

The determinants of adherence to ART medication refill pick up in the regional hospital HIV clinics at the Sekhukhune district, Limpopo province, South Africa.

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KEY WORDS

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Determinants of adherence

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Sekhukhune district

Elias Motsoaledi sub-district

Ephraim Mogale sub-district

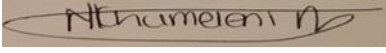
Limpopo Province



DECLARATION

I declare that **“The determinants of adherence to ART medication refill pick up in the regional hospital HIV clinics at the Sekhukhune district, Limpopo province, South Africa”** is my own work and that it has not been submitted for any degree or examination in other university and that all sources I have used or quoted have been indicated and acknowledged by complete quotation and citation of reference.

Full Names: Mulisa Nepfumbada

Signature: 

Date: November 2022



DEDICATION

I dedicate this study to my mother who valued education and neglected her dreams to support my dream of getting educated. To my late father, thank you for believing in me so much, continue to rest well Baba. My brother and my two sisters, thank you for your support.

To my husband and my three children, this one is for your patience and sacrifice while I dedicate my time to study.



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I would like to thank my supervisor Dr Anam Nyembezi of the University of the Western Cape for providing me with guidance, support, and encouragement during the process of completing this Mini-Thesis. I was privileged to have a patient supervisor. Thank you.

A special thank you to the Limpopo Department of Health for allowing me to conduct this study in the Sekhukhune district. To the Elias Motsoaledi and Ephraim Mogale sub-district managers, thank you. To the data collectors, I appreciate your support.



GLOSSARY OF ACRONYMS AND ABBREVIATIONS

AIDS:	Acquired immunodeficiency syndrome
ART:	Antiretroviral therapy
ARV:	Antiretroviral
CD4:	Cluster of differentiation 4
HIV:	Human immunodeficiency virus
LMIC:	Low to Middle Income Countries
PHC:	Primary Health Clinics
TB:	Tuberculosis
UNAIDS:	United Nations Programme on HIV and AIDS
WHO:	World Health Organisation



ABSTRACT

Background: South Africa has been reported to have high burden of HIV and is currently running the largest antiretroviral therapy (ART) programme globally which incorporates the test and treat policy. However, adherence to ART is particularly crucial for the optimal health outcomes of patients with HIV. Prior studies on ART adherence have focused on pill count and patient's self-reporting while few literatures focused on the ART medication refill pick up to measure adherence. Evidence suggests that there are barriers to medication adherence in many parts the country. Furthermore, factors such as socio-demographic and patient's characteristics have been found to be associated with ART adherence. However, the prevalence and determinants of medication refill pick-up have been under studied in South Africa.

Aim: The aim of the study was to determine the prevalence and identify factors associated with adherence to ART medication refill pick up among patients attending the regional hospital HIV clinics in Sekhukhune district, Limpopo province.

Method: A retrospective cohort study of patients who initiated ART between August 2020 and August 2021 in the regional hospital HIV clinics based on the electronic records was used. The study involved extraction of data from an electronic record which included age, gender, pregnancy, co-morbidity, baseline CD4 count, ART regimen, TB, WHO clinical HIV stage, treatment duration and number of missed pharmacy refill pick up appointments. Data was extracted from TIER.net database into Microsoft Excel 2010 and was analysed using EPI-info 7.2.5.0 software.

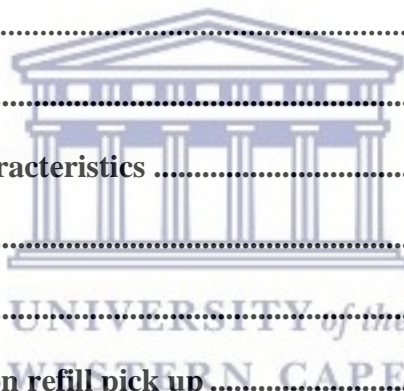
Results: Among a total of 731 participants in this study, only 30.5% participant were found to be adherent to medication refill pick up. Adherence to ART medication refill pick up was the highest (39.1%) on patients collecting medication at the sub-district with the lowest burden of patients. Socio-demographic characteristics such as age, gender, pregnancy, and TB did not have a significant association with adherence to ART medication refill pick up.

Conclusion: Patients collecting medication from district with high burden of patients are less likely to be adherence to ART medication refill pick up as compared to participant attending care from district with low burden of patients.

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CHAPTER 1: INTRODUCTION

1.1 Background

Human Immunodeficiency Virus (HIV) infection is a chronic disease which requires a lifelong combination antiretroviral therapy (ART) (Chawla et al., 2018). However, adherence to ART is critical to the sustained suppression of the rate at which HIV multiplies within the human body, in making the body less susceptible to other opportunistic infection and in preventing the transmission of HIV virus to other individuals (Mabunda et al., 2019).

A global estimation of about 37.7 million people were living with HIV in 2020 (UNAIDS, 2021). Eastern and Southern Africa carried the largest share of global HIV burden which was estimated to be more than half of the global estimate in 2020. South Africa had the highest number of people affected by HIV with the overall HIV prevalence of approximately 20.6% among the global estimate (UNAIDS, 2021). Moreover, South Africa has the largest ART programmes globally which was introduced in 2004 and incorporated the test and treats policy in September 2016 (Moosa et al., 2019). In 2004 the Limpopo Province rolled-out ART programme in the regional hospitals and gradually scaled it up to make it available in all government health care facilities (Mabunda et al., 2019).

Although ART does not cure HIV/AIDS, it is known to significantly maintain HIV suppression in plasma over long term and drop the viral load to undetectable level in the blood (Aquaro et al., 2019). To achieve ART maximum health benefits, patients' adherence to ART regimens is one of the factors that improve clinical outcomes of HIV infected patient (WHO, 2010). In addition, for the effective therapy and management of HIV, patients are required to commit to taking at least 95% of the treatment as prescribed (Azia, Mukumbang & Van Wyk, 2016).

Non-adherence to ART may lead to multidrug resistance which may consequently allow HIV to multiply and progress to opportunistic infections (Azia, Mukumbang & Van Wyk, 2016). According to WHO (2016), non-adherence is the inability to follow treatment plans, take medication at prescribed times and frequencies and also follow restrictions regarding lifestyles, food and other medication. In addition, non-adherence may lead to a number of negative outcomes on health care system and on individuals taking medication. These outcomes may include switching of patients treatment regimen from low to high due to treatment failure, viral

mutation and the development of drug resistance. These higher regimens may be difficult to access due to availability in the country (WHO, 2016; Moosa et al., 2019).

Since the introduction of ART, efforts have been made to ensure and to measure adherence to ART medication. Two simple methods have been used to measure adherence to ART medication, however, Pharmacy Adherence Measures (PAMs) have been widely used due to their objective characteristics (McMahon et al., 2011). Medication refill pick up is a PAM which assess pharmacy records to measure medication acquisition and distinct medication consumption. It is used to measure whether all or majority of prescribed medication are picked up by the patients (Williams et al., 2013).

1.2 Problem statement

ART medication refill pick up was found to increase chances of lowering viral load and improving the quality of life of patients (Igumbor et al., 2011). However, adherence to medication refill pick up is widely affected by different factors such as age, gender, co-morbidity, duration on treatment and viral load suppression which have been found to have been associated with ART medication refill pick up adherence (Kim et al., 2018; Azmach, Hamza & Husen, 2019). In addition, the prevalence of ART medication adherence seems to be different across the regions. For example, Ayer et al. (2016) and Gachara (2017) found the prevalence of ART medication refill pick up of 21.1% in Nigeria and 56% in South Africa respectively. In Southern African countries, high rates (range between 2.7% to 55.4%) of loss to follow-up on medication refill pick up among those initiated on ART have been reported (Chauke, Huma & Madiba, 2020; Bussmann et al., 2008). Previous studies on ART adherence has focused on behavioural intervention targeting patients and providers, hence studies in medication refill pick up barrier such as socio-demographic have not been widely done (Johnson et al., 2020).

In a study conducted in South Africa by Mabunda et al. (2019), they found an association between non-virological suppression and non-optimal ART adherence (not refilling ART medication on time). Previous studies on ART adherence has focused on behavioural intervention targeting patient and providers, hence studies in medication refill pick up barrier such as socio-demographic have not been widely done (Johnson et al., 2020). However limited studies have been done to determine the prevalence of adherence to ART medication refill pick

up in South Africa. Therefore, this study aimed at bridging the knowledge gap, specifically in the Sekhukhune district, Limpopo Province. Sekhukhune district has 20% of the total population in Limpopo Province and constitutes 19.04% of total HIV infection in the province (Department of Health SA, 2020). The highest cause of death among the age group of 25 to 64 year old male and female is HIV/AIDS (Department of Health SA, 2020). However the prevalence of adherence to medication refill pick up in the Limpopo province has not been studied.

1.3 Purpose of the study

The findings of this study may be used to enhance the available health promotion programmes at the regional hospitals, inform new programmes and intervention targeting improvements in ART adherence in the district as well as part of evidence for health systems planning and the allocation of human resources in the Primary Health Facilities (PHC) and evaluation of the already existing or implemented policies. Pharmacist may also be able to intervene in helping patients achieve a better therapeutic outcome based on the results of this study.

1.4 Thesis outcome

This thesis is structured in six chapters:

Chapter 1 provides a global trend of HIV and further narrows down to HIV trend in Africa as well as in South Africa. Details of the significance of ART medication refill pick up are also described as well as methods available to measure ART medication adherence are also outlined in this chapter.

Chapter 2 provides the literature on global and local (South African) overview of ART medication refill, including the factors associated with medicine refill pick up.

Chapter 3 outlines the study aims and objectives. This chapter also provides the study methodology including study design, study population and sampling, data analysis as well as the validity and reliability of the study observation.

Chapter 4 provides the results of the study with a particular focus on comparing the association between ART medication refills pick up adherence and the socio demographic characteristics. The results are discussed in chapter 5 and followed by the conclusion and recommendation in chapter 6.

CHAPTER 2: LITERATURE REVIEW

2.1 Definition of ART adherences

Adherence is defined as the extent to which patient's follow a treatment plan, takes medication at a prescribed time, frequencies, and follow restrictions regarding diet and other medication requirements (WHO, 2003; Achappa et al., 2013). Adherence to ART is the base of an effective therapy and management of HIV (Spinelli et al., 2020; Seguy et al., 2007). Therefore, to ensure optimal clinical benefits of ART, the National Guideline in South Africa stipulates >95% adherence (DOH. 2004).

HIV viral load serves as the surrogates of adherence to ART, but virologic suppression failure or loss of virologic control may occur well after the decrease in adherence (Spinelli et al., 2020). Although ART adherence can be interrupted for a short period of time without viral load suppression failure, determining the ART adherence is still crucial.

A study by Castillo-Mancilla et al. (2016a) found out that even though viral load suppression is not necessarily a perfect surrogate for a complete adherence, there are other consequences that suboptimal adherence have and concluded that higher ART medication adherence is associated with the lower levels of biomarkers of inflammation, immune activation and coagulopathy. This implies that ART adherence could have biological consequences beyond viral load suppression. There is a positive association between suboptimal adherence and a higher level of inflammation among HIV suppressed patients (Castillo-Mancilla et al., 2018b).

2.2 ART medication refill pick up overview

Medication refill pick up is one of the methods used to measure ART adherence (Anoje et al., 2017). There are two methods that are used to measure patient's medication adherence; patient self-report and prescription/pill based adherence measures (McMahon et al., 2011). Unlike patient self-report which can be highly affected by recall bias, prescription/pill-based (medication refill pick up) adherence measure has been validated as a method to assess adherence in a variety of medication. Medication refill pick up measures whether a patient picks up their medication before or on the date which their previous medication is finished (Williams et al., 2013). Evidence from a study in South India showed that self-report adherence

measures tend to over-estimate adherence, hence prescription/pill based adherence measure is the methods of choice to measure adherence in this study (Venkatesh et al., 2010).

Determining adherence to ART medication pick up is crucial in the implementation of interventions to prevent future viral load suppression failure and other HIV related problems. In a study done in Brazil, the researcher used medication refill pick up method to assess adherence to ART and found that the delay in picking up ARVs was closely related with virologic failure (Cruz et al., 2018). Pharmacy based methods in routine clinical care predict virologic and other clinical outcomes. Limited comparative data also suggested that pharmacy adherence methods (such as medication refill) are likely superior to self-report adherence measures (McMahon, 2015).

In a study done in the United State, researchers found the prevalence of adherence to clinics appointment for ART medication refill to be 32.6% (Ayer et al., 2016), this prevalence is higher than the prevalence of 21.1% found in Nigeria (Anoje et al., 2017). However, in Botswana Ndiaye et al. (2013) found a high prevalence of 75.6% among the young adolescence. While in another study done in South Africa, Gachara (2017) found a prevalence of 56% which is lower than that of Botswana. A study done in one of the regional hospital in Limpopo province used patient self-report as a method to measure adherence to ART; and concluded that the prevalence of ART adherence was 61% in a regional hospital compared to the provincial adherence of 85% (Mabunda et al., 2019).

Furthermore, patient retention to care is a key to measure the success of ART. Around a third of patients are reported as lost to follow-up in the Sub-Saharan Africa (Fox & Rosen, 2010). Lost to follow-up is a general term for a patient who have not returned to their facilities for medicine refill pick up appointments (Wilkinson et al., 2014). According to McMohon et al. (2013), the true reason for lost to follow-up may be due to death, self-transfer from one facility to another facility or treatment discontinuation. A systemic review by Wilkinson et al. (2014), showed that the percentage lost to follow-up in low and middle income countries (LMIC) range from 2.7% to 55.4%.

2.3 Factors associated with adherence to ART medication refill pick up

2.3.1 Demographic factors

Higher medication refill request have been linked to demographic factors such as age, language and race; where younger age was found to have higher medication refill pick up rates in California (Prayaga et al., 2019). In another study in California, researchers indicated that males with no other chronic diseases tend to adhere to their ART medication while less female turn to be adherence to their ART medication (Ortego et al., 2012). In a study done in Korea, a researcher found that female patients were more likely have suboptimal adherence to ART medication as compared to male patients (Kim et al., 2018). However, in Zambia the researchers found that among Zambians between 15-19 years being male was significantly associated with not refilling treatment (Denison et al., 2018). This was in line with a study done in South Africa where women were 33% more likely to portray optimal adherence as compared to men (Moosa et al., 2019). However in a systematic review some of the studies showed that male gender were positively associated with optimal adherence while others did not have a significant association (Azmach, Hamza, & Husen, 2019).

Mouhamed et al. (2019) also concluded in their study that younger patients in Senegal were more likely to not adhere to ART medication refill. Nonetheless, a systemic review found that in majority of the reviewed studies, there was no association between socio-demographic and adherence to ART, but some of the studies showed that age of HIV patients (per year increasing) was positively associated with optimal adherence (Azmach, Hamza, & Husen, 2019).

2.3.2 Co-morbidity factors

In the United States, patients suffering from multiple chronic diseases and taking multiple chronic medication including ART were more likely to be non-adherent to their ART medication refill pick up (Williams & Kenyon, 2014). However, another study in United States (Northern California) indicated that patients older than 65 years of age, with more chronic conditions and disability, reported to have greater risk of non-adherence due to forgetfulness and side effects (Carr-Lopez et al., 2014). Delays in medication refill pick up was found to be more in a hospital with patients taking higher number of medication per day as compared to a hospital with patients taking less number of medications per day (Seguy et al., 2007).

In Columbia, Tashonna et al. (2017) found that HIV infected patients with cardiovascular diseases were found to be more adherent to their ARV medication than patients without cardiovascular diseases. Depression symptoms, perceived stress and co-morbidities such as malignancy and psychiatric disorder were associated with less certainty about the perceived ability to adhere to ART medication (Reynolds et al., 2004; Kim et al., 2018). In South Africa a study by Moosa et al. (2019), the burden of pills due to TB treatment did not affect adherence.



CHAPTER 3: METHODOLOGY

3.1 Aim

The aim of the study was to determine prevalence and factors associated with adherence to ART medication refill pick up among patients attending the regional hospital HIV clinics using electronic record, in the Sekhukhune district, Limpopo province, South Africa.

3.2 Objectives

- To describe baseline socio-demographic and clinical characteristics of participants on ART medication refill pick up.
- To determine the prevalence of adherence to ART medication refill pick up.
- To determine the socio-demographic and clinical factors associated with ART medication refill pick up.

3.3 Study design

A quantitative retrospective cohort study was used to determine the prevalence and factors associated with adherence to ART medication refill pick up. Incidence of non-adherence and lost to follow-up, as well as the rate at which they were occurring was uncovered. A retrospective cohort study is useful in determining the possible relationship between exposures and not outcomes (Joubert & Ehrlich, 2012), the effects of demographic and co-morbidity on adherence to ART medication refill pick up was determined. According to Setia (2016), a retrospective cohort study design allows data to be collected from the past events and facilitates the collection of outcomes of various variables at baseline. Furthermore, a retrospective study requires less time and resources to execute, making it suitable for a mini-thesis and has potential to reduce selection bias (Setia, 2016). The cohort in this study consisted of electronic database of adults aged 18 to 59 years with HIV who were initiated on ART between August 2020 and August 2021 at a regional hospital HIV clinics.

3.4 Study setting

The study was conducted at the Philadelphia regional hospital ARV clinics in the rural area of Sekhukhune district of the Limpopo Province in South Africa. Philadelphia hospital is a public

hospital which is located under Elias Motsoaledi sub-district. It is categorised as one of many previously disadvantaged district municipality (Mamabolo, 2021). Philadelphia hospital is one of the two regional hospitals in the Sekhukhune district and has ten feeder clinics which offer comprehensive HIV care, including antiretroviral treatment (Department of Health SA, 2015). The hospital covers two sub-districts; namely Elias Motsoaledi sub-district which covers four out of ten clinics and Ephraim Mogale which covers six out of ten clinics (Department of Health SA, 2015). The selected study setting is based in a rural area where challenges such as lack of proper infrastructure, transportation and water scarcity still exist (Mamabolo, 2021).

3.5 Population and sampling

The study population included all eligible HIV positive adults aged 18 to 59 years who initiated HIV treatment between August 2020 and August 2021 in the Philadelphia regional hospital HIV clinics. For the purpose of this study, eight PHCs were selected and consisted of four clinics from Elias Motsoaledi sub-district; Philadelphia Gateway, Kwarrilagte, Elansdoorn and Moutse East clinics and four clinics from Ephraim Mogale sub-district; Toitskral, Spitspunt, Makeepsvlei and Witfontein clinics. All eligible patients in the chosen facilities were part of the study.

Inclusion: All living ART patients aged 18 to 59 years who initiated their treatment at the regional hospital HIV clinics between August 2020 and August 2021 were included in this study.

Exclusion: Patients were excluded if they initiated ARV treatment but requested a transfer to another facility or died between August 2020 and August 2021. All ART patients aged 18 to 59 years who initiated their ART medication at the regional hospital HIV clinics prior to August 2020 and after August 2021 were excluded from this study.

3.6 Data collection

3.6.1 Data collection procedure

The study used routine quantitative data collection from the patient's electronic records data base called TIER.net. TIER.net is an electronic data base for ART monitoring, evaluation and documentation of the number of people alive and on treatment (Etoori et al., 2020). In this programme patients demographic, laboratory test results and treatment is documented by the caregiver during patients' visit. Data was extracted for all eligible patients and saved as excel

documents. As part of ensuring confidentiality, patients identifier such as file numbers and patient's names were removed and replaced with numbers in the Microsoft excel tool. The study collected socio-demographic data and clinical characteristics from TIER.net data base.

The study collected the following variables: socio-demographic data (age, gender) and clinical characteristics (TB status at start of treatment, viral load, CD4 count, ART start date, last pharmacy ART refill, ART regimen, date of appointment kept, WHO clinical HIV stage, date of lost to follow-up).

3.6.2 Data collection tool

A data collection tool (see Appendix 1) based on the standardised clinic collection tool for routine data was used to collect data (such as age, gender etc.) from the patient's electronic register.

3.6.3 Definition of outcomes and variables

Non-adherence to ART medication refill pick up was defined as the delay in medication refill pick up by 7 or more days of the appointment day. Adherence to ART medication refill pick up was defined as medication refill picked up within 7 days of their refill appointment date. Furthermore, patients who collected their medication refill 7 or more days before the appointment date were also considered as non-adherent. The study was observed for ten month after the initial treatment, therefore overall adherence to medication refill pick up was defined as adherence to medication refill pick up for at least nine or more month. Lost to follow-up was defined as patients who lost contact with the HIV clinic for 3 consecutive month, not known to have died and did not return for medication refill pick up.

3.7 Data analysis plan

Quantitative secondary data of eligible patient was extracted from the patients' electronic records, refined for quality, and completeness and saved in an excel format. All data was cleaned and all missing data was recorded as "not recorded". The primary outcome variable for the study was the adherence to ART medication refill pick up which was defined as medication refill picked up within 7 days of the appointment date for more than 90% of the time.

Microsoft excel was used for data entry of this study and Epi info 7.2.5.0 software was used to compute the descriptive and inferential statistics. Univariate analysis of all variables was conducted to describe the distribution and to find the patterns that exist within the variable while descriptive characteristics was used to characterise the participant characteristics including: age, gender, length on ART, co-morbidity. Descriptive statistic was presented as means, standard deviations (SD) and median and expressed as percentages. For the descriptive analysis, data was compared between two sub-districts. Bivariate analysis was conducted to calculate the odds ratio for the variable collected, the 95% confidence interval and the P-value to determine the statistical significance. The adjusted odds ratio associated 95% intervals was estimated, and the significant results reported at p-values of <0.05 and <0.001 .

3.8 Validity and reliability

3.8.1 Validity

Validity in a quantitative study is defined as the extent to which a concept is accurately measured (Heale & Twycross, 2015). To ensure validity, all eight clinics approved by the department for the purpose of this study were selected. Furthermore a clear inclusion and exclusion criteria was defined and a collection tool (Appendix 1) was used to collect data to reduce selection bias. Additionally, the data extractor extracted data in the presence of the researcher and all measurement was double checked by the researcher and the data extractor for accuracy and completeness to reduce measurement bias.

3.8.2 Reliability

According to Kesmodel (2018), the study is reliable if it can produce the same results when repeated. Therefore to ensure repeatability of the study, a clear exclusion and inclusion criteria was defined. The extraction tool which clearly shows the variables was also used. The data in this study was a secondary data which is also used to extract monthly ART statistics used by the province; therefore the data collected may be reliable as well. The person responsible for data extraction was trained on the use data extraction tool for standardization across clinics.

3.9 Limitations

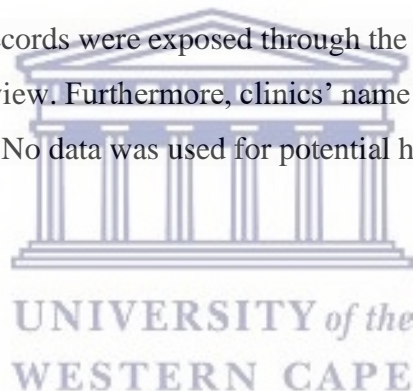
The study only assess data from the electronic records at the Philadelphia regional hospital ARV clinics. Some of the variables were incomplete in some of the patient's electronic records.

Therefore those with missing information was extracted as 'not recorded'. Tier.net program could not convert data to excel hence data was manually transferred to excel sheet.

3.10 Ethics statement

Ethics approval was obtained from the University of the Western Cape, Biomedical Research Ethics Committee and the Limpopo Department of Health, South Africa. Approval to access ART patient records was obtained from the sub-district and selected hospital clinics.

Secondary data was used for this study; therefore, no consent was required from the participants. To protect human dignity, privacy and confidentiality, ethical principles in data collection and analysis was applied. Thus, the name of participants was not collected. Collected data was saved in a password protected computer file accessible to the researcher only and shall be kept for only five years thereafter destroyed. Though the study involved a vulnerable group who are HIV positive, there was a minimal risk as it did not involve direct contact with the participants. The most significant risk in this study was the potential loss of privacy and confidentiality when medical records were exposed through the study. However patients name was required nor used in the review. Furthermore, clinics' name were coded using number 1 to 8 to protect the dignity thereof. No data was used for potential harm and embarrassment of the participants.



CHAPTER 4: RESULTS

This chapter presents the current study outcomes. These outcomes are presented and interpreted based on the study objectives. The results are presented in six sections, namely: realisation of the sample; description of the characteristics of all social demographic variables in the study data set; description of clinical characteristics and co-morbidity of the participants; the prevalence of adherence to ART medicine refill pick up, the analysis of the factors associated with adherence to ART medication refill pick up and summary of results.

4.1 Realisation of the sample

The study data was extracted from Tier.net programme and manually entered into an excel worksheet for analysis and interpretation. The data extracted was for all patients between the age of 18 to 59 years, who initiated ARV treatment between August 2020 and August 2021. Data was collected from two sub-districts; Elias Motsoaledi and Ephraim Mogale. Total study participants were 731 in which 539 (74%) were from Elias Motsoaledi sub-district while 195 (26%) participants were from Ephraim Mogale sub-district.

The percentage distribution of the study participants between the Elias Motsoaledi sub-district and Ephraim Mogale sub-district is shown in Figure 1. Majority (74%) of the participants were from Elias Motsoaledi sub-district while 26% of the participants were from Ephraim Mogale sub-district.

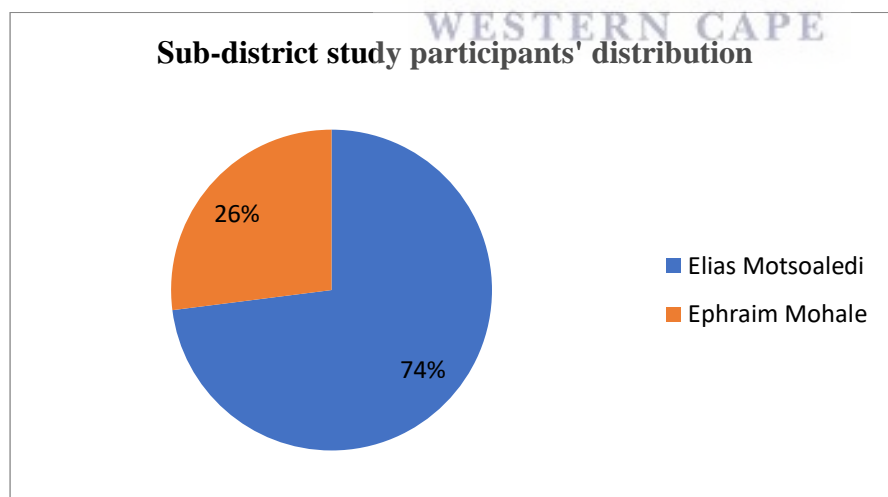


Figure 1: Sub-district participant distribution (N = 731)

The percentage participants' distribution are shown in figure 2 for Elias Motsoaledi sub-district. Elias Motsoaledi sub-district (Figure 2) had a total of 539 study participants. The highest number of participants were from clinic 1 (36%) and the lowest number of patients came from clinic 4 (17%).

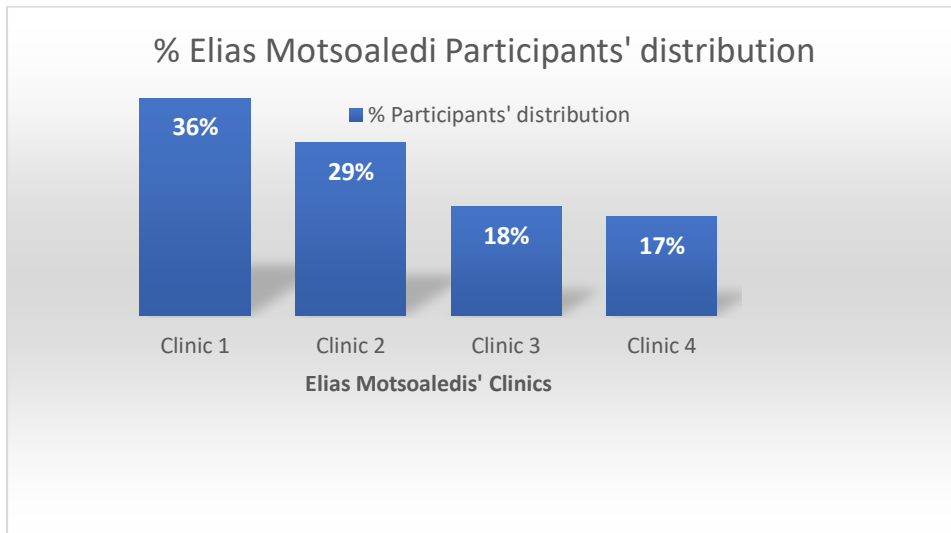


Figure 2: Elias Motsoaledi sub-district facility distribution of the study participants (N = 539)

Ephraim Mogale sub-district (figure 2) had a total of 192 study participants. The highest number of participants were from clinic 1 (62%) and the lowest number of patients came from clinic 4 (7%).

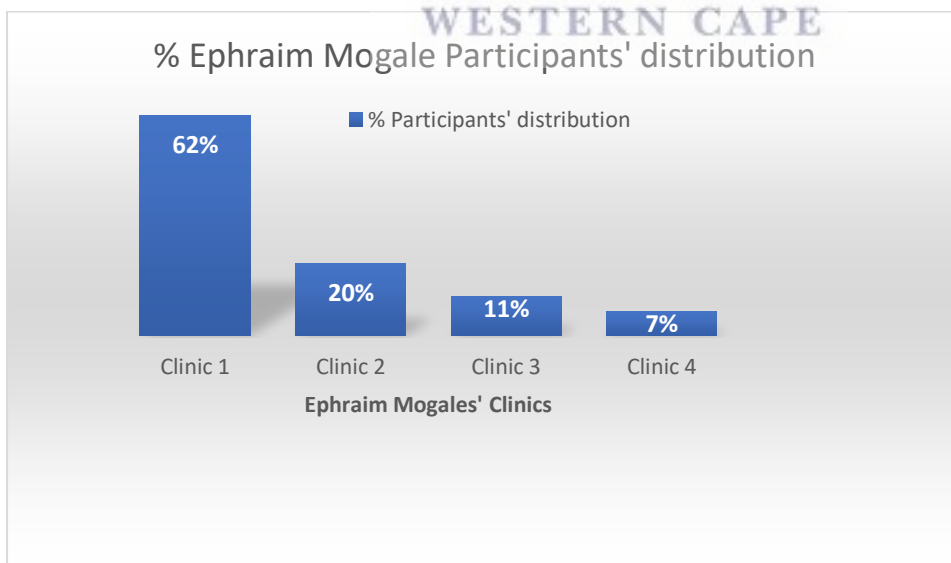


Figure 3: Ephraim Mogale sub-district facility distribution of the study participants (N = 192)

4.2 Descriptive characteristics of socio-demographic of the participants

The majority of the participants in this study were female and youth aged between 18 and 34 in both sub-districts. The youth in Elias Motsoaledi and Ephraim Mogale constituted 53.8% and 55.7% of participants respectively which symbolised a high prevalence in this age group. In both Elias Motsoaledi and Ephraim Mogale sub-district, female participants made up 72.0% and 65.6% of the total participants respectively. Table 1 provides the descriptive characteristics of socio-demographic features of the study participants.

The age distribution in this study indicated the average (mean) age of 34 years with the most frequent age of 29 years. The minimum age was 18 years and the maximum age was 58 years. The standard deviation of the age was 9.66.

Table 1: Descriptive characteristics of socio-demographic of the participants (N = 731)

Characteristics		Elias Motsoaledi		Ephraim Mogale	
		Frequency	Percentage	Frequency	Percentage
Age	18-34 (Youth)	290	53.8%	107	55.7%
	35-59 (Adults)	249	46.2%	85	44.3%
Total		539	100%	192	100%
Gender	Female	388	72.0%	126	65.6%
	Male	151	28.0%	66	34.4%
Total		539	100%	192	100%

The results for the descriptive characteristics of social demographic features associated with the study outcomes (adherence, non-adherence and lost to follow-up) are summarised in Table 2. The results shows that the percentage of youth who were adherent to medication refill pick up was higher (43%) among the Ephraim Mogales' participants than in Elias Motsoaledi sub-district (24.8%). The overall adherence among adult participants was 32.3% while the overall adherence among the youth was 33.9%.

The results indicates that 27.8% and 36.5% of female participants in Elias Motsoadi sub-district and Ephraim Mogale sub-district were adherent to medication refill pick up respectively with an overall adherence of 32.2%. The results also show that the percentage of male participants who were adherent were higher (44%) among the Ephraim Mogales' participants than in Elias Motsoaledi (26.5%). Overall adherence among male participants was 35.3%, slightly higher than female and youth adherence levels.

Table 2: Descriptive characteristics of social demographic features associated with the study outcomes.

Characteristics		Elias Motsoaledi			Ephraim Mogale		
		Adherence	Non-adherence	Lost to follow-up	Adherence	Non-adherence	Lost to follow-up
Age	Adult	76(30.5%)	145(58.2%)	28(11.2%)	29(34.1%)	33(38.8%)	23(27.1%)
	Youth	72(24.8%)	179(61.7%)	39(13.5%)	46(43%)	26(24.3%)	35(32.7%)
TOTAL		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)
Gender	Female	108(27.8%)	231(59.5%)	49(12.6%)	46(36.5%)	38(30.1%)	42(33.3%)
	Male	40(26.5%)	93(61.6%)	18(11.9%)	29(44%)	21(31.8%)	16(24.2%)
Total		148(27.5%)	324(60.1)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)

Table 3 indicates the descriptive characteristics of pregnant participants. The total number of participants is 308, all male and those with pregnancy test not done were excluded. In Elias Motsoaledi sub-district, 31.6% of the female participants were pregnant while 41.7% from Ephraim Mogale sub-district were pregnant.

Table 3: Descriptive characteristics of pregnant participants. (N = 308)

Characteristics		Elias Motsoaledi		Ephraim Mogale	
		Frequency	Percentage	Frequency	Percentage
Pregnant	Pregnant	61	31.6%	48	41.7%
	Not pregnant	132	68.4%	67	58.3%
TOTAL		193	100%	115	100%

Table 4 provides the descriptive characteristics of pregnant participants association with the study outcomes. Among the pregnant participant only 13.1% were adherent in Elias Motsoaledi sub-district compared to 37.5% in Ephraim Mogale sub-district. The results also indicates that in both sub-districts, participants who were not pregnant were more adherent to medication refill pick up than those that were pregnant.

Table 4: Descriptive characteristics of pregnant participants associated with the study outcomes. (N = 308)

Characteristics		Elias Motsoaledi			Ephraim Mogale		
		Adherence	Non-adherence	Lost to follow	Adherence	Non-adherence	Lost to follow
Pregnant	Pregnant	8(13.1%)	40(65.6%)	13(21.3%)	18(37.5%)	12(25%)	18(37.5%)
	Not pregnant	39(29.6%)	78(59.1%)	15(11.4%)	27(40.3%)	19(28.4%)	21(31.3%)
TOTAL		47(24.6%)	118(67.1%)	28(14.5%)	45(39.1%)	31(27%)	39(33.9%)

4.3 Description of clinical characteristics and co-morbidity of the participants.

Other participants in this study did not have clinical characteristics recorded on Tier.net, therefore all missing characteristics were described as ‘not recorded’. Table 5 provides the description of clinical characteristics and co-morbidity of the participants in the data set. Majority of participants (78.3%) in Elias Motsoaledi sub-district did not have a TB status recorded during the study period while 32.3% in Ephraim Mogale sub-district did not have TB status recorded. Only 2.6% of the participants had TB during the study period. In Elias Motsoaledi, 25.2% of participants had uncompromised CD4 count of more than 350cell/ml while Ephraim Mogale had 57.3% participants with uncompromised CD4 count. In overall, 22.57 % of the participants had a viral load of less than 1000 copies while 18.47% had less than 20 copies of the virus. Notably, Elias Motsoaledi had the highest number of patients whose CD4 count and viral loads (58.4% and 57.9% respectively) were not recorded. Majority of participants in this study were in WHO Stage 1 and also in ART regimen 1.

Table 5: Co-morbidity and clinical characteristics of the participants (N=731)

Characteristics		Elias Motsoaledi (n=539)		Ephraim Mogale (n=192)	
		Frequency	Percentage	Frequency	Percentage
TB	TB results positive	14	2.6%	5	2,6%
	TB results negative	103	19.1%	125	65.1%
	Not recorded	422	78.3%	62	32.3%
Total		539	100%	192	100%
CD4 count	Uncompromised <350cell/ml	136	25.2%	110	57.3%
	Compromised >350cell/ml	88	16.3%	47	24.3%

	Not recorded	315	58.4%	35	18.2%
Total		539	100	192	100%
Viral load	Supressed<1000	100	18.6%	65	33.9%
	Undetected <20	75	13.9%	41	21.4%
	Not supressed>1000	52	9.6%	33	17.2%
	Not recorded	312	57.9%	53	27.6%
Total		539	100	192	100%
WHO clinical HIV stage	Stage 1	343	63.6%	139	72.4%
	Stage 2	71	13.2%	37	19.3%
	Stage 3	45	8.4%	11	5.73%
	Stage 4	7	1.3%	2	1.0%
	Not recorded	73	13.5%	3	1.6%
Total		539	100%	192	100%
ART treatment regimen	Regimen 1	537	99.6%	191	99.5%
	Regimen 2	2	0.4%	1	0.4%
Total		539	100%	192	100%

Table 6 indicates the descriptive characteristics of the clinical and co-morbidity features associated with the study outcomes. Adherence was found to be low on patient with TB in both Ephraim Mogale and Elias Motsoaledi sub-district (1.0% and 0.6% respectively). In Ephraim Mogale, 27.1% of WHO clinical stage 1 participants were adherent while only 16.5% in Elias Motsoaledi were adherent to medicine refill pick up. Generally participants with uncompromised CD4 count and suppressed viral load were more adherent as compared to participants with compromised CD4 count and unsuppressed viral load in both sub-districts.

Table 6: Descriptive characteristics of clinical and co-morbidity features associated with the study outcomes.

Characteristics		Elias Motsoaledi (n=539)			Ephraim Mogale (n=192)		
		Adherence	Non-adherence	Lost to follow	Adherence	Non-adherence	Lost to follow
TB	TB results positive	3(0.6%)	10(1.9%)	1(0.2%)	2(1.0%)	2(1.0%)	1(1.0%)
	TB results negative	32(5.9%)	59(10.9%)	12(2.2%)	46(24.0%)	37(14.1%)	42(21.9%)
	Not recorded	113(21.0%)	255(47.3%)	54(10.0%)	27(14.1%)	20(10.4%)	15(7.8%)
Total		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)

WHO clinical HIV stage	Stage 1	89(16.5%)	218(40.4%)	36(6.7%)	52(27.1%)	43(22.4%)	44(22.9%)
	Stage 2	24(4.5%)	39(7.2%)	8(1.5%)	15(15.8%)	10(5.2%)	12(6.3%)
	Stage 3	9(1.6%)	33(6.1%)	3(0.6%)	5(2.6%)	4(2.1%)	2(1.0%)
	Stage 4	2(0.3%)	5(0.9%)	0(0%)	1(0.5%)	1(0.5%)	0(0%)
	Not recorded	24(4.5%)	29(5.3%)	20(3.7%)	2(1.0%)	1(0.5%)	0(0%)
Total		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)
ART treatment regimen	Regimen 1	147(27.3%)	323(59.9%)	67(12.4%)	75(39.1%)	58(30.2%)	58(30.2%)
	Regimen 2	1(0.2%)	1(0.2%)	0(0%)	0(0%)	1(0.5%)	0(0.5%)
Total		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)
CD4 count	Uncompromised >350cell/ml	40(7.4%)	78(14.5%)	18(3.3%)	40(20.8%)	32(16.7%)	38(19.8%)
	Compromised <350cell/ml	31(5.8%)	49(0.1%)	8(1.5%)	23(12%)	13(6.8%)	11(5.7%)
	Not recorded	77(14.3%)	197(36.5%)	41(7.6%)	12(6.3%)	14(7.3%)	9(4.7%)
Total		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)
Viral load	Supressed<1000	39(7.2%)	56(10.4%)	5(0.9%)	37(19.3%)	23(12%)	5(2.6%)
	Undetected <20	36(6.7%)	33(6.1%)	6(1.1%)	21(11.0%)	17(8.9%)	3(1.6%)
	Not supressed>1000	10(1.9%)	34(6.3%)	8(1.5%)	8(4.2%)	8(4.2%)	17(8.9%)
	Not recorded	63(11.7%)	201(37.3%)	48(8.9%)	9(4.7%)	11(5.7%)	33(17.2%)
Total		148(27.5%)	324(60.1%)	67(12.4%)	75(39.1%)	59(30.7%)	58(30.2%)

4.4 The prevalence of medication refill pick up

Medication refill records for ten consecutive refill visits were analysed, table 7 below paints the monthly cumulative percentage of adherence, non-adherence and lost to follow-up outcome. Adherence percentage decreased from 72.53% in the second month to 47.85% in the last month of the observation. While non-adherence percentage increased from 29.82% to 52.15%.

Table 7: Monthly adherence distribution of all outcomes N=731

	Adherence n (%)	Non-adherence n (%)	Lost to follow n (%)	Total participants (n)
Month 1	441 (60.3%)	218 (29.8%)	72 (9.8%)	731
Month 2	478 (72.5%)	173 (23.6%)	8 (1.2%)	659
Month 3	377 (57.9%)	262 (40.3%)	12 (1.8%)	651
Month 4	366 (57.3%)	264 (41.3%)	9 (1.4%)	639
Month 5	364 (57.8%)	258 (41.0%)	8 (1.3%)	630
Month 6	350 (56.3%)	267 (42.9%)	5 (1.3%)	622

Month 7	342 (55.4%)	268 (43.4%)	7 (1.0%)	617
Month 8	331 (54.3%)	276 (45.3%)	3 (0.5%)	610
Month 9	323 (53.2%)	283 (46.6%)	1 (0.2%)	607
Month 10	290 (47.9%)	316 (52.2%)	0 (0.0%)	606
Total			125(17.1%)	

The following table indicates the overall adherence to medication refill pick up per sub-district. After 10 months follow-up with the participants, 30.5% of the participants were able to pick up their medication refill within seven days of the appointment date for 90% of the time, furthermore 17.1% participants were lost to follow-up. While 52.4% of participants were non-adherent to medication refill pickup, Ephraim Mogale municipality was found to have majority (39.1%) of the participants who adhered to medication refill pick up as compared to Elias Motsoaledi where only 27.5% were adherent.

Table 8: Overall percentage for outcome variables. N=731

OVERALL ADHERENCE	sub-district		Total (731)
	Elias Motsoaledi (n=539)	Ephraim Mogale (n=192)	
ADHERENCE n (%)	148 (27.5%)	75 (39.1%)	223 (30.5%)
NON-ADHERENCE n (%)	324 (60.1%)	59 (30.7%)	383 (52.4%)
LOST TO FOLLOW-UP n (%)	67 (12.4%)	58 (30.2%)	125 (17.1%)

4.5. Analysis of factors associated with adherence to medication refill pick up.

Logistic regression analysis for participants was conducted only for participants who were adherent and non-adherent to medication refill pick up. Participants who were lost to follow-up were not included in this analysis because according to the definition, patients who are lost to follow-up cannot be classified as adherence or non-adherence because their where about is not known. After excluding the lost to follow-up participants the total participants were 606.

Results for logistic regression analysis of possible socio demographic characteristics associated with adherence to medication refill pick up is shown in Table 9. Those who were adherent to medication refill pick up were more likely to be adults. The difference was however, not statistically significant (P-value = 0.442). Participants who were adherent to ART medication refill pick up were more likely to be male than female. However, the difference was also not statistically significant (P-value of 0.380).

Table 9: Bivariate association of the socio-demographic characteristics and adherence to ART medication refill pick up. N=606

Characteristics	Adherence n (%)	Non-adherence n (%)	Odds ratio (95% CI)	P-value
AGE GROUP				
Adults	105 (37.1%)	178(62.9%)	1.025 (0.736 - 1.427)	0.442
Youth	118(36.5%)	205(63.5%)		
GENDER				
Female	154(36.41%)	269(63.59%)	0.946 (0.661 1.354)	0.380
Male	69(37.70)	114(62.30%)		

Table 10 provides logistic regression analysis of sub-district and adherence to ART medication refill pick up. Participant who were adherent to ART medication refill pick up were more likely to be from Ephraim Mogale sub-district than from Elias Motsoaledi sub-district. The difference was statistically significant (P-value = 0)

Table 10: Bivariate association of sub-district and ART medication refill pick up. N=606

Characteristics	Adherence n (%)	Non-adherence n (%)	Odds ratio (95% CI)	P-value
Sub-district				
Elias Motsoaledi	148 (31.4%)	324 (68.6%)	0.359 (0.243 - 0.532)	0
Ephraim Mogale	75 (56.0%)	59 (44.0%)		

Table 11 provides the results for logistic regression analysis of pregnancy associated with adherent to medication refill pick up. The following result had a total of 241 participants, male and lost to follow-up participants were excluded. Participants who were adherent to medication refill pick up were less likely to be pregnant. However the difference was not statistically significant (P-value of 0.145).

Table 11: Bivariate association of Pregnancy and ART medication refill pick up. N = 241

characteristics	Adherence (n, %)	Non-adherence (n, %)	Odds ratio (95% CI)	P-value
PREGNANT				
Pregnant	26 (33.3%)	52 (66.7%)	0.735 (0.418 - 1.293)	0.145
Not pregnant	66 (40.5%)	97 (59.5%)		

Table 11 provides the results for logistic regression analysis for comorbidity/clinical characteristics and ART medication refill pick up. The total number of participants in this analysis is 606, all participant who were lost to follow-up were not included in this analysis. Participant who were adherent were more likely to be on regimen 1. However, this was not statistically significant (P-value of 0.472). Participant who were adherent were less likely to have TB. This was also not statistically significant (P-value of 0.117).

Table 12: Bivariate association of comorbidity/clinical characteristics and ART medication refill pick up. N=606

characteristics	Adherence n (%)	Non-adherence n (%)	Odds ratio (95% CI)	P-value
ART Regimen				
Regimen 1	222 (36.8%)	381 (63.2%)	1.165 (0.105 – 12.925)	0.472
Regimen 2	1 (33.3%)	2 (66.7%)		
TB				
Have TB	5 (29.41%)	12(70.59%)	0.513 (0.173 - 1.518)	0.117
Do not have TB	78(44.83)	96(55.17%)		

4.5. Summary of results

The results of this study were presented using 3 figures and 11 tables. The analysis looked at all patients between the age of 18 to 59 years, who initiated ARV treatment between August 2020 and August 2021 (N = 731). The results explore the descriptive characteristics of socio demographic, clinical and co-morbidity of the study participants. The prevalence of adherence to medication refill pick up was determined. The binary logistic regression analysis model was used to assess the association between socio-demographic, clinical and comorbidity with adherence to ART medication refill pick up.

From the results, it is evidence that adherence to ART by patients between the age of 18 and 59 is bellow expectation. Socio demographic, clinical and comorbidity characteristics did not

show a significant association with adherence to ART medication refill pick up. However picking up medication refill from a sub-district or facility that does not have a lot of patients increases the likelihood of adherence. Additionally, adherence to medication refill pick up decreases as the month of collection increases.



CHAPTER 5: DISCUSSION

5.1. Introduction

This chapter will discuss the findings from the quantitative retrospective cohort study to determine the prevalence and investigating factors associated with adherence to ART medication refill pick up among patients attending HIV care at the regional hospital HIV clinics in the Sekhukhune district, Limpopo Province. This discussion will focus on the findings and how they relate to current literature.

5.2. Socio demographic characteristics

Socio demographic characteristics considered in this study were age, gender, pregnancy and sub-district. The results in this study indicated sub-district as the only socio demographic characteristic which is significantly associated with adherence to ART medication refill pick up. Participants who collected medication from Ephraim Mogale sub-district were more likely to be adherent to ART medication refill pick up. According to Census (2011) Elias Motsoaledi generally has a larger population (66.9%) as compared to Ephraim Mogale sub-district (33.1%). Elias Motsoaledi sub-district had significantly higher number of patients (74%) as compared to Ephraim Mogale sub-district (26%). Ephraim Mogale sub-district having smaller population has therefore resulted in facilities serving a smaller population as compared to Elias Motsoaledi.

The socio demographic factors considered in the findings such as age and gender did not show a significant association and carries across the literature reviews. Those who were adherent to medication refill pick up were 1.02 more likely to be adults in this study. Though the influence was not statistically significant, the finding was consistent with a study by Mouhamed et al. (2019) who concluded that younger patients in Senegal were more likely to not be adherent to ART medication refill pick up. Majority of the reviewed studies (77.1% and 71.4%) did not indicate an association with adherence relating to sex and age respectively, only 14.3% of the studies showed that age per year increasing was positively associated with optimal adherence (Azmach, Hamza and Husen, 2019).

Apart from age, gender was also found to not be significantly associated with adherence. Male participants in this study were more likely to be adherent as compared to female participants. HIV infected females in developing countries demonstrated a better health seeking behaviour

as compared to male (Moosa et al., 2019), this is not consistent with this study as the results indicated that more female demonstrated a better health seeking behaviour than male based on total male and female. Furthermore, in the rural setting of Zambia, adherence was associated with being female (Sasaki et al., 2012).

Moreover, participants who were adherent were more likely to not be pregnant in this study, this was also not statistically significant. Evidence suggest that pregnant women who receive one or more prescription turned to be non-adherent. This study found adherence of 25.2% among pregnant women. Despite the benefits of ART medication in pregnancy, this study showed a high rate of non-adherence among pregnant women which is not consistent with the Nigerian finding, Nigerian pregnant women showed a better adherence in pregnancy. In South Eastern Nigeria, only 37.1% where non adherence and a much lower rate of non-adherence (19.4%) has been reported (Ekama et al., 2012).

5.3. Comorbidity

Co-morbidity characteristic findings in this study was TB. In South Africa, HIV and TB co-infection rate is high (Moosa et al., 2019). Nonetheless, only 2.6% of the HIV participants had TB during this study period. Furthermore, this study indicated no significant association between adherence and TB. This was consistent with other South African studies which found no significant changes in adherence on HIV and TB co-infected patients (Moosa et al., 2019). Limpopo province is among one of the most affected by TB, approximately 55% TB patients are also HIV positive (Matakanye, Tshitangano, Mabunda & Maluleke, 2021). In this study results, 78.3% and 32.3% of participant from Elias Motsoaledi and Ephraim Mogale sub-district respectively did not have TB status recorded on Tier.Net this may have an effect on the prevalence association thereof.

5.4. Clinical characteristics

The total study participants on 1st line regimen were 99.6% and the total participant on 2nd line regimen were 0.4%. 1st line ART regimen is the most recommended, simplified, less toxic and the most convenient regimen hence the majority of the participants were initiated on 1st line regimen (Bereda & Bereda, 2021). Logistic regression analysis on ART regimen indicated no significant association with medication refill pick up. Being in 1st line regimen did not increase the chances of adherence in this study. It has been determined that the complexity and dosing

of more than one dose per day may hinder adherence (Moosa et al., 2019). Nonetheless this study did not show a significant association.

Majority of the participants in this study did not have clinical characteristics recorded on Tier.net programme. Missing data on patient's viral load and CD4 count constituted for about 49.9% and 47.9% respectively. This is higher than a study in South Africa in which 36% of patient outcome such as CD4 count, viral load and ART initiated reason were missing (Etoori, Wringe, Kabudula, Renju, Rice, Gomez-Olive & Reniers, 2020). This study was conducted during the COVID-19 pandemic and therefore Missing data in this study might have been due to the COVID-19 pandemic as more focus was on the pandemic rather than HIV programme.

5.6. Adherence to medication refill pick up

Three outcomes variables were determined in this study, namely; adherence to ART medication refill pick up, non-adherence to ART medication refill pick up and the lost to follow-up. Only 82.9% of the participants were able to remain in care until the end of the study. The percentage of patients who retained care is higher than other findings in South Africa (Chauke, Huma & Madiba, 2020). In Ekurhuleni district, South Africa, 60% of the participant retained in care for the period of more than 12 month while 28% percent were lost to follow-up (Chauke, Huma & Madiba, 2020). In this study, 17.1% of participants were lost to follow-up, this is in consistent with a systemic review by Wilkinson et al. (2014) which indicated that the percentage lost to follow-up ranges from 2.7% to 55.4% in low and middle income countries. This study has indicated a high number of non-adherence to medication refill pick up.

Overall, the study results show that there is a low prevalence of medication refill pick up in the Philadelphia regional hospital HIV clinics, Sekhukhune district. The results indicated that only 30.5% of the overall participants were able to collect their ART medication refill within 7 days of their appointment date for more than 90% of their time during the study period. In United States, researchers found the prevalence of 32.6% (Ayer et al., 2016) which is consistent with the prevalence in this study. The prevalence in this study is higher than the prevalence of 21.1% found in a study done in Nigeria (Anoje et al., 2017). To further understand the pattern of ART adherence in this study, the results indicated that 60.3% of the participant were adherent in the first appointment. This adherence percentage increased to 72.6% in the second appointment and subsequently decreased with time until 44.9% in the last appointment over the ten months

period. Nonetheless, in another region of South Africa, the likelihood of achieving optimal adherence to ART improved with time (Moosa et al., 2019).



CHAPTER 6: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Participants collecting medication from sub-district with high burdened of HIV patients were found to be less adherent to ART medication refill pick up as compared to participants collecting medication from a sub-district with low burden of HIV patients. Concurrently, participants who were adherent to ART medication refill pick up were less likely to be pregnant and to have had TB during the study period. Therefore, having co-morbidity such and TB did not positively increase the chances of ART medication refill pick up. Furthermore, there was no significant association between adherence to medication refill pick up and socio-demographic factors such as adults and male.

6.2 Recommendations

To improve on ART medication refill adherence, more emphasis should also be directed to health system factors such as high number patients. Facilities with high number of patients should be prioritised to improve on adherence. Another focus should be on pregnant women taking ARV to minimize risk related to non-adherence. Other factors influencing non-adherence in the Sekhukhune district should be investigated in order to address the high rate of non-adherence. Due to high prevalence of non-adherence among pregnant women in this study, more study need to be conducted on the effect of non-adherence on mother to child HIV transmission prevalence. Furthermore, recording of full patient clinical test results after any consultation on the electronic system should be strengthened to avoid missing information.

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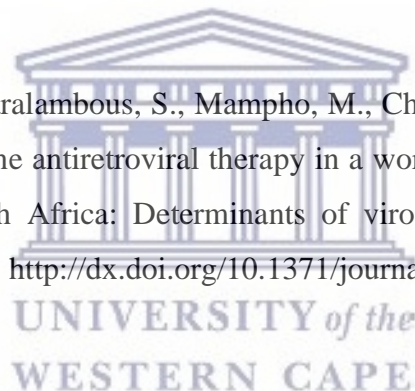
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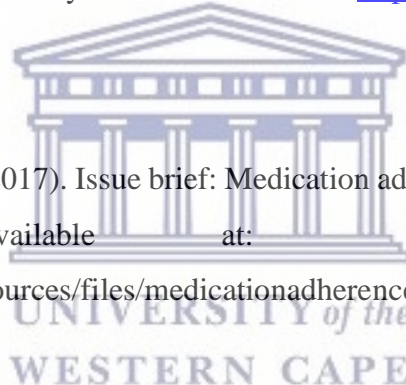
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ANNETURE 1. DATA COLLECTION TOOL

Province: _____	file Number: _____	
District: _____		
Facility/Site: _____	_____	
Questions		Responses
1. Gender		M ____ F ____
2. Age		_____
3. Date tested HIV positive		___/___/___
4. ART treatment start date		___/___/___
5. date Transferred into the facility		___/___/___
6. Type of ART regimen		First Line ____ Second Line ____
7. WHO staging		Stage 1 ____ Stage 2 ____ Stage 3 ____ Stage 4 ____



Province: _____	file Number: _____	
District: _____		
Facility/Site: _____	_____	
Questions		Responses
8. Baseline CD4 count		____ cells/mm ____ Missing
9. On co-trimoxazole at baseline		Yes ____ No ____ N/A ____
10. On TB treatment at ART start		Yes ____ No ____
11. Viral load		_____
12. Have other chronic diseases		Yes ____ No ____ Specify disease if yes. _____
14. Number of times medication picked up after 7 days of the appointment.		____
Number of times medication picked up before 7 days.		____
Date of lost to follow-up		____/____/____

ANNEXURE 2: ETHICS APPROVAL LETTER, UWC



UNIVERSITY OF THE WESTERN CAPE

Private Bag X 17, Bellville 7535, South Africa

Tel: +27 21-959 2809 Fax: 27 21-959 2872

E-mail: soph-comm@uwc.ac.za

**To Deputy Director General
Limpopo Department of Health
Polokwane
South Africa**

Dear Sir/ Madam

RE: Request to conduct Research from Sekhukhune District, Philadelphia Hospital HIV feeder clinics for Academic Research Purpose

With reference to the above captioned subject, I am currently a registered student with University of the Western Cape. I write to request for your permission to conduct research from Sekhukhune district for my MPH mini thesis entitled: The determinants of adherence to ART medication refill pick up in the regional Hospital HIV clinics at the Sekhukhune district, Limpopo province, South Africa. I intend to collect data within the period dated 1st August 2020 to 31st August 2021 once permission is granted.

Hope the above finds you in order.

Kind regards

M Nephumbada

3054831@myuwc.ac.za

nkhumelenimulisa@gmail.com

072 3668 682



Signature

ANNEXURE 3:ETHICS CLEARANCE CERTIFICATE



14 February 2022

Letter of support for Mulisa Nephumbada to conduct a research study

To whom it may concern

This is to confirm that Mulisa Nephumbada is a registered Master of Public Health student at the School of Public Health, University of the Western Cape (student number 3054831). I am her thesis supervisor for the duration of his research. She is about to embark on data collection for her research project as required in order to complete her degree. She has submitted her proposal and received approval from the Limpopo Department of Health (*Ethics Reference Number LP-2021-12-003*) and the University's Research Ethics (*Ethics Reference Number BM21/10/8*). The title of her research is: **The determinants of adherence to ART medication refill pick up in the regional hospital HIV clinics at the Sekhukhune district, Limpopo province, South Africa.**

It would be greatly appreciated if you could grant her permission to collect the data for this important research study without a delay to meet her thesis submission deadline.

Yours Sincerely
Dr Anam Nyembezi
Senior Lecturer
School of Public Health
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Human Resources for Health

ANNEXURE 4: LIMPOPO PROVINCE ETHICS APPROVAL



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

Department of Health

Ref : LP-2021-12-003
Enquires : Ms PF Mahlokwane
Tel : 015-293 6028
Email : Phoebe.Mahlokwane@dhsd.limpopo.gov.za

Mulisa Nefumbada

PERMISSION TO CONDUCT RESEARCH IN DEPARTMENTAL FACILITIES

Your Study Topic as indicated below;

The determinants of adherence to ART medication refill pick up in the regional hospital HIV clinics at the Sekhukhune district, Limpopo province, South Africa

1. Permission to conduct research study as per your research proposal is hereby Granted
2. Kindly note the following:
 - a. Present this letter of permission to the institution supervisor/s a week before the study is conducted.
 - b. The approval is **ONLY** for **Elandasdoorn Clinic; Kwarreilaagte Clinic; Makeepsvei Clinic; Moutse East Clinic; Philadelphia Gateway Clinic; Spitspunte Clinic; Toitskraal Clinic and Witfontein Clinic**
 - c. In the course of your study, there should be no action that disrupts the routine services, or incur any cost on the Department.
 - d. After completion of study, it is mandatory that the findings should be submitted to the Department to serve as a resource.
 - e. The researcher should be prepared to assist in the interpretation and implementation of the study recommendation where possible.
 - f. The approval is only valid for a 1-year period.
 - g. If the proposal has been amended, a new approval should be sought from the Department of Health
 - h. Kindly note that, the Department can withdraw the approval at any time.

Your cooperation will be highly appreciated

Head of Department

pp

UNIVERSITY of the
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07/02/2022

Date

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