, Hoy, J, Paten, NI, Friis-Møller, N, Neuhaus, J, Liappis, AP & Phillips, AN. 2010. *Changes in lipids and lipoprotein particle concentrations after interruption of antiretroviral therapy.* J Acquir Immune Defic Syndr 54(3):275-284. From: https://kirby.unsw.edu.au/sites/default/files/hiv/.../KI%20publications%200612.pdf(Accessed 23 January 2017)

Lifson, AR, Neuhaus, J, Arribas, JR, Van den Berg-Wolf, M, Labriola, AM & Read, TRH. 2010. *Smoking- related health risks among persons with HIV in the strategies for management of Anti-retroviral therapy clinical trial*. American Journal of Public Health 100(10):1896-1903. From: https://www.ncbi.nlm.nih.gov › NCBI › Literature › PubMed Central (PMC) (Accessed 25 January 2017)

Mashinya, F, Alberts, M, Van Geertruyden, J & Colebunders, R. 2015. *Assessment of cardiovascular risk factors in people with HIV infection treated with ART in rural South Africa. Across-sectional study*. AIDS Res Ther 12(42):1-10. From: https://aidsrestherapy.biomedcentral.com/articles/10.1186/s12981-015-0083-6 (Accessed 22 January 2017)

Muhammad, S, Sanu, MU & Okeahialam, BN. 2013. Cardiovascular disease risk factors among HIV-infected Nigerians receiving highly active antiretroviral therapy. Nigerian Medical Journal: *Journal of the Nigeria Medical Association*. 54(3):185-190.

https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3719245/?report=printable#ref18

Nsagha, DS, Assob JCN, Njunda, AL, Tanue, EA, Kibu, OD, Ayima, CW & Ngowe, MN. 2015. *Risk factors of cardiovascular diseases in HIV/AIDS patients on HAART*. The open AIDS journal 9(51):51-59. From: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4645867/ (Accessed 23 January 2017)

Ogunmola, OJ, Oladosu, OY & Olamoyegun, AM. 2014. *Association of hypertension and obesity with HIV and antiretroviral therapy in a rural tertiary health center in Nigeria: A cross-sectional cohort study.* Vascular health and risk management 10:129-137. From: https://www.ncbi.nlm.nih.gov/pubmed/24672244 (Accessed 01 February 2017)

Periard, D, Cavassini, M, Taffè, P, Chevalley, M, Senn, L, Chapuis-Taillard, C, de Vallière, S, Hayoz, D & Tarr PE. 2008. *High Prevalence of Peripheral Arterial Disease in HIV-infected Persons*. Clinical Infectious Disease 46:761-767.
From: https://www.ncbi.nlm.nih.gov/pubmed/18230043 (Accessed 22 January 2017)

Rooyen, JM, Fourie, CMT, Steyn, HS, Koekemoer, G, Huisman, HW, Schutte, R, Malan, L, Glyn, M, Smith, W, Mels, C & Schutte, AE. 2014. *Cardiometabolic markers to identify cardiovascular disease risk in HIV-infected black South Africans*. South African Medical Journal 104(3):195-199. From: https://**www**.ncbi.nlm.nih.gov/pubmed/24897823 (25 Janaury 2017)

Shah, K, Alio, AP, Hall, WJ & Luque, AE. 2012. *The Physiological Effects of Obesity in HIV-Infected Patients*. Journal of AIDS & Clinical Research 151(3):doi:10.4172/2155-6113.1000151.

South Africa Demographic and Health Survey. 2016. Key indicator report. https://www.statssa.gov.za/publications/Report%2003-00-09/Report%2003-00-092016.pdf

Statistics South Africa 2016. Mid-year population estimates. From: http://www.statssa.gov.co.za (Accessed 02 February 2017)

Tadewos, A, Addis, Z, Ambachew, H & Banerjee, S. 2012. *Prevalence of dyslipidaemia among HIV-infected patients using first-line highly active antiretroviral therapy in Southern Ethiopia: A cross-sectional comparative group study*. AIDS Research and Therapy 9(31):1-8. From: https://aidsrestherapy.biomedcentral.com/articles/10.1186/1742-6405-9-31 (Accessed 28 January 2017)

Tate, T., Willig, A.L., Willig, J.H., Raper, J.L., Moneyham, L., Kempf, M.C., Saag, M.S. and Mugavero, M.J., 2012. HIV infection and obesity: where did all the wasting go?. *Antiviral therapy*, *17*(7), p.1281.)

UNAIDS 2016. Global AIDS update 2016.

World health organization. 2015. WHO STEPS instrument: Core and expanded. Accessed from: http://:www.who.int/chp/steps

World health organization. 2016. Cardiovascular diseases (CVDs). Accessed from: www.who.int/cardiovascular_diseases/en/

Zhou, DT, Kodogo, V, Vongai, KF, Gomo, CE, Oektedalen, O & Stray-Pedersen, B. 2015. *Dyslipidaemia and cardiovascular disease risk profiles of patients attending an HIV treatment clinic in Harare, Zimbabwe*. HIV AIDS- Research and palliative care

7:145-155.From: https://www.ncbi.nlm.nih.gov/pubmed/25999764 (Accessed 24 January 2017)

ANNEXURES

ANNEXURE 1: THE BUDGET

Expenses	Cost
Copies of Questionnaires including the information letter (382 copies at R6.00 per copy)	R2292.00
Copies of the research protocol (9 copies at R24.00 per copy)	R216.00
Copies of informed consent forms (382 copies at R1.00)	R382.00
Copies of permission letters to the hospital and department of health (4 copies at R2.00 per copy)	R8.00
Binding of report	R100.00
Weighing scales, height rods, waist circumference tapes, BMI wheels and blood pressure machines	Will borrow from the department
Tokens of appreciation for the researcher assistants (3 gifts at R100 each)	R300
Total costs	R3298.00

ANNEXURE 2: TIME SCHEDULE

Task	Time
Submission of protocol to the Supervisor	13 February 2017
Protocol presentation	17 February 2017
Revision of protocol	18-24 February 2017
Submission of protocol to School of Health Care Sciences Research Committee	01 March 2017
Feedback of protocol and presentation at School of Health Care Sciences Research Committee	15 March 2017
Feedback approval	March 2017
Submission to TREC	31 March 2017
Submission of permission letters	May 2017
Pilot study	May 2017
Data collection	May and June 2017
Data entry, cleaning and analysis	July 2017 – September 2017
Writing the report	January 2018 – April 2018
Submission of report	May 2018
Revision of the report	October 2017
Submission of the final report	June 2018

ANNEXURE 3: TABLE FOR DETERMINING SAMPLE SIZE

Table3: Table for determining sample size (Kreijcie & Morgan 1970)

Total	*Sample*	*Total*	*Sample*	*Total*	*Sample*
10 ⇒	10	220 ⇒	140	1200 ⇒	291
15 ⇒	14	230 ⇒	144	1300 ⇒	297
20 ⇒	19	240 ⇒	148	1400 ⇒	302
25 ⇒	24	250 ⇒	152	1500 ⇒	306
30 ⇒	28	260 ⇒	155	1600 ⇒	310
35 ⇒	32	270 ⇒	159	1700 ⇒	313
40 ⇒	36	280 ⇒	162	1800 ⇒	317
45 ⇒	40	290 ⇒	165	1900 ⇒	320
50 ⇒	44	300 ⇒	169	2000 ⇒	322
55 ⇒	48	320 ⇒	175	2200 ⇒	327
60 ⇒	52	340 ⇒	181	2400 ⇒	331
65 ⇒	56	360 ⇒	186	2600 ⇒	335
70 ⇒	59	380 ⇒	191	2800 ⇒	338
75 ⇒	63	400 ⇒	196	3000 ⇒	341
80 ⇒	66	420 ⇒	201	3500 ⇒	346
85 ⇒	70	440 ⇒	205	4000 ⇒	351
90 ⇒	73	460 ⇒	210	4500 ⇒	354
95 ⇒	76	480 ⇒	214	5000 ⇒	357
100 ⇒	80	500 ⇒	217	6000 ⇒	361
110 ⇒	86	550 ⇒	226	7000 ⇒	364
120 ⇒	92	600 ⇒	234	8000 ⇒	367
130 ⇒	97	650 ⇒	242	9000 ⇒	368
140 ⇒	103	700 ⇒	248	10000 ⇒	370
150 ⇒	108	750 ⇒	254	15000 ⇒	375
160 ⇒	113	800 ⇒	260	20000 ⇒	377
170 ⇒	118	850 ⇒	265	30000 ⇒	379
180 ⇒	123	900 ⇒	269	40000 ⇒	380
190 ⇒	127	950 ⇒	274	50000 ⇒	381
200 ⇒	132	1000 ⇒	278	75000 ⇒	382
210 ⇒	136	1100 ⇒	285	100000 ⇒	384

ANNEXURE 4(a): INFORMATION LETTER

Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province.

INTRODUCTION

I invite you to volunteer for a research study. This information sheet is to help you to decide if you would like to participate. Before you agree to take part in this study you should fully understand what is involved. You should not agree to take part unless you are completely happy about the study.

PURPOSE OF THIS STUDY

- The aim of the study is to profile selected cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province. The objectives of the study are:
- To identify the socio-demographic factors of HIV patients on ART in Bushbuckridge sub-district
- To determine the prevalence of selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district
- To determine the association between socio-demographic factors, selected cardiovascular disease risk factors and ART among HIV patients on ART in Bushbuckridge sub-district.

WHAT DOES THE STUDY INVOLVE

The research has 2 parts; the first part; you are requested to complete the consent form that will be given to you by the researcher in approximately 30 minutes and also expected to complete the researcher-administered questionnaire of which the researcher will ask you questions.

ETHICAL APPROVAL

This research study Protocol has been submitted to the School of Health Care Sciences Research Committee for approval, the Turfloop Research Ethics Committee (TREC) for ethical clearance and the Department of Health (Mpumalanga province)for approval.

YOUR RIGHTS AS A PARTICIPANT

Your participation is entirely voluntary and you can refuse to participate or withdraw at any time without giving any reasoning. Your right to anonymity, privacy and confidentiality will be ensured all the time. As a patient, this research is not intended to influence the healthcare service that you receive whether you participate or not.

Contact persons: Ms Mathebula R.L (Researcher)

Cell phone number: 0764971444

Email address: rudymathebula@gmail.com

ANNEXURE 4(b): PAPILLA RA VUXOKOXOKO

Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge

MANGHENELO

Ndza mi rhamba hiku ti twela ka n'wina ku ngenelela ka ndzavisiso. Papilla leri ra vuxokoxoko ira ku mi pfuna ku teka xiboho xo ngenelela. Mi nga se pfumela ku ngenelela ka ndzavisiso lowu, mi fanele ku twisisa leswi lavekaka. Mi nga pfumeli ku ngenelela handle ka loko mi ti twa mi tsakela ku ngenelela ndzavisiso lowu.

XIKONGOMELO XA NDZAVISISO

- xinavelo xa ndzavisiso lowu iku komba swihlengetiwa swa swivangelo swa ngozi swa vuvabyi bya mbilu eka vanhu lava hanyaka na xitsongwa-tsongwana xa HIV va nga leka vutshunguri
- ku kombisa swivangelo swa matshamelo ya vanhu lava hanyaka na xitsongwa-tsongwana xa HIV va nga leka vutshunguri
- ku kombisa nhlayo ya vanhu lava hanyaka na xitsongwa-tsongwana xa HIV va nga leka vutshunguri va ngana swivangelo swa ngozi swa vuvabyi bya mbilu
- ku kombisa ku hlangana exikarhi ka matshamelo, swivangelo swa ngozi swa vuvabyi bya mbilu na vutshuguri bya ART

XANA KU LAVEKA YINI KA NDZAVISISO LOWU

ndzavisiso lowu, wuna swiyenge swi mbirhi, xiyenge xo sungula; mi komberiwa ku tata fomo ro pfumela ku ngenelela ka ndzavisiso, leri minga ta nyikiwa hi mulavisisi ku nga se hela khume-nharhu (30) na kambe mi languteriwe ku tata khwexinere leyi mulavisisi anga ti mi vutisa swi vutiso eka yona.

Ngangiselo wa ndzavisiso lowu wu rhumeriwe ka komiti ya xikolo xa health care sciences swa ku va nika pfumelelo, le ka komiti ya Turfloop Research Ethics Committee (TREC) swa ku matikhomelo wa ndzavisiso lowu wu va kahle ka vanhu lava

ngenelelaka na kambe ka ndzawulo ya rihanyu ka xifundza kulu xa Mpumalanga ku va nika pfumelelo.

MALUNGHELO YA N'WINA TA NI HI VA NGENELELI

Vu ngeneleri bya n'wina iku ti twela ka n'wina hiku hetiseka na kambe mi nga ala ku ngelela kumbe mi nga huma nkarhi un'wana na u'nwana mi nga nikanga xi vangelo. Ma lunghelo ya n'wina kuva xikalavito kumbe xihundla swita tiyisisiwa hi minkarhi hinkwayo. Tani hi muvabyi, ndzavisiso lowu awu tiyimiselanga hiku hlohlotela vukororekeri bya rihanyu lebyi mi byi kumaka, kumbe xana mi ngenelerile kumbe ami ngenelelanga.

Ti hlanganiseni na: Rudy Mathebula (Mulavisisi)
Nomboro ya riqhingo: 076 4971444
Email address: rudymathebula@gmail.com

ANNEXURE 5(a): University of Limpopo: CONSENT FORM
Statement concerning participation in a research project.

Name of the research project

Profile of selected cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province.

I have heard the aims and objectives of the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aims and objectives of the study are clear to me. I have not been pressurized to participate in anyway.

I understand that participation in this research project is completely voluntary and that I may withdraw from it at any time and without stating reasons. This will have no influence on my work and the position I hold.

I know that this study has been approved by the Research, Ethics and Publications Committee of the University of Limpopo and the Department of Health (Bushbuckridge Sub-district).I am fully aware that the results of this study will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this research project.

…… …….

Name of the participant Signature of the participant

…… ……..... …….

Place Date Witness

Statement by the researcher

I provided verbal information regarding this study and I agree to answer any future questions concerning the study as best as I am. I also give assurance that adherence to the approved protocol will be prioritised.

…… …….. ……. ……

Name of the researcher Signature Date Place

ANNEXURE 5(b): FOMO YO PFUMELELA
UNIVERSITY OF LIMPOPO

ETHICS COMMITTEE

NHLOKOMHAKA YA PROJETE: profile of selected cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province.

MURHANGERI WA PROJETE: Ms Mathebula R.L.

FOMO YO PFUMELELA

Mina, ndza pfumela hiku ti twela ka mina ku ngenelela ka projete leyi landzelaka: profile of selected cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province.

Ndzi lemuke:

1. ndzavisiso lowu wa swihlengeletiwa swa swivangelo swa ngozi swa vuvabyi bya mbilu eka vanhu lava va hanyaka na xitsongwa-tsongwana xa HIV lava nga leka vutshunguri bya anti-retroviral therapy

2. komiti ya matikhomelo yi pfumerile ku vanhu va nga tshinereliwa ku va ngenelela ka ndzavisiso

3. xikongomelo na matirhelo ya ndzavisiso ndzi hlamuseriwe swona

4. gangiso wa ndzavisiso wu swi humesele erivaleni vu ngozi lebyi languteriweke kumbe lebyi nga kona eka vanhu lava ngenelelaka endzavisiso lowu, hlamuselo wa swilo swa kahle leswi nga languteriwa swa mina kumbe vanhu eka ndzavisiso lowu.

5. Ndzi ta tivisiwa hi hungu leri nga ta hundzuka hiku famba ka ndzavisiso leri nga ta hlohlotela ku pfumela ka mina kuya mahlweni na ku ngenelela.

6. Ndlela ya ku kuma kandziyiso lowu fambisanaka na ma ngenelelo ya mina ka ndzavisiso lowu wu ta ve wu kongomane na munhu loyi anga ta ve a kombisaka ndlela yo ngenelela ka ndzavisiso

7. xivutiso xin’wana na xin’wana lexi ndzi nga ta va na xona mayelana na ndzavisiso kumbe lexi yelanaka na swona swita hlamuriwa hi mulavisisi.

8. Loko ndzi ri na xivutiso xin’wana himhaka, kumbe tinkinga hi mayelana na ndzavisiso, kumbe ku vona leswi ndzi nga swi tsakeleki, ndzi nga ti hlanganisa na un’we wa ti membara ta ntlawa wa ndzavisiso.

9. Ku ngenelela ka ndzavisiso lowu iku ti twela na kambe ni nga huma nkarhi un’wana na un’wana

10. Loko ko vana kinga ya rihanyu lowu nga ta voniwa eku fambeni ka ndzavisiso, kumbe ndzi kamberiwa ka ma ngenelelo, swi yimo swo fana ni sweswo swi ta vulavuriwa na mina exihundleni na munhu loyi anga twasela kumbe ndzi rhumeriwa ka dokodela.

11. Ndzi hakerisa yunivhesiti ya Limpopo kumbe vanhu hinkwavo lava nga ngenelela eka projete leyi vuriweke e henhla xihumaka ka ma ngenelelo lawa ma nga le henhla ka projete kumbe leswi nga ta yelana na yona, swa xivangelo xin’wana na xin’wana , leswi katsaka kuka na ku ka va nga nakekeli lava vuriweke.

nkandziyiso wa mulavisisiwa nkadziyiso wa mbhoni

_____ _____

nkandziyisiwe a_____ hiti_____siku_____ra 2017

ANNEXURE 6(a)

RESEARCHER ADMINISTERED QUESTIONNAIRE

Participation number ☐

SECTION A: SOCIO-DEMOGRAPHIC INFORMATION

Answer the following questions on:

1. DEMOGRAPHIC INFORMATION			
Question	**Response**	**Code**	
Sex	Male Female	1 2	D1
Age	18-24 25-34 35-44 45-54 >55	1 2 3 4 5	D2
Race	African Coloured Indian White	1 2 3 4	D3
Employment status	Employed Self-employed Unemployed Student	1 2 3 4	D4
Marital status	Single Married Co-habiting Divorced Separated Widowed	1 2 3 4 5 6	D5
Highest level of education	No formal school Primary school Secondary school University/college Post graduate	1 2 3 4 5	D6

2. ANTHROPOMETRIC ASSESSMENT AND BLOOD PRESSURE			
Question	**Response**	**Code**	
Baseline measurements: Weight Height BMI Waist circumference Blood pressure	 _____ (kg) _____(m) _____(kg/m^2) _____ (cm) _____ (mmHg)	 1 2 3 4 5	 B1 B2 B3 B4 B5
Current measurements: Weight Height	 _____ (kg) _____(m)	 1 2	 C1 C2

BMI Waist circumference Blood pressure	_____(kg/m^2) _____ (cm) _____ (mmHg)	3 4 5	C3 C4 C5

3. ANTI-RETROVIRAL THERAPY		
Question	**Response**	**Code**
How long have you been on ART	_____(months/years)	ART 1
ART regimen		ART 2

SECTION B: SELECTED CARDIOVASCULAR RISK FACTORS

1. Smoking			
Question	**Response**	**Code**	**Q.No**
Do you currently smoke any tobacco such as cigarettes, cigars?	Yes No (*if no go to question1.3)*	1 2	1.1
Do you currently smoke tobacco daily?	Yes No	1 2	1.2
Do you currently use smokeless tobacco products such as snuff?	Yes No (*if no go to 1.5)*	1 2	1.3
Do you currently use smokeless tobacco products daily?	Yes No	1 2	1.4
On average how many times a day?	Number _____ Don't know ____	1 2	1.5

2. Alcohol consumption			
Question	**Response**	**Code**	**Q.No**
Have you ever consumed an alcoholic drink such as beer, wine, spirits and fermented cider?	Yes No (*if no go to 3)*	1 2	2.1
Have you consumed an alcoholic drink within the past 12 months?	Yes (if yes go to 2.4) No (if no go to 2.3)	1 2	2.2
Have you stopped drinking due to health reasons, such as a negative impact on your health or on the advice of your doctor or other health worker?	Yes (if yes go to 3) No	1 2	2.3

During the past 12 months, how frequently have you had at least one alcoholic drink daily?	Daily 5-6 days/ week 3-4 days/ week 1-2 days/week 1-3 days/ month Less than once a month Never	1 2 3 4 5 6 7	2.4
Have you consumed an alcoholic drink within the past 30 days?	Yes No (if no go to question 3)	1 2	2.5
During the past 30 days, what was the largest number of standard alcoholic drinks you had on a single occasion, counting all types of alcohol together?	Number _____ Don't know	1 2	2.6

3. Dietary intake			
Question	**Response**	**Code**	**Q.No**
In a typical week, on how many days do you eat fruit? *(use showcard)*	Number of days _____ Don't know	1 8	3.1
How many servings of fruit do you eat on one of these days? *(use showcard)*	Number of servings ____ Don't know	1 8	3.2
In a typical week, on how many days do you eat vegetables? *(use showcard)*	Number of days _____ Don't know	1 8	3.3
How many servings of vegetables do you eat on one of those days? *(use showcard)*	Number of servings _____ Don't know	1 8	3.4
What type of oil or fat most often used for meal preparation in your household? *(use showcard)*	Vegetable oil Brick margarine Soft-tub margarine Other: specify_____ None used	1 2 3 4 5	3.5
On average, how many meals per week do you eat that were not prepared at home (by meals I mean breakfast, lunch and supper)?	Number_____ Don't know	1 2	3.6
How often do you add salt or a salty sauce such as soy sauce to your food right before you eat it or as you are eating it?	Always Often Sometimes Rarely	1 2 3 4	3.7
How often is salt, salty seasoning or a salty sauce added in cooking or preparing	Always Often Sometimes Rarely	1 2 3 4	3.8
How often do you eat processed food high in salt? *By processed food high in salt, I mean foods that have been*	Always Often Sometimes Rarely	1 2 3 4	3.9
How much salt or salty sauce do you think you consume?	Far too much Too much Just the right amount Too little	1 2 3 4	3.10

4. Physical activity			
Question	**Response**	**Code**	**Q.No**
Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like lifting or carrying heavy loads, digging or construction for at least 10 minutes continuously? *(use showcard)*	Yes No (if no go to 4.4)	1 2	4.1
In a typical week, on how many days do you do vigorous-intensity activities as part of	Number of days ____ Don't know	1 8	4.2
your work?			
How much time do you spend doing vigorous-intensity activities at work on a typical	Hours:minutes ___:____		4.3
Does your work involve moderate-intensity activity, that causes small increases in	Yes No (if no go to 4.7)	1 2	4.4
In a typical week, on how many days do you do moderate-intensity activities as part of	Number of days _____ Don't know	1 2	4.5
How much time do you spend doing moderate-intensity activities at work on a typical	Hours:minutes ___:____		4.6
Do you do moderate-intensity sports, fitness or recreational(leisure) activities	Yes No (if no go to 4.10)	1 2	4.7
In a typical week, on how many days do you do moderate-intensity sports, fitness or	Number of days _____ Don't know	1 2	4.8
How much time do you spend doing moderate-intensity sports, fitness or recreational activities	Hours:minutes ____:____		4.9
on a typical day?			
How much time do you usually spend sitting or reclining on a typical day?	Hours:minutes ____;____		4.10

End of questions
(Don't forget to thank the participant for answering the questions and his/her time)

ANNEXURE 6(b): KHWEXINERE

Nomboro yo nghenelela

XIYENGE XA A: vuxokoxoko bya mungheneri

Hlamula swivutiso leswi landzelaka:

4. VUXOKOXOKO			
Xivutiso	**Nhlamulo**	**khodi**	
Rimbewu	waxinuna xisati	1 2	D1
Malembe	18-24 25-34 35-44 45-54 >55	1 2 3 4 5	D2
Rixaka	Munhu wantima mukhaladi mukula Mulungu	1 2 3 4	D3
Xiyimo xo ntirho	Loyi a thoriweke Ku ti tirha Loyi anga tirheki Mudyondzi	1 2 3 4	D4
Xiyomo xa vukati	Awu tekiwangi/awu tekangi U tekile/u tekiwile Mi tshama swin'we Mi hambanile dlaya vukati Noni	1 2 3 4 5 6	D5
Xiyimo xa tidyondzo	Awu dyondzangi Xikolo xale hansi u hetile Xikolo xale henhla u hetile Yunivhesithi/kholeji Ku tatisa tindyondzo	1 2 3 4 5	D6

5. XIYIMO XA MIRI NA NTIKELO WA NGHATI			
Xivutiso	**Nhlamulo**	**khodi**	
Mpimo waleku sunguleni: Ntiko wa xikolo Mpimo wo leha BMI Mpimo wa masenge Ntiko wa nghati	_____ (kg) _____(m) _____(kg/m^2) _____ (cm) _____ (mmHg)	1 2 3 4 5	B1 B2 B3 B4 B5
Mpimo wa siku ra ndzavisiso: Ntiko wa xikolo Mpimo wo leha BMI Mpimo wa masenge Ntiko wa nghati	_____ (kg) _____(m) _____(kg/m^2) _____ (cm) _____ (mmHg)	1 2 3 4 5	C1 C2 C3 C4 C5

6. ANTI-RETROVIRAL THERAPY		
Xivutiso	**Nhlamulo**	**Code**
Inkarhi wo fikela kwihi u teka ti ART	_____(tin'hweti/malembe)	ART 1
U teka tiphilisi ta njhani		ART 2

XIYENGE XA B: SWIVANGELO LESWI HLAWULEKEKE SWO VANGA VUVABYI BYA MBILU

1. KU DZAHA			
Xivutiso	**Nhlamulo**	**khodi**	**Q.No**
Ka nkarhi wa sweswi wa dzaha swidzidziharisi swin'wana na swin'wana?	Ina E-e (*if no go to question1.3)*	1 2	1.1
Ka nkarhi wa sweswi u dzaha siku na siku swidzidziharisi?	Ina E-e	1 2	1.2
Ka nkarhi wa sweswi wa dzaha swidzidziharisi swo hava musi swo fana na xinefu?	Ina E-e (*if no go to 1.5)*	1 2	1.3
Eka nkarhi wa sweswi u dzaha swidzidziharisi swo hava musi siku na siku?	Ina E-e	1 2	1.4
U dzaha ka ngani hi siku	Nhlayo _____ A ndzi swi tivi ____	1 2	1.5

2. MANWELO YA BYALWA			
Xivutiso	**Nhlamulo**	**Khodi**	**Q.No**
U se tshama u nwa byalwa byo fana na wayeni, ti biya na swipiriti?	Ina E-e (*loko kuri e-e, hundzela ka 3)*	1 2	2.1
U nwile byalwa endzhaku ka tinh'weti ta khumbe-mbirhi?	Ina *(loko kuri ina, hundzela 2.4)* E-e *(loko kuri e-e, hundzela ka 2.3)*	1 2	2.2
U yimile ku nwa byalwa hikwalaho ka swivangelo swa rihanyo kufana na kuva swinga rina mbuyelo wa kahle eka rihanyo ra wena kumbe xi tsundzuxo hi dokotela kumbe mitirhi wa rihanyo u'wani?	Ina *(loko kuri ina, hundzela ka 3)* E-e *(loko kuri e-e, hundzela ka 3)*	1 2	2.3
Eka tinh'weti ta khumbe-mbirhi, awu nwa ka ngani hi siku	Masiku hinkwawo 5-6 wa masiku/ evhikini 3-4 wa masiku/ evhikini 1-2 wa masiku/evhikini 1-3 wa masiku/ n'hweti Ehansi ka n'hweti E-e	1 2 3 4 5 6 7	2.4
Eka masiku ya makhume-nharhu lama nga undza, u nwile byala?	Ina E-e *(loko kuri e-e hundzela ka 3)*	1 2	2.5
Eka masiku ya makhume-nharhu lama nga hundza, he yini nhlayo yale henhla ya byalwa lebyi unga byinwa hinkarhi un'we?	Nhlayo _____ A ndzi swi tivi	1 2	2.6

3. MADYELO			
Xivutiso	**Nhlamulo**	**khodi**	**Q.No**
Evhikini, I masiku ma ngani u dyaka mihandzu? *(use showcard)*	Nhlayo _____ A ndzi swi tivi	1 8	3.1
U dya mihandzu yi ngani eka masiku lawa? *(use showcard)*	Nhlayo ____ A ndzi swi tivi	1 8	3.2

Evhikini, I masiku ma ngani u dyaka matsavu? *(use showcard)*	Nhlayo _____ A ndzi swi tivi	1 8	3.3
U dya matsavu yi ngani eka masiku lawa? *(use showcard)*	Nhlayo _____ A ndzi swi tivi	1 8	3.4
U tirhisa mafurha ya njhani ku sweka swakudya? *(use showcard)*	Mafurha ya matsavu Majarini ya xitina Majarini ya xibakitana Kumbe man'wani hlamusela _____ Kumbe awu tirhisi	1 2 3 4 5	3.5
I masiku mangani evhikini u dyaka swakudya swo ka swi nga swekiwangi kaya (swakudya swa nampundzu, swakudya swa nanhlikanhi na swa madyambu)? *(use showcard)*	Nhlayo ya masiku_____ A ndzi swi tivi	1 2 3 4 5 8	3.6
Xana ungave u chela munyu kumbe soso leyi ngana munyu kufana na soy soso ka swakudya swa wena unga se dya kumbe uri karhi u dya? *(tirhisa showcard)*	Minkarhi hinkwayo Hi xitalo Minkarhi yin'wani Swo shika E-e A ndzi switivi	1 2 3 4 5 8	3.7
Xana u ngave u chela munyu, swo nandzihisa swo vana munhy, kumbe ti soso to vana munyu loko uri karhi u sweka kumbe ku lungisela swakudya a kaya? (tirhisa showcard)	Minkarhi hinkwayo Hi xitalo Minkarhi yin'wani Swo shika E-e A ndzi switivi	1 2 3 4 5 8	3.8
Xana ungave u dya swakudya leswi taka swi endlhiwile swiri na munyu wa le henhla, hi swakudya leswi taka swi cheriwe munyu wa le henhla, *ndzi vula swakudya leswi swi nga hundzurisiwa ka ntumbuluko wa swona, swo fana na swinyotinyoti swo tala munyu, swakudya leswi nga endzeni ka swikotela, swakudya leswi nga endlhiwa ka ti restoranti ta swakudya swo hantlisa, chizi, baykhon nati nyama (tirhisa showcard)*	Minkarhi hinkwayo Hi xitalo Minkarhi yin'wani Swo shika E-e A ndzi switivi	1 2 3 4 5 8	3.9
Xana u ehleketa ku u dya munyu kumbe tisoso to vona munyu ku fikelela kwihi?	Ngopfu-ngopfu Ngopfu Mpimo wo ringanela Swi/wutsongo Swi/wutsongo ngopfu A ndzi swi tivi	1 2 3 4 5 8	3.10

4. VUTIOLORI			
Xivutiso	**Nhlamulo**	**khodi**	**Q.No**
Ntirho lowu uwu endlaka wu endlaka wu endla leswaku u hefemulela ehenhla, kumbe mbilu ya wena yi bela henhla swo fana no tlakula swilo swo tika, ku cela kumbe swa tikontiraka nkarhi wo ingana khume wa timinete kumbe ku tlula? *(use showcard)*	Ina E-e *(loko kuri e-e, hundzela ka 4.4)*	1 2	4.1
Evhikini, I masiku manganic u endlaka vutiolori byo tika tani hi ntirho wa wena	Nhlayo ya masiku ____ A ndzi swi tivi	1 8	4.2
I nkarhi wa ku fikela kwihi uwu tekaka ku endla mintirho yo tika entirhweni wa wena esikwini?	Tiawara:timinete ___:____		4.3
Ntirho lowu uwu endlaka wu endla leswaku u hefemulela ehenhla ka tsongo kumbe mbilu ya wena yi bela ehenhla ka tsongo nkarhi wo fikela khume wa timinete *(use showcard)*	Ina E-e (*loko kuri e-e, hundzela ka 4.7)*	1 2	4.4

Evhikini, I masiku ma ngani u endlaka ntirho wo ka wu nga tiki ngopfu?	Nhlayo ya masiku _____ A ndzi swi tivi	1 2	4.5
I nkarhi wo fikela kwihi uwu tekaka ku endla mintirho yo ka yi nga tiki entirhweni wa wena	Tiawara:timinete ___:____		4.6
Wa endla mintirho yo ka yi nga tiki yo fana na mintlangu, vutiolori leyi endlaka u hefemulela ehenhla, kumbe mbilu ya wena yi bela ehenla *swo fana na ku hlambela, ku famba u hlatisa, ku tsutsuma etc. nkarhi wo ringana khume wa timinete?* *(use showcard)*	Ina E-e *(loko kuri e-e, hundzela ka 4.10)*	1 2	4.7
Evhikini, I masiku ma ngani u endlaka mintirho yo ka yi nga tiki yo fana na mintlangu kumbe vutiolori?	Nhlayo ya masiku _____ A ndzi swi tivi	1 2	4.8
Inkarhi wo fikela kwihi u wu tekaka ku endla mintlangu, kumbe vutiolori?	Tiawara:timinete ____:____		4.9
I nkarhi wo fikela kwihi uwu tekaka u tshamile esikwini?	Tiawara:timinete ____;____		4.10

Ku hela ka swivutiso

(u nga rivali ku khensa mungheneri ka nkarhi wa yena na kuva a hlamule swivutiso)

ANNEXURE 7

UNIVERSITY OF LIMPOPO

DEPARTMENT OF PUBLIC HEALTH

Private Bag X1106, Sovenga ,0727,

South Africa

Cell : 0764971444, Email: rudymathebula@gmail.com

To: The Chief Executive Officer

Tintswalo Hospital

Date: _____

Dear Ms/Mr

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered Master's student in the Department of Public Health at the University of Limpopo. My supervisor is Dr Maimela

The proposed topic of my research is: **Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province**

The objectives of the study are:

(a) To determine the socio-demographic factors of HIV patients on ART in Bushbuckridge sub-district

(b) To determine the prevalence of selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district

(c) To explore the association between socio-demographic factors, selected cardiovascular risk factors and ART among HIV patients on ART in Bushbuckridge sub-district

To assist you in reaching a decision, I have attached to this letter:

(a) A copy of an ethical clearance certificate issued by the University of Limpopo

(b) A copy of the research instrument which I intend using in my research

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows: ***(rudymathebula@gmail.com or ericmaimela@webmail.co.za)***

Upon completion of the study, I undertake to provide you with a copy of the dissertation.

Your permission to conduct this study will be greatly appreciated.

Yours faithfully

_____ _____

Ms Mathebula RL (Researcher) Dr Maimela E (Supervisor)

ANNEXURE 8

UNIVERSITY OF LIMPOPO

DEPARTMENT OF PUBLIC HEALTH

Private Bag X1106,Sovenga,0727

South Africa

cell: 0764971444, Email:rudymathebula@gmail.com

To: The Operational Manager

_____ Clinic

Date: _____

Dear Ms/Mr

REQUEST FOR PERMISSION TO CONDUCT RESEARCH

I am a registered Master's student in the Department of Public Health at the University of Limpopo. My supervisor is Dr Maimela

The proposed topic of my research is: **Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga province**

The objectives of the study are:

(a) To determine the socio-demographic factors of HIV patients on ART in Bushbuckridge sub-district

(b) To determine the prevalence of selected cardiovascular disease risk factors among HIV patients on ART in Bushbuckridge sub-district

(c) To explore the association between socio-demographic factors, selected cardiovascular risk factors and ART among HIV patients on ART in Bushbuckridge sub-district

To assist you in reaching a decision, I have attached to this letter:

(a) A copy of an ethical clearance certificate issued by the University of Limpopo

(b) A copy of the research instrument which I intend using in my research

Should you require any further information, please do not hesitate to contact me or my supervisor. Our contact details are as follows: ***(rudymathebula@gmail.com or ericmaimela@webmail.co.za)***

Upon completion of the study, I undertake to provide you with a copy of the dissertation.

Your permission to conduct this study will be greatly appreciated.

Yours faithfully

_____ _____

Ms Mathebula RL (Researcher) Dr Maimela E (Supervisor)

ANNEXURE 9

APPROVAL OF RESEARCH PROPOSAL

University of Limpopo
Faculty of Health Sciences
Executive Dean
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 2149, Fax: (015) 268 2685, Email:kgakgabi.letsoalo@ul.ac.za

DATE: 02 JUNE 2017

NAME OF STUDENT:	**Mathebula R.L**
STUDENT NUMBER:	**200813344**
DEPARTMENT:	**PUBLIC HEALTH**
SCHOOL:	**HEALTH CARE SCIENCES**
QUALIFICATION –	**MPH**

Dear Student

FACULTY APPROVAL OF PROPOSAL (PROPOSAL NO. FHDC2017/516-562)

I have pleasure in informing you that your MPHARM proposal served at the Faculty Higher Degrees Meeting on the 02 June 2017 and your title was approved as follows:

Approved Title: Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-district, Mpumalanga Province.

Note the following:

Ethical Clearance	**Tick One**
Requires no ethical clearance Proceed with the study	
Requires ethical clearance (TREC) (apply online) Proceed with the study only after receipt of ethical clearance certificate	√

Yours faithfully

Prof L. Skaal
Chairperson

UNIVERSITY OF LIMPOPO
FACULTY OF HEALTH SCIENCES
2017 -06- 07
PRIVATE BAG X1106
SOVENGA 0727

CC: **Supervisor:** Dr E Maimela

Finding solutions for Africa

ANNEXURE 10
ETHICAL CLEARENCE

University of Limpopo
Department of Research Administration and Development
Private Bag X1106, Sovenga, 0727, South Africa
Tel: (015) 268 2212, Fax: (015) 268 2306, Email:noko.monene@ul.ac.za

TURFLOOP RESEARCH ETHICS COMMITTEE CLEARANCE CERTIFICATE

MEETING:	**31 August 2017**
PROJECT NUMBER:	**TREC/242/2017: PG**
PROJECT:	
Title:	Profile of cardiovascular disease risk factors among HIV patients on anti-retroviral therapy in Bushbuckridge Sub-District, Mpumalanga Province
Researcher:	RL Mathebula
Supervisor:	Dr E Maimela
Co-Supervisor:	Prof L Skaal
School:	Health Care Sciences
Degree:	Masters in Public Health

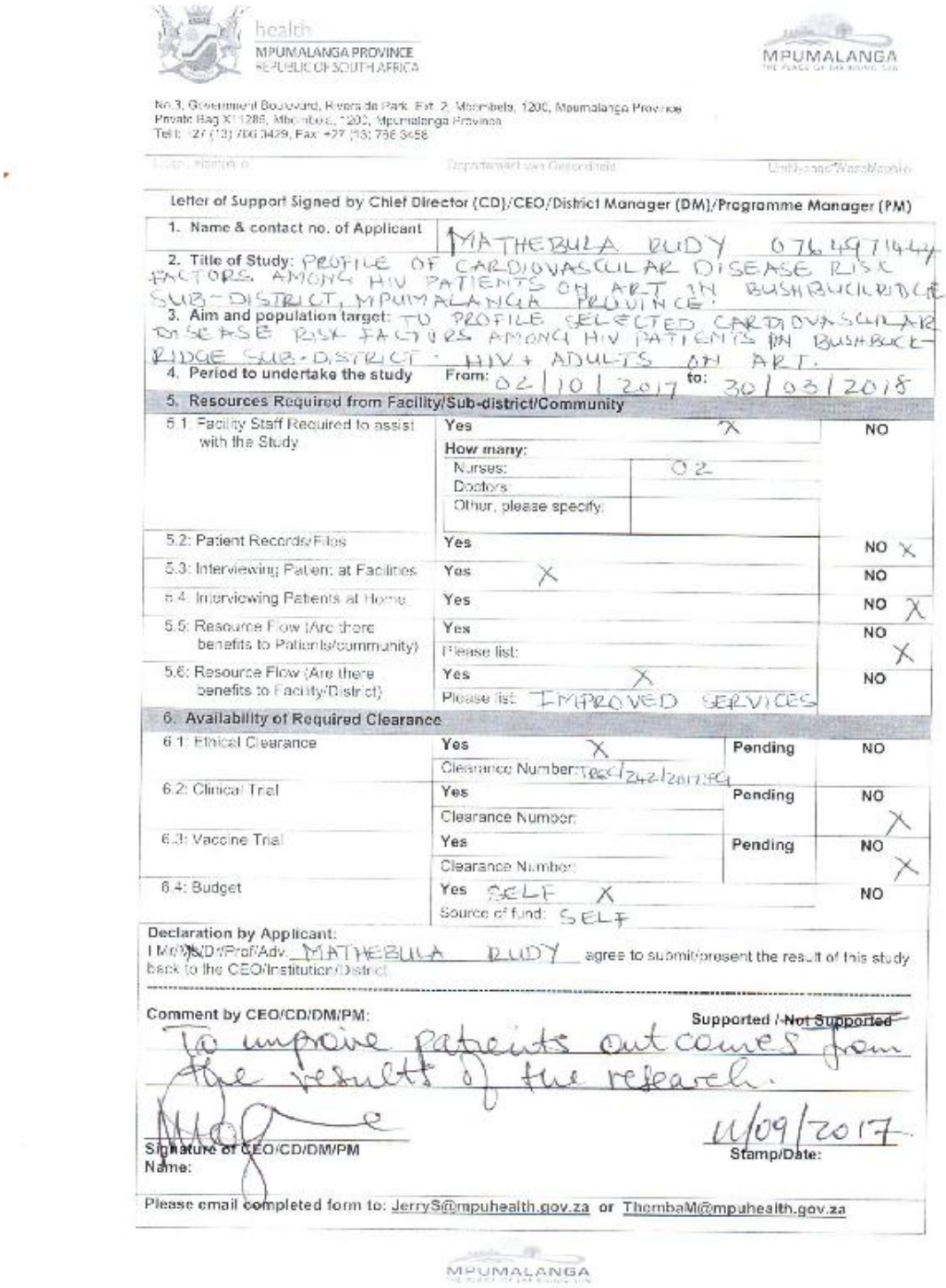
PROF TAB MASHEGO
CHAIRPERSON: TURFLOOP RESEARCH ETHICS COMMITTEE

The Turfloop Research Ethics Committee (TREC) is registered with the National Health Research Ethics Council, Registration Number: **REC-0310111-031**

Note:
i) **Should any departure be contemplated from the research procedure as approved, the researcher(s) must re-submit the protocol to the committee.**
ii) **The budget for the research will be considered separately from the protocol.**
PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES.

Finding solutions for Africa

ANNEXURE 11
FACILITY APPROVAL (TINTSWALO HOSPITAL)



health
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

MPUMALANGA

No 3, Government Boulevard, Riverside Park Ext 2, Mbombela, 1200, Mpumalanga Province
Private Bag X11285, Mbombela, 1200, Mpumalanga Province
Tel: +27 (13) 766 3429, Fax: +27 (13) 766 3458

Letter of Support Signed by Chief Director (CD)/CEO/District Manager (DM)/Programme Manager (PM)

1. Name & contact no. of Applicant	MATHEBULA RUDY 076 497 1444		
2. Title of Study: PROFILE OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG HIV PATIENTS ON ART IN BUSHBUCKRIDGE SUB-DISTRICT, MPUMALANGA PROVINCE.			
3. Aim and population target: TO PROFILE SELECTED CARDIOVASCULAR DISEASE RISK FACTORS AMONG HIV PATIENTS IN BUSHBUCK-RIDGE SUB-DISTRICT - HIV + ADULTS ON ART.			
4. Period to undertake the study	From: 02/10/2017	to: 30/03/2018	
5. Resources Required from Facility/Sub-district/Community			
5.1: Facility Staff Required to assist with the Study	Yes X How many: Nurses: 02 Doctors: Other, please specify:		NO
5.2: Patient Records/Files	Yes		NO X
5.3: Interviewing Patient at Facilities	Yes X		NO
5.4: Interviewing Patients at Home	Yes		NO X
5.5: Resource Flow (Are there benefits to Patients/community)	Yes Please list:		NO X
5.6: Resource Flow (Are there benefits to Facility/District)	Yes X Please list: IMPROVED SERVICES		NO
6. Availability of Required Clearance			
6.1: Ethical Clearance	Yes X Clearance Number: Rec 24/2/2017: PG	Pending	NO
6.2: Clinical Trial	Yes Clearance Number:	Pending	NO X
6.3: Vaccine Trial	Yes Clearance Number:	Pending	NO X
6.4: Budget	Yes SELF X Source of fund: SELF		NO

Declaration by Applicant:
I Mr/Ms/Dr/Prof/Adv. MATHEBULA RUDY agree to submit/present the result of this study back to the CEO/Institution/District

Comment by CEO/CD/DM/PM: Supported / ~~Not Supported~~
To improve patients outcomes from the results of the research.

Signature of CEO/CD/DM/PM
Name:

11/09/2017
Stamp/Date:

Please email completed form to: JerryS@mpuhealth.gov.za or ThembaM@mpuhealth.gov.za

MPUMALANGA

ANNEXURE 12
APPROVAL FROM PROVINCIAL DEPARTMENT OF HEALTH

health
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

No 3 Government Boulevard, Riverside Park, Ext 2, Mbombela, 1200 Mpumalanga Province
Private Bag X11285, Mbombela, 1200, Mpumalanga Province
Tel: +27 (13) 766 3429, Fax: +27 (13) 766 3458

Isebe Lezempilo Departement van Gesondheid UmNyango WezeMpilo

Enquiries: Timothy Nxumalo (013) 766 3511

Ms. Ruddy Mathebula
P.O Box 835
Ximungwe
1281

Dear Ms. Ruddy Mathebula

APPLICATION FOR RESEARCH & ETHICS APPROVAL: PROFILE OF CARDIOVASCULAR DISEASE RISK FACTORS AMONG HIV PATIENTS ON ANTI-RETROVIRAL THERAPY IN BUSHBUCKRIDGE SUB-DISTRICT, MPUMALANGA PROVINCE

The provincial health research committee has approved your research proposal in the latest format you sent.

- Approval Ref Number: MP_201709_009
- Approval period: 01/10/2017 31/03/2018
- Facilities: Tintswalo

Kindly ensure that the study is conducted with minimal disruption and impact on our staff, and also ensure that you provide us with the soft or hard copy of the report once your research project has been completed.

Kind regards

MS TZ MADONSELA
MPUMALANGA: PHRC

2017/9/26
DATE

MPUMALANGA
THE PLACE OF THE RISING SUN