Pre-Exposure Prophylaxis (PrEP) therapy in KwaZulu-Natal: An implementation guideline

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DOCTOR OF NURSING

By

ROXANN MOODLEY

Under the guidance of

Dr P. Orton

And

Dr P. Basson (Co- supervisor)

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DECLARATION

This dissertation is being submitted to the Durban University of Technology for the degree of Doctor of Nursing. I declare that this work is my own and has not been submitted before for any degree or examination to this or any other university or institution for this or any other degree or award.

Student number: **21644759**

Student: _____ Date: 7/5/20

Roxann Moodley

Supervisor: _____ Date: 7 MAY 2020

Dr P. Ortor

Co- Supervisor: _____ Date: 7-5-20

Dr P Bassen

DEDICATION

DEDICATED TO FUTURE NURSES THAT STRIVE TO MAKE A DIFFERENCE IN OUR WORLD

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ABSTRACT

Why is pre-exposure prophylaxis (PrEP) therapy not implemented as a preventative treatment against human immunodeficiency virus (HIV) in primary health care (PHC) clinics in the KwaZulu Natal province? PrEP therapy has proven to be an effective preventative strategy against HIV (Bekker *et al.* 2016) which could be used to decrease the number of individuals becoming infected with the Human Immunodeficiency virus. This study explores the perceptions of PHC nurses, PHC doctors, PHC support staff and individuals at high risk of contracting HIV regarding PrEP therapy in KwaZulu Natal public clinics. The Department of Health (DoH) has published guidelines for the implementation of PrEP therapy; however, the guidelines have not been adopted and used by the primary health care staff in the clinics and has resulted in pre-exposure prophylaxis therapy not being implemented in the clinics to individuals at high risk of contracting Human Immunodeficiency Virus.

This research employed a qualitative framework using the grounded theory approach of Charmaz (2014). There are ten districts in KwaZulu Natal with a total of 588 primary health clinics that are accessible to the public. Five primary health care clinics were used in this research study with fourteen participants that were interviewed. Using semi-structured interviews with research participants across primary health care clinics that were purposefully selected, the researcher was able to develop an implementation guide for the department of health (DoH) pre-exposure prophylaxis therapy guidelines. The implementation guide that has been developed can be used by health care providers to assist with the implementation of the department of health pre-exposure prophylaxis therapy guideline in the primary health care clinics. The results of the study showed that educating the public and the individuals at high risk of contracting HIV can create awareness and demand for pre-exposure prophylaxis therapy. Participants expressed their concern regarding the implementation of pre-exposure prophylaxis in the primary health care clinics as there may not be enough resources to successfully implement and monitor individuals that want to take pre-exposure prophylaxis therapy.

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ABBREVIATIONS

AIDS	- acquired immunodeficiency syndrome
ART	- antiretroviral therapy
ARV	- antiretroviral treatment
cART	- combination antiretroviral therapy
CDC	- centers for disease control and prevention
CHW	- community health worker
CDP	- continuing professional development
DoH	- Department of Health
DNA	- Deoxyribonucleic acid
FTC	- emtricitabine
HCT	- HIV counselling and testing
HCP	- Health care practitioner
HCW	- health care worker
HIV	- human immunodeficiency virus
KZN	- KwaZulu-Natal
MSM	- men that have sex with men
PEP	- post-exposure prophylaxis
PHC	- primary health care
PLWHIV	- number of people living with HIV
PrEP	- pre-exposure prophylaxis
RNA	- ribonucleic acid
STI	- sexually transmitted infection
TDP	- tenofovir

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

Chapter 1 provides an overview of the study by explaining the background to the problem statement, presenting the study's aim, objectives, and research questions, and then discussing the significance of the study followed by the operational definitions and layout of the thesis.

1.2 BACKGROUND TO THIS STUDY

The human immunodeficiency virus (HIV) infection rate has remained consistently high and has become a world epidemic despite preventative interventions (which include male medical circumcisions, topical barriers, oral antiretroviral treatment [ART] and prevention of HIV campaigns) (Statistics South Africa 2018; Karim *et al.* 2012). At the end of 2015, statistics showed that there were 37 million individuals infected with HIV globally (World Health Organization [WHO] 2016). Only 17 million of these individuals received ART. The majority of HIV infected individuals reside in middle to low-income countries (WHO 2016). South Africa's statistics for HIV infected individuals has grown from 4.25 million infected individuals in 2002 to 7.52 million in 2018 (Statistics South Africa 2018). The age group 15 to 49 years old has an infection rate of 19% in South Africa. In 2016, 56% of the HIV infected individuals living in South Africa were receiving anti-retro viral's (ARVs), which amounted to 20% of the global population receiving treatment for HIV.

The HIV infection is a global epidemic that has affected the human population since 1983 when it was discovered (Barre-Sinoussi *et al.* 1983). Since the discovery there has been a significant incline in the number of individuals becoming infected with it. The statistics for sub-Saharan Africa indicate that there are 25.8 million HIV infected individuals in this region, and this region has the highest newly infected individual rate in the world (WHO 2016). South Africa, the epicentre of the epidemic, had 6.3 million

infected individuals at the end of 2013 and currently has the highest ARV treatment programme in the world (WHO 2016), although only 56% of infected individuals in South Africa are receiving ART (WHO 2016).

During 2015, a breakthrough in research was the introduction of pre-exposure prophylaxis (PrEP) to prevent future HIV infections in high risk populations (Bekker *et al.* 2016). PrEP therapy is a combination of pharmaceutical agents that is taken prior to exposure to the HIV in order to prevent the individual becoming HIV infected (Bekker *et al.* 2016). PrEP, which is a combination of tenofovir and emtricitabine (otherwise known by the trade name Truvada), can reduce the risk of an individual contacting HIV by more than 90% when involved in sexual relations (Bekker *et al*. 2016). PrEP therapy is thus a preventative measure that can be taken to prevent HIV acquisition (South African National AIDS Council 2017) and decrease HIV prevalence (WHO 2017).

The WHO (2015) guidelines for PrEP implementation state that for implementation to be successful adequate knowledge of PrEP needs to be communicated to community members to promote early HIV treatment and to identify high risk individuals to commence PrEP therapy. Therefor HIV services in the communities need to be expanded to promote accessibility and implementation of PrEP in the community. Notably, PrEP is offered to individuals as a choice, free of coercion and with information regarding prevention strategies to further decrease their risk of becoming HIV infected (Centers for Disease Control and Prevention, USA [CDC] 2018). Through cooperation communities have the capability to reduce the infection rate of HIV within individuals (WHO 2016).

In addition to PrEP, other preventative strategies that have already been put in place include the “ABC” campaign (Abstain, Be faithful and Condomize). The CDC (2016) states that the release of ART in the mid-1990s has contributed to a decrease in new HIV infections. Coates *et al.* (2009) suggests that there must be a behavioural change in individuals meaning that individuals should take necessary precautions to prevent themselves from acquiring HIV in the first place. The authors further point out the importance of post-exposure prophylaxis (PEP), which is taken after possible

exposure to HIV to prevent seroconverting of the individual in an emergency situation where an individual has been potentially exposed to HIV through rape, occupational hazard, sharing needles with a drug user or after having sexual intercourse.

The effectiveness of PrEP depends on the individual that takes the combination drug. As stated in the PROUD study conducted by McCormack *et al.* (2016), PrEP therapy users showed effectiveness compared to a placebo in decreasing the acquisition of HIV. Fonner *et al.* (2016) proved through a meta-analysis study that there is a noticeable decrease in acquiring HIV when utilising PrEP daily as prescribed, although there was no behavioural risk compensation noted in these individuals. PrEP has proved itself to be effective in decreasing the acquisition of HIV and therefore should be made available to communities that require the drug.

Since the introduction of PrEP therapy in South Africa there have been many articles published regarding guidelines for the initiation, identification of “high risk” individuals, and implementation of the therapy (Cohen & Baden 2012; Bekker *et al.* 2016; WHO 2015). The guidelines offer the medical team a framework to guide the initiation of PrEP therapy in high risk populations. The challenges with implementing PrEP therapy in the public sector is that primary health care (PHC) clinic systems are not well understood; it is expected that this research will shed light on the understanding of the personnel working in the clinics regarding the challenges they experience. This information will assist with the implementation of PrEP therapy in the KwaZulu-Natal (KZN) area.

PrEP as an HIV prevention strategy was introduced to assist in the fight against HIV infection. According to the WHO (2016), Truvada is to be taken by HIV uninfected individuals. During the IPreX trial, Grant *et al.* (2010) found that PrEP prevented up to 90% of HIV infection in the participants.

According to the DoH guidelines (Bekker et al 2016), the combination of tenofovir (TDF) and emtricitabine (FTC) can also be used as PEP. Pebody (2015) states that PEP therapy can be used in combination with other ART to decrease the risk of seroconversion after being exposed to HIV. PEP is initiated by a physician and

thereafter care for the individual is by nursing practitioners (Anova Health Institute 2016).

Wilton *et al.* (2015) state that one of the barriers to implementation of PrEP is the confusion of who is most suitable to prescribe it. PrEP delivery is best delivered at the clinic level but there is poor guidance and knowledge on this prevention strategy. Evaluating individuals' PrEP initiation and monitoring are the responsibilities of the nurse practitioner (Blackwell 2014).

In the light of the above studies this study was essential in order to understand the needs and challenges of the community and health care practitioners so as to facilitate the availability of PrEP to communities who need it. This research study focused on the development of a guide for the implementation of the South African PrEP therapy guidelines. The perceptions and challenges of the PHC nurses who deal with individuals at high risk for HIV infection and the initiation of PrEP therapy for these individuals in the KZN area will be explored to understand their perceptions of the PrEP therapy implementation. The PrEP therapy guide produced can be used by primary healthcare nurses to assist in the implementation of the guidelines for PrEP therapy in the KZN public sector PHC clinics.

1.3 PROBLEM STATEMENT

Guidelines are the essential foundation for health care delivery, planning, service, evaluation and quality improvement for all health care practitioners. According to Gagliardi and Alhabib (2015), guidelines are not always translated into policy or practice which contributes to the omission of beneficial therapies, suboptimal patient outcomes or a waste of resources. This emphasises the importance of research to identify barriers that influence the poor usage of guidelines and to tailor implementation strategies so that their impact can be optimised.

The identification of individuals at high risk of contracting HIV and providing them with treatment information is necessary to ensure effectiveness of the PrEP therapy programme. Studies have shown that the low uptake of oral PrEP therapy could be

due to structural, behavioural or psychological factors (Marrazzo *et al.* 2015; Van Damme *et al.* 2012).

The initiation of PrEP therapy for individuals at high risk of contracting HIV needs to be at service delivery sites that include an HIV prevention programme tailored to the needs of the key populations within the communities they serve. Additionally, human resources and affordability needs to be considered when PrEP therapy is initiated (Bekker *et al.* 2016). The DoH (2016) has set out guidelines for the implementation of PrEP therapy in the PHC clinics, however the implementation of PrEP therapy has not been observed in the clinics.

PrEP therapy is available in South Africa as stated previously in this research. PrEP therapy has proven itself to be effective in preventing the acquisition of HIV in individuals (Bekker *et al.* 2016). Therefore, it is essential that the guidelines for PrEP therapy initiation be followed and maintained to prevent an increase in HIV infected individuals in KZN.

This research is related to understanding some of the constraints to implementing PrEP therapy in the public sector in KZN PHC clinics. An implementation guide has been developed with the aim of assisting PHC workers to implement PrEP therapy in the PHC clinics thus preventing an increase in HIV infection rate.

1.4 AIM OF THE STUDY

The aim of this research is to understand the perceptions and challenges of nurses and medical practitioners that practice in PHC clinics, as well as those that are identified as high risk of contracting HIV infection regarding the implementation of PrEP therapy and to develop an implementation guide for the DoH guidelines on PrEP therapy in the KZN public sector PHC clinics.

1.5 OBJECTIVES OF THIS STUDY

The objectives of this study were to:

1. Describe the perceptions of the PHC nurses, medical doctors, support staff at PHC clinic and identified high risk individuals with regards to PrEP therapy.
2. Identify the challenges faced by PHC nurses and PHC doctors to PrEP therapy implementation.
3. Develop a guide to assist with the implementation of PrEP therapy in the PHC clinics in the KZN area.

1.6 RESEARCH QUESTIONS

1. What are the perceptions of PHC nurses, PHC doctors, support staff and hihj risk individuals with regards to PrEP therapy?
2. What are the perceptions of the high risk population for HIV acquisition regarding PrEP therapy?
3. What are the challenges being faced by PHC nurses and doctors with regards to PrEP therapy initiation?
4. what implementation plan could be developed for the DoH PrEP therapy in PHC clinics in KZN?
5. What can be done to assist the “high risk” population to commence PrEP therapy?

1.7 SIGNIFICANCE OF THE STUDY

Pre-exposure prophylaxis therapy is an additional prevention strategy that has been made available to South Africa in the form of a drug to prevent HIV infection of individuals that are HIV negative. According to Statistics South Africa (2018), KZN is experiencing a high HIV infection rate and needs to decrease the number of individuals being infected with this virus. This research is essential in understanding the perception and challenges that have been experienced with regards to PrEP therapy implementation in the public sector in PHC clinics in order to develop an implementation guideline that will take into consideration the challenges that are

experienced by both the medical staff and the community. This research can help to protect the high risk population in KZN area if the outcomes are implemented by the PHC clinics in KZN thereby preventing HIV infection and decreasing the burden of disease in the communities of KZN.

1.8 OPERATIONAL DEFINITIONS

The Human Immunodeficiency Virus (HIV) refers to a virus that causes AIDS (acquired immunodeficiency syndrome). Testing positive for HIV through blood identification of the HIV antibody means that the person has been exposed to the HI virus and become infected with it (Van Dyk 2013: 496).

Acquired Immune Deficiency/Immunodeficiency Syndrome (AIDS) refers to a virus that has entered the body and has attacked the immune system, making it weak against fighting of other pathogens which is detrimental to the wellbeing of the person (Van Dyk 2013: 493).

Immune system. This refers to the organs and processes of the body that provide resistance to infection and toxins. Organs include the thymus, bone marrow, and lymph nodes (Oxford Dictionary 2016).

Antiretroviral (ARV) refers to a class of drugs which inhibit the activity of retroviruses such as HIV (Oxford Dictionary 2016).

Antiretroviral therapy (ART) refers to drugs that are given to a person to suppress or prevent the replication of HIV in cells (Van Dyk 2013: 493).

Post-exposure prophylaxis (PEP) refers to methods that can be used to prevent HIV infection in a person that has been exposed to the HI virus. This treatment should be commenced within 72 hours of exposure to the HI virus to prevent the person from sero-converting to the HI virus (Van Dyk 2013: 499).

Pre-exposure prophylaxis (PrEP) refers to the use of antiretroviral medication to prevent HIV infection. Pre-exposure prophylaxis agents may come in the form of topical gels, rings, oral tablets and injectable formulations (Bekker *et al.* 2016: 2078).

Primary health care nurse refers to a specialist nurse practitioner who has an additional qualification in health diagnosis, treatment and care (South African Nursing Council 2012).

High Risk Individuals are individuals that are defined according to the DoH guidelines as being at high risk for acquiring HIV.

Support staff individuals that assist with the running of the organization by supporting the main memebers of the organization

1.9 CONCLUSION

HIV is a global concern since the discovery of the virus in 1983. Since then there has been strategies that were implemented to eradicate the world of the human immunodeficiency virus however new infections persist which calls for new strategies to assist in decreasing the amount of individuals being infected with the virus. This chapter focused on the introduction and background of the study. The problem statement, purpose of the study, the research question and the significance of the study was discussed as well as the definitions for operational terms. The following chapter will introduce and discuss the literature search .

1.10 THE LAYOUT OF THE THESIS

Chapter 1 – Introduction and background to the study

This chapter described the introduction, background and significance of this study. The research question, problem statement and the purpose of the study were presented.

Chapter 2 – Literature review

Review of literature related to the topic being investigated in this research so as to give the researcher a broader perspective of what has been published .

Chapter 3 – Research Methodology and design

In this chapter, the researcher explains the methodology and design used to describe the processes that were involved in obtaining the findings. This chapter focuses on the research design, research setting, study population, sampling process, data collection, data analysis and ethical considerations.

Chapter 4 – Results

Interviews were conducted during data collection, thus findings will be illustrated in this chapter. The researcher used grounded theory analysis.

Chapter 5 – Discussion of findings

In this chapter the findings are discussed in conjunction with the literature to support the findings.

Chapter 6 – Summary of this study, recommendations, limitations, conclusion and reflection

In this chapter, a summary of the study is presented as well as the recommendations and conclusion to this study. The reflective view from the researcher is also included in this chapter.

Chapter 7 – The implementation plan for DoH PrEP guidelines

In this chapter, the implementation guide for the DoH PrEP therapy guidelines will be discussed

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

Chapter 1 presented an overview of the study. This chapter presents a review of literature focusing on the HIVART, PrEP and PEP. This chapter puts the study into context by describing what is already published in domains pertaining to the research problem. It provides the framework of reference for the questions used during the interviews for data collection.

Since the discovery of the human immunodeficincy virus there has been an abundance of research published on the prevention and treatment of this virus (Elsinger & Fauci 2018: 413). The discovery of PEP decreased the number of incidences occurring worldwide but was not sufficient to eradicate the virus. Since PEP implementation, there has been a breakthrough in research resulting in PrEP and its introduction in 2015 to South Africa. PrEP as a therapy has proven to decrease the chance of acquiring HIV by up to 95% (even when exposed to the HIV) in HIV negative individuals (Grant *et al.* 2010). With the right method of distribution and adherence to PrEP therapy and the advised behavioural changes the number of individuals being infected and affected by HIV can be considerably decreased (Bekker *et al.* 2016).

The literature search was conducted using various search engines such as Science Direct, Nexus database system, ProQuest, Academic Search Complete, Springerlink, CINAHL, Medline, Ebscohost, Sabinet Online, Pubmed, Google Scholar, the worldwide web, e-books, theses and dissertations. Search words used included HIV/AIDS, ART, PEP and PrEP, guidelines and grounded theory

2.2 PREVENTION OF HIV

Preventative strategies of the HI virus have been made know through public media to prevent the spread of the virus. Currently, more means than ever are available to prevent HIV infection. Besides abstaining, limiting the number of sexual partners, never sharing needles and using condoms correctly every time when practising sex, medicines like PrEP and PEP can prevent HIV infection (CDC 2016).

AIDS-related deaths have been reduced by more than 51% since the peak in 2004. In 2018, 770 000 people died from AIDS-related illnesses worldwide, compared to 1.4 million in 2010 and 1.9 million in 2004, proving that prevention is successful against the virus infection. AIDS related mortality has declined by 33% since 2010 (WHO 2016).

2.3 HIGH RISK POPULATIONS

Populations that are at high risk of contracting the HIV have been identified by Simelela and Venter (2014: 251) and Van Dyk (2013: 41) as sex workers, men that have sex with men (MSM), truckers, adolescents, heterosexual men and others that do not have access to health care services. According to AVENT (2019), MSM have a 22% increased risk of contracting HIV. These authors also state that individuals exposed to poverty, unemployment, alcohol abuse, gender violence, teenage pregnancy and poor or no condom usage can be classified as at substantial risk.

According to the WHO (2016) guidelines for PrEP, PrEP should be initiated in HIV negative individuals at substantial risk of HIV infection. Substantial risk has been defined by WHO (2016) as “HIV incidence greater than 3 per 100 person-years in the absence of PrEP”. In 2012 PrEP was suggested for sero-discordant couples, MSM and transgender individuals. At a later stage, in 2014, people who inject drugs and prisoners were added to this population. Cowan *et al.* (2016) states that besides MSM, in South Africa the risk populations for HIV acquisition are: sexually active adolescent girls, young women, sex workers and discordant couples.

2.4 PREVALENCE OF HUMAN IMMUNODEFICIENCY VIRUS

2.4.1 Global prevalence of human immunodeficiency virus

Globally, almost 37.9 million people were living with HIV/AIDS in 2018. During 2018 an estimated 1.7 million individuals worldwide became newly infected with HIV. The global amount of people accessing ART was 23.3 million which is an increase of 8 million since 2010 (AVENT 2019) therefor HIV treatment access is crucial to the global struggle to distinct HIV/AIDS as a public health threat (The Joint United Nations Programme on HIV and AIDS [UNAIDS] 2018).

The majority of the HIV infections are found in low- and middle-income countries, of which South Africa is one. Sub-Saharan Africa hosts 70% of the total HIV infected individuals (UNAIDS 2018). Sub-Saharan Africa had 25.8 million infected individuals at the end of 2014. AVENT (2019) states that 25% of all new HIV infections are from eastern and southern Africa.

2.4.2 Prevalence of HIV in South Africa

South Africa is known to have the fourth highest concentration of HIV infected individuals with Lesotho and Swaziland (countries bordering South Africa) having the highest prevalence (Statistic South Africa 2018). The HIV prevalence rate in South Africa is estimated at 13,1% of the population. The total number of people living with HIV in 2018 was about 7.52 million. The total number of people living with HIV in South Africa increased from an estimated 4.25 million in 2002 to the 7.52 million by 2018. The total number of people living with HIV (PLWHIV) was estimated at approximately 7.97 million in 2019, with 19.07% of the population aged 15–49 years being HIV positive (Statistics South Africa 2018).

2.4.3 Prevalence of HIV in KwaZulu-Natal

Forty percent of the sub-Saharan population that is infected with HIV resides in KZN (UNAIDS 2016). The HIV prevalence among the population living in KZN is 18,23% (Statistics South Africa 2018). KZN is the province with the highest HIV prevalence and also the province with the highest new infection rate in South Africa. This is a clear indication that KZN carries a burden regarding HIV/AIDS and prevention strategies need to be successfully implemented.

KZN is the hub of the HIV epidemic in South Africa (Statistics South Africa 2018). The introduction of PEP in 1987 brought with it the hope of eradicating this disease. Promotion of PEP was implemented in conjunction with behavioural changes, increased accessibility to healthcare for treatment and counselling and education regarding the disease (UNAIDS 2016).

2.5 TREATMENT OF HIV INFECTION

At the AIDS conference in 2016 the ’90-90-90’ strategy was discussed. Pre-exposure prophylaxis therapy and the 90-90-90 strategy was introduced by UNAIDS (2016) to reduce the number of individuals infected with the HIV by 2030. The strategy was that by 2020, 90% of all people living with HIV would know their status, 90% of all individuals diagnosed with HIV patients would be on ART, and that 90% of people on treatment would have a suppressed viral load. HIV treatment is a critical tool that is used to minimise the spread of HIV but prevention is also an essential component to end the worlds HIV epidemic by 2030 (UNAIDS 2016). According to AVENT (2019) 79% of people living with HIV know their status and 62% are on treatment. Among those on treatment 53% are virally suppressed.

2.5.1 Antiretroviral therapy and HAART

ART consists of drugs that treat HIV infection. This therapy aims to slow down the progress of the HIV on the human immune system. Combination ART (cART) is also referred to as highly active ART (HAART) (WHO 2015).

HIV positive individuals have an increasing amount of the virus in their blood due to the virus replicating itself. If left untreated, the virus replicates itself to a point where it lowers the immune system of the infected individual so that the human body is not be able to fight off other pathogens due to a weakened immune system. ART assists in decreasing the HIV load in the body by preventing replication of the virus at different replication points (Van Dyk 2013).

ART restores immunological function so that the immune system functions effectively to prevent opportunistic infections. Once ART is initiated it prevents the replication of the HI virus thus preventing the destruction of the immune system. Additionally, ART improves the quality of life for an individual that has been infected with HIV. Quality of life decreases once HIV attacks the immune system and the body becomes susceptible to pathogens. The body is also weakened because of new and repeated infection and the infected individual is ill most of the time. ART assists with the quality of the infected individuals' life by maintaining a functional immune system and allowing individuals to carry on with daily activities and live a better quality of life (Cohen *et al.* 2013).

HIV attacks the individuals' cells at many points and it is the function of ART to block the actions of the virus in order to stop it from replicating itself. There are four main classes of ART which are: nucleoside reverse transcriptase and non-nucleoside reverse transcriptase (disrupt HIV at the early stage of invasion into the individuals cell; they inhibit the changing of RNA to DNA of the virus by interfering with the viruses reverse transcriptase enzyme), protease inhibitors (prevent formation of new HIV cells by paralysing the protease enzyme, this prevents the release of new HIV cells from the infected cell) and integrase inhibitors (prevent HIV DNA from entering into the host cell's nucleus thus preventing replication of the virus) (WHO 2016; Van Dyk 2015 111).

Furthermore, ART reduces AIDS related illnesses, sicknesses and death. Infected individuals that do not take ART have a greater chance of progressing to the last stage of HIV infection which is AIDS and generally do not have a good prognosis (Van Dyk 2013: 110; WHO 2016).

Monotherapy is not recommended when treating HIV infection. A combination of the different classes of ART i.e. HAART, is suggested for treating individuals infected with HIV. Various combinations of ART are available to treat HIV positive individuals. The following combination therapy guidelines are suggested by WHO (2016) when treating patients with the HIV infection:

- Two nucleoside reverse transcriptase inhibitors plus one non-nucleoside reverse transcriptase inhibitor, or
- Three nucleoside reverse transcriptase inhibitors, or
- Two nucleoside reverse transcriptase inhibitors and one protease inhibitor.

An important aspect of ART/HAART is to ensure that all infected individuals with HIV receive treatment and counselling timeously to ensure effectiveness of the treatment.

2.5.2 Post-exposure prophylaxis (PEP)

This section of the literature review discusses PEP. This is essential knowledge as the introduction of PrEP needs to have more of an impact on society than PEP in order to decrease the number of individuals being infected with HIV.

AZT was approved as a drug treatment for AIDS in 1987. Healthcare workers are constantly at risk of being infected with HIV due to their work. These HIV exposed workers were given AZT to prevent seroconversion. This treatment dramatically decreased the incidence of seroconversion among health workers (Cardo *et al.* 1997). In addition, Shih *et al.* (1991: 262) proved that AZT dramatically decreases seroconversion to prevent transmission of HIV infection post-exposure including mother to child transmission.

Accidental exposure to HIV, in the case of a healthcare worker being expose to HIV in the work situation or anybody in the case of sexual abuse or rape, should result in the individual taking PEP. PEP is effective in this case if it is taken within 72 hours of exposure to the virus. A course of 28 days should follow the initial dose. This protocol reduces the risk by 80% of becoming HIV positive or seroconverting (HIV.gov 2018).

Non-occupational post-exposure (nPEP) treatment, for example rape, should be considered after establishing the exposed individual's HIV status. If rapid HIV blood test results are unavailable, and nPEP is suggested, nPEP should be initiated immediately. In such a case treatment can be withdrawn if the source is later proven not to be HIV infected (CDC 2016). nPEP is recommended when the source of the body fluids is known to be HIV-positive and the reported exposure presents a substantial risk for transmission and it is not recommended when the reported exposure does not hold a considerable risk of HIV transmission. Treatment should be sought less than 72 hours after potential exposure and should be prescribed as a 28-day course of a 3-drug antiretroviral treatment (CDC 2016; WHO 2016).

Long term usage of ART/HAART should not be confused with PEP which is used as a post-exposure prophylaxis for only 28 days. ART/HAART is taken by an individual that is found to be HIV positive and is advised to continue with lifelong HAART (Van Loggerenberg *et al*. 2015).

2.5.3 Pre-exposure prophylaxis (PrEP)

PrEP is an ART treatment that is prescribed to HIV negative individuals to prevent HIV infection. This therapy increases the immunity within the body to defeat HIV when exposed to it therefore prevent seroconversion after exposure to HIV. The individual has to be compliant with taking PrEP in-order to maintain high levels of the ART. It comes in the form of a daily dose of ART that is taken orally.

The drug combination that is registered as PrEP in South Africa is tenofovir and emtricitabine, known under the brand-name Truvada (CDC 2016). PrEP, which is a combination of tenofovir and or emtricitabine or zidovudine and lamavudine and atazanovir or lipinavir can be used for adults (DoH, KZN accessed 2016). Venter (2018) and Pebody (2015) claim that PrEP has many positive outcomes that will be discussed below. High PrEP activity was noted after a week of one daily PrEP treatment in MSM (Seifert et al 2015). Adherence to PrEP is essential to maintain high levels of the drugs to prevent seroconversion of the HIV.

PrEP provides appropriate levels of ARVs in the bloodstream. If exposure occurs, the ARVs stop the virus from replicating and entering the cell of the individual. This in turn keeps the individual HIV negative. PrEP can also be used intermittently, and can be used when needed by an individual and the individual can choose to stop taking the therapy when they are no longer at risk (Bekker *et al.* 2016: 1). It must be noted that when PrEP is taken intermittently the risk for HIV infection will increase substantially (WHO 2015).

Grant *et al.* (2010) suggested using a combination of tenofovir and emtricitabine. Their research revealed a reduced risk of 44% in MSM and transgender women. Okwundu *et al.* (2012) agree and claim found a reduction of risk in becoming infected with HIV if one is taking PrEP and there is adherence to the drugs. McCormack *et al.* (2016) confirmed that the combination of tenofovir and emtricitabine has a high protection against HIV. Besides MSM, Wilton *et al.* (2015) found that in individuals that inject drugs and take daily doses of tenofovir or the combination of tenofovir and emtricitabine increased the efficacy of PrEP and decreased the risk of contracting HIV.

Adherence to PrEP has proven to be beneficial to the individual in preventing HIV transmission when exposed to the virus. As per De Man *et al*. (2013), individuals on PrEP need to be monitored, especially those on long term use, to ensure that they are protected from side effects of long-term usage and adhering to the PrEP. Ware *et al.* (2012) stated that partners that are in a stable relationship have better adherence better to PrEP than those in an instable relationship.

Individuals that have been commenced on PrEP should change their behaviour and use protective mechanisms (e.g. condoms and a decreasing in the number of sexual partners) to prevent them from getting infected with HIV. Volk *et al.* (2015) stated that taking PrEP influenced 15% of the participants to decrease their number of sexual partners and hence behaviour change was also established.

Sharma *et al.* (2014) recommends that the following be taken into consideration when prescribing PrEP: adherence, tolerability, development of drug resistance, cost

effectiveness, risk compensation and change in behaviour (individuals may see taking PrEP as a decrease in risk). Drug resistance should also be considered. According to Abbas *et al.* (2011), individuals taking PrEP need to be monitored for HIV status to decrease drug resistance. A simulation study was conducted to assess the impact of PrEP on HIV and drug resistance on the sub-Saharan epidemic. Results showed that individuals that were taking PrEP and were infected with HIV had a high prevalence of drug resistance from PrEP. Adherence to the treatment is a barrier and condom usage can stop if PrEP is available (Young *et al.* 2014).

PrEP is not a life-long treatment. According to WHO (accessed in 2016), PrEP is used for individuals that are at a high risk of being infected with HIV for a period of time. In comparison to PEP users where ART is taken chronically and is taken with a prolonged treatment plan, PrEP need only be taken by an individual while they are at high risk of contacting the HIV. Therefore, PrEP can be cost effective with regards to treatment cost. The ultimate goal is to reduce the infection rate of HIV and increase usage of ART in those individuals that are HIV infected to promote healthy living and reduce the risk of spreading the virus by keeping the viral load low (DoH 2019).

2.6 OUTCOME OF HIV TREATMENT

An infected individual's viral load should decrease six to eight weeks after commencing anti-retroviral therapy. If the viral load decreases in this period, the treatment is effective (WHO 2016). If the viral load does not decrease, an alternative regime is required. As previously stated, the outcome of HAART is for an individual to have a prolonged life even though infected with HIV; however, adherence is essential in order to maintain a low viral load. If the viral load remains low the human body is able to fight off infections and maintain good immunity to pathogens.

Adherence to HAART and retention in care is essential when an individual is on anti-retroviral therapy. According to Van Loggerenberg *et al*. (2015), for ART/HAART to be effective, 95% adherence is needed. Inadequate drug levels can lead to drug resistance and serious consequences for the individual's treatment programme – an infected individual can spread the resistant strain of HIV to more individuals if they

become exposed to the HIV infected individuals' blood and/or bodily fluids. The therapy of a drug resistant strain individual needs to be changed in order for it to be effective.

Georgeu *et al.* (2012) demonstrated that nurse initiated and managed antiretroviral treatment (NIMART) was accepted by nurses. They had the confidence to deliver ART/HAART successfully. This was done with the support of clinical guidelines and clinical training, allowing for telephone enquiries between nurses and, and nurses were visited and supported on a regular basis. This study reflects that with the proper guidelines and support NIMART was a success.

Individuals that have become infected with HIV and have started ART treatment need to ensure that they have continuous access to ART to ensure that they maintain their adherence.

2.7 CHALLENGES IN THE USE OF ANTIRETROVIRAL TREATMENT

Individuals that receive PEP treatment need to consider the cost of transport to clinic, time away from work, alcohol use, lack of counselling, long waiting hours for results, stigma attached to ART/HAART and PrEP and users fees for patients (Van Loggerenberg *et al.* 2015). These negative factors contribute to poor adherence to ART.

Arnold *et al.* (2012) add that monitoring PrEP is a problem. Besides interviewing and counselling individuals on PrEP, further training for clinic staff and physicians need to be provided for PrEP implementation to be successful and the medical system needs to be addressed. Poor agreement between the clinical protocols regarding PrEP, public health infrastructure that does not accommodate PrEP, and insufficient community education and provider training can lead to the downfall of PrEP implementation.

As per Liu et al (2014) increasing knowledge of PrEP amongst potential users is key in implementing PrEP. According to Kurtz and Buttram (2016), there has been no

health campaign to promote PrEP. The study conducted on MSM showed that half of the participants in a focus group had heard about PrEP and the dosage. Participants that had heard of PrEP could access it from the street market and it was generally used as a morning after pill. The lack of knowledge once again leads us to the conclusion that there is a need for education for not only the health care providers but also the public.

Marcus *et al.* (2014) suggested that researchers involved in PrEP consider a multi modal intervention that supports pill taking as a daily routine, education about PrEP, feedback on medication adherence, and the importance of adherence. A multi-component package should include: PrEP drugs, safety monitoring, behavioural intervention and monitoring of effects of individuals taking PrEP. This type of package, according to Underhill *et al.* (2010), should be implemented in clinical practice to optimise PrEP. In agreement with this, Amico *et al.* (2016) add that adherence should not be the only factor that contributes to PrEP success, rather there should be a host of other preventative tools to go along with it. Similarly, a study conducted by Toledo *et al.* (2015) shows that in order to have satisfactory adherence to PrEP there needs to be pre-enrolment education, myth reduction counselling, side effect symptom monitoring, gauging of personal interest of the individual, and development of a social network. Similarly Bekker *et al.* (2016: 4) states that a guideline needs to incorporate the following: an explanation of what PrEP is, an outline of the current indications for PrEP usage, an outline of the steps for appropriate user selection and guidance on how to monitor and maintain PrEP usage.

PrEP has been implemented at clinics, however there are limited studies on the success of PrEP initiation and maintenance in high risk individuals (Wilton *et al.* 2015). Barriers that need to be addressed for PrEP uptake are awareness and knowledge, negative attitudes and opinions, cost, safety, risk compensation, lack of guidelines, and confusion of health care providers as to who is best to prescribe PrEP. PrEP must be delivered in a setting where other methods of prevention can be re-enforced and regular testing and monitoring of the individual on treatment can be done (Molina *et al.* 2015). Govindasamy (2012) similarly identified the need for an intervention for pre-ART retention of patients in sub-Saharan Africa where the need to enroll more

individuals is essential. However, the study found that there was a shortage of nursing staff, transport costs for the patients to visit the clinics were too high, and waiting periods were too long for patients to see medical staff.

Although guidelines for PrEP implementation and usage have been developed, according to Eakle *et al.* (2013) there is a need for operational research in order to validate its effectiveness. PrEP guidelines need to be revised and expanded to incorporate other populations such as transgender persons, heterosexual men and women, HIV serodiscordant couples, and people who inject drugs and thus not be solely directed to MSM (Bekker *et al.* 2016: 3).

Medical and nursing practitioners need to promote the usage of PrEP as they are the medical personnel that interact with the prospective high risk individuals. However, if medical staff are not comfortable with prescribing PrEP, this could be detrimental to the individuals that actually require the treatment. Sharma *et al.* (2014) state that only 45.5% of physicians were willing to prescribe PrEP out of 86 responses received from on an online survey. It stands to reason that medical staff need to be trained on PrEP and there needs to be guidance and support to staff so that they can provide a holistic service to the population (WHO 2016).

According to the Anova Health Institute (2016), the long term efficacy of PrEP has not been established yet and there is no knowledge of whether resistance will be a common event among individuals that become infected with HIV while on PrEP treatment. Besides the side effects that have been identified, an individual's renal function, HIV status, hepatitis screen and sexually transmitted infection (STI) screen has to be conducted prior to initiation of medication as PrEP effects the kidneys and the liver. Individuals can also present with an allergy to tenofovir or emtricitabine which means that it is not an option for this group of individuals (Anova Health Institute 2016). WHO (2016) guidelines for PrEP expressed concern that the implementation of PrEP could lead to threatening the effectiveness of the already well-established prevention interventions (namely condom usage). Finally, there also could be a stigma attached to an individual starting PrEP, depending on how the implementation is done.

2.8 ACCESS TO TREATMENT

PrEP should be available at all government clinics and hospitals in KZN. According to the South African Department of Health (2019), there is a need to upscale and accelerate HIV treatment in combination with prevention as well as the provision of PrEP.

After the HI virus has entered the individual and has infected the body, the individual has to go on lifelong antiretroviral treatment. Sub-Saharan Africa accounted for 66% of all new infections of HIV in 2015, and the estimated number of individuals infected with the HIV worldwide was 37 million individuals. Of that population, only 15.8 million individuals are receiving ART and more specifically in South Africa there are 3 078 570 individuals that were receiving ART which amounted to 45% of the HIV infected population (WHO 2016). This clearly indicates that there is a need to get more ART out to the infected population.

In 2003 South Africa started a five-year ART programme and by 2008 it was the largest ART programme world-wide. As a result of the programme, in 2010, 1.6 million individuals tested for HIV and 800 000 adults and children started ART. The government supplies ARVs to infected individuals at no cost to public sector patients once their CD4 count falls below 350 (CDC 2016).

2.9 THE NEED FOR PrEP THERAPY GUIDELINES

According to the CDC (2016), guidelines and policies need to be in place to ensure there is guidance and reassurance for distribution of the drugs in the PrEP programme. Arnold *et al.* (2012) showed that there was a poor demand for PrEP and that there needs to be a model that takes into account the monitoring of side effects and adherence to PrEP. According to Cohen *et al.* (2012) health care providers that prescribe PrEP need to have a management plan regarding the patients' sexual behaviour, safety and well-being.

Bekker *et al.* (2016) developed a guideline that can be used for the implementation of PrEP therapy. The main aims of the guideline are: discuss what PrEP is, outline the indications for PrEP, outline steps that need to be taken to identify appropriate users, and provide guidance to, monitor and maintain PrEP users. These authors further discuss the contraindications of PrEP and the need for education for the health care workers and PrEP users in order for the treatment to be successful in decreasing the number of individuals being infected with HIV (Appendix I contains the guideline developed by Bekker *et al* (2016).

The CDC (2016) offers guidance on the implementation of PrEP. There is no further information as to why PrEP therapy has not been implemented to date.

2.10 THE ROLE OF THE PRIMARY HEALTH CARE NURSE IN PrEP THERAPY

Primary health care nurses based in the PHC clinics in KZN should be the first to examine and initiate therapy especially in the rural areas where there are no general practitioners available. NIMART was part of a major strategy initiated by the government for the plan to ensure that all healthcare institutions in the country are ready to receive and assist patients with regards to HIV care (Colvin *et al.* 2010). However according to Colvin *et al.* (2010), the major load shift onto nurses increased the stress and pressure on them and with the short staffing issue, this has created work overload. This has a major impact on the rollout of PrEP therapy as PHC nurses will be the leaders in identifying possible individuals for therapy and initiating therapy.

Nurses are unable to prescribe medications as per the legal framework set out by the South African Nursing Council (1991) but the solution to this was “Streamlining tasks to expand treatment and care” (STRETCH). Guidelines were given to nurses on specific initiation and management of patients on therapy and if there was a complex patient that could not be dealt with at the clinic then that patient would be referred to the doctor. Nurses received training on guidelines, re-prescription of drugs and nurse initiation of medication. Clinical support was seen as an important part of these strategies to maintain those guidelines (Colvin *et al.* 2010; Bekker *et al.* 2016; Georgeu *et al.* 2012). PHC nurses should be supported in the clinical environment by receiving

training on PrEP and offered guidelines to assist in their line of duty while initiating PrEP therapy and educating the public about the availability of the therapy.

2.10.1 The impact of knowledge, perception and experiences of primary health care nurses on PrEP therapy

The responsibilities of the nursing practitioner in the clinical setting is set out by the legal framework which enables the nursing practitioner to perform numerous roles to assist a patient as per South African Nursing Council regulation R2598 (1991). A specialist nurse is identified by South African Nursing Council (1991) as a nurse that has in-depth knowledge and practice in a primary health care setting. According to Blackwell (2014) the evaluation of a patient for PrEP, monitoring of the patient on treatment and initiation of the treatment is the responsibility of the nursing practitioner. The healthcare provider that initiates PrEP treatment for an individual needs to consider a plan for the individual with regards to an intervention for sexual behaviour, safety and well-being of the individual (Cohen and Baden, 2012). PrEP adherence has been poor in African countries and it could be due to stigma (Pebody 2015). Similarly, PrEP uptake in UK is slow and Pebody (2015) add that there could be a lack of awareness, side effect concerns, stigma of PrEP users and resistance from medical officers to prescribe it. Similarly, Fernandez-Montero *et al.* (2012) identified the following considerations when implementing PEP, namely, the cost factor, drug related adverse effects, drug interactions, drug resistance and ethics of human relationships.

The WHO guidelines for PrEP implementation (2016) state that the needs of the community must be met and in order for this to be done, adequate knowledge of PrEP needs to be given to the community to promote early treatment and to identify high risk individuals to start PrEP therapy. Also, services in the communities need to be expanded to promote the implementation of PrEP. Importantly, PrEP is offered to individuals as a choice, free of coercion together with access to prevention strategies to further decrease their risk of becoming HIV infected.

2.11 CONCLUSION

HIV has impacted on the world by increasing the mortality rate. Many individuals infected with HIV have to go on chronic medication which has impacted the medication budgets of the state. Individuals infected with HIV are more prone to other medical conditions due to the lowered immune system. Measures to decrease the rate and number of people infected with the HIV has not been as successful in some areas compared to others. Although the introduction of PEP along with prevention campaigns has led to a decrease in the number of incidents of HIV infection, it has not eradicated the infection completely and as a result Africa has one of the most infected populations in the world.

With the great success of PrEP, which has already been proven with numerous studies, it is hoped that if initiated properly and followed through that HIV will become an infection of the past. PrEP like any other medication has its downfalls and, because it is a new drug on the market, it is not known what the long term side effects will be and one cannot be sure that individuals will take less precautions to prevent HIV infection because they are on PrEP. These questions can only be answered in time and only if individuals who are identified as high risk individuals take the PrEP as prescribed.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

Chapter 2 provided a broad view of what has been published in this field. This chapter gives a detailed description of the methodology used to achieve the set aim and objectives of the study.

Based on the nature of the research problem and questions that needed to be answered, the works of Charmaz (2006) was used to guide the researcher. Charmaz's interpretation and explanation of grounded theory best suited this study. A short discussion on the development and evolution of grounded theory by Glaser and Strauss (1967), as well as the limitations of grounded theory design, are presented below. There will be reference to 'old' literature to ensure the underpinnings of Grounded Theory is understood.

3.2 RESEARCH AIM, OBJECTIVE AND QUESTIONS

This research aimed to understand the perceptions and challenges of PHC nurses, and medical practitioners that practice in PHC clinics, and individuals at high risk of contracting HIV infection, regarding the implementation of PrEP therapy with the aim of developing an implementation guideline for the DoH guidelines on PrEP therapy in the KZN public sector primary health clinics.

The objectives of the research were to describe the perceptions of the PHC nurses, medical practitioners and identified individuals at high risk contracting HIV with regards to PrEP therapy that have been identified by the researcher or referred to by a research participant. Secondly the influences in the implementation of the DoH PrEP guidelines were identified followed by the development of a guide to assist with the implementation of PrEP therapy in the primary healthcare clinics in the KZN area.

This research was directed by the following research questions:

1. What are the perceptions of PHC nurses , PHC doctors, support staff and hihj risk individuals with regards to PrEP therapy?
2. What are the perceptions of the high risk population for HIV acquisition regarding PrEP therapy?
3. What are the challenges being faced by PHC nurses and doctors with regards to PrEP therapy initiation?
4. what implementation plan could be developed for the DoH PrEP therapy in PHC clinics in KZN?
5. What can be done to assist the “high risk” population to commence PrEP therapy?

3.3 THE PHILOSOPHICAL UNDERPINNING OF THE STUDY

Qualitative research is rooted in an interpretivist philosophical position, seeking to understand how the social world is interpreted, understood, experienced, and produced (Charmaz 2014). According to Creswell (2009: 15), qualitative research is: “An inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem”. The researcher shapes a complex, holistic picture, analyses data and conducts the study in a natural setting to report detailed views of participants (Charmaz 2014: 14). The focus of qualitative research is on developing an understanding of people’s perception and construction of their existence as meaningful processes, the interaction with one another and the interpretation of those interactions in the context of the social world, as well as the importance of observation in “natural” settings as opposed to the laboratory.

An inductive approach to conducting qualitative research was suitable for this research, as it seeks to establish an understanding between the research objectives and the summary findings derived from the data collected during interviews. Grounded theory is one of several interpretive approaches. According to Strauss and Corbin (1990) grounded theory is used in studies to analyse and understand complex.

Grounded theory, as a qualitative research method, seeks to explore and develop a detailed understanding of a phenomena (Charmaz 2014).

An in-depth description of grounded theory follows in the next sub-section.

3.3.1 Four elements of the research process

The four elements of the research process, as described by Crotty (1998), was used to frame this study (Figure 3.1). These elements are: epistemology, theoretical perspective, methodology and methods. According to Crotty (1998), methods is the procedures or actions used to gather data and the analysis thereof focussing on the research questions, whereas methodology is the strategy, plan of action, design underlying the choice and selection of specific methods to collect the data and describe the result. The theoretical perspective the philosophical approach informing the methodology, providing reasons and principles to form a framework for the process. Epistemology is defined as the theory of knowledge rooted in the theoretical perspective and thus in the methodology.

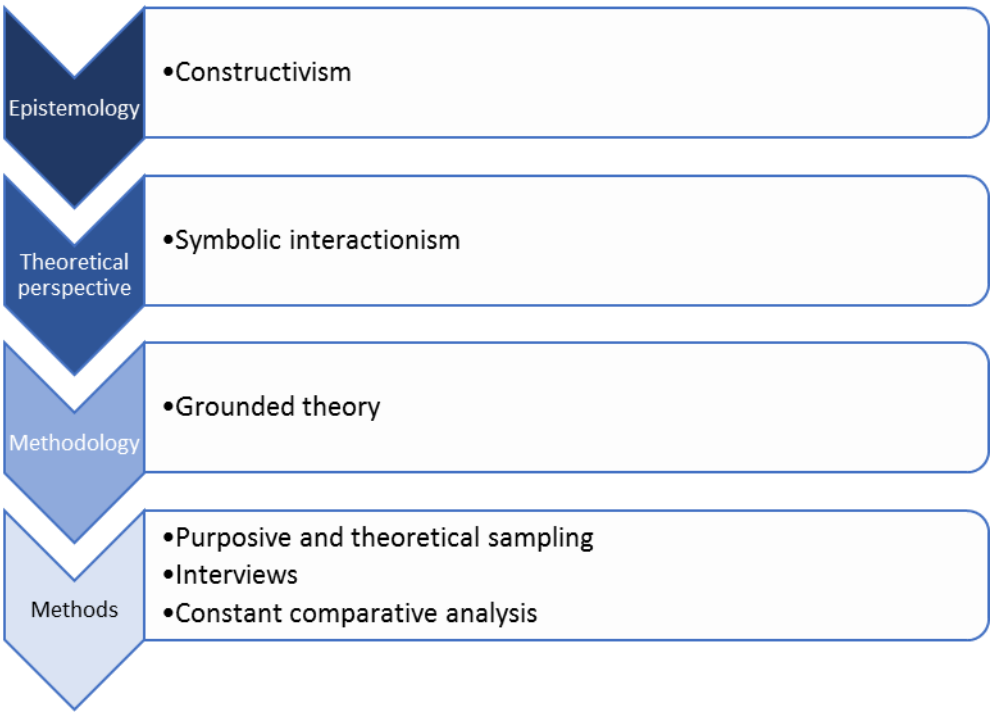

Figure 3.1: Research model based on Crottys' four elements of social research
Source: Crotty (1998)

A description of each element and the application thereof as applicable to this research follows below.

3.3.1.1 Epistemology: Constructivism

Epistemology is known as the study of knowledge which Crotty (1998: 3) explains as "a way of understanding and explaining how I know what I know". According to Maynard (1994: 10) and Hamlyn (1995: 242), epistemology presents a philosophical grounding for determining what kind of knowledge is likely to be acceptable and real. Therefore, it is necessary to identify, explain and justify the epistemological stance that is adopted. It is all about making significant logic of the world one is living in (Levers 2013: 3). Crotty (1998: 8) described a range of epistemologies, but for this research constructivism was the best suited epistemology.

Constructivism is a means of understanding and explaining what an individual knows. Elkind and Flavell (1969) view constructivism as the perception that reality is a result of human intelligence interacting with experience in the real world. Strauss and Corbin (1998) argue that constructivism is used to explain a phenomenon, using a constructivist approach when collecting and analysing data.

A constructivist approach to making meaning of the perceptions of PrEP therapy as experienced by PHC nurses, doctors, support staff and individuals at high risk of contracting HIV was an appropriate approach in this study. The constructivist approach allowed the researcher to construct meaning from the voices of the participants and develop guidelines rooted in the participants' experience.

In a grounded theory study, the researcher and the object of investigation are interactively linked and therefore the findings of the study are created as the investigation proceeds (Charmaz 2014: 31). It is the role of the researcher to discover the truth that lies within the object of the investigation and to discover data and the theories that it implies (Charmaz 2006). As a constructivist Charmaz (2014: 33) mentions that priority should be placed on the phenomenon under study where both data and analysis are created from shared experiences and relationships with participants and other sources. In the current study data collection and the analysis of

the interviews was conducted simultaneously using a constant comparison methodology. The researcher constructed meaning from participants own words through constant comparison with earlier interviews.

The researcher was the sole investigator and directly interacted with the research participants. The researcher was able to search and explore how the research participants constructed their realties and knowledge. Within the margins of grounded theory, the researcher was able to collect and analyse data from the research participants simultaneously (this is further explained in 3.7). In addition, the research was conducted in the PHC clinics where the participants were working and so in their natural setting.

3.3.1.2 Theoretical perspective: Symbolic interactionism

Symbolic interactionism is one of several theoretical perspectives that explains human conduct (Denzin 2014). Symbolic interactionism is a theory explaining that people make sense of their world through the interaction of language, experience with people and things (Blumer 1969). Aksan *et al.* (2009) claim people live equally in the natural and the symbolic environment. Therefore, meanings are continuously created and recreated through the interpreting of processes during interactions with others, and how we interact with all that surrounds us gives us an experience which we can interpret. Therefore, as we grow with experience and interaction we make meaning of the experience within a context (Blumer 1969). Similarly, Aksan *et al.* (2009: 903) state that symbolic interaction theory hold the view that people live both in the natural and the symbolic settings. Symbolic interaction is a process where meanings are created through mutual interaction between people.

Symbolic interactionism aims to make sense of how an individual makes sense of their world from their perspective, rather than how social institutions define and impact individuals, that is to say, “how repeated meaningful interactions among individuals come to define the makeup of society” (Carter & Fuller 2015: 2). It further contends that people can and do think about their actions, rather than just respond in a mechanistic way to external stimuli (Charmaz 2014).

A researcher, in analysing data, uses their past and present involvements and interactions with people, perspectives and research practices to construct realities and meanings (Charmaz 2006). The researcher, in the current study, was able to interpret the participants experiences with PrEP therapy keeping in mind that humans act toward things and people based on meanings they assign to them. These meanings come through experience of interaction between humans. Through an interpretive process the researcher constructed a new understanding of the participants' perceptions and challenges with PrEP therapy which in turn was used to develop a guide for the implementation of the DoH guidelines.

3.3.1.3 Methodology: Grounded theory

Methodology refers to a plan of action that links the researcher's choice of methods to the desired outcome of the research study (Crotty 1998: 3). The research design selected for this qualitative research was grounded theory.

Historically, grounded theory refers to a "general method of [constant] comparative analysis" (Glaser and Strauss 1967). This exploration of grounded theory starts by looking at the ideas of the pioneers of grounded theory, Glaser (1930 - present) and Strauss (1916-1996), before moving on to Kathy Charmaz's constructivist grounded theory.

The grounded theory approach as expounded by by Glaser and Strauss in the early years is used by qualitative researchers to explore social practices when they occur within human relations and are rooted in ontological critical realism and epistemological objectivity (Annells 1997: 122; Speziale and Carpenter 2007: 133). Glaser and Strauss (1967) argued that actual data can be derived from enquiry into the social world. The researcher should start with a general topic and data will be sourced according to the topic.

Traditionally, the goal of grounded theory was to "fit and work and explain a process" (Charmaz 2014: 18), and the level of understanding of those taking part in the process.

The “fit, work and the level of understanding thereof” were the indicators of the accuracy of the theory. The goal of the traditional grounded theory was thus to clarify a basic social process (Charmaz 2014: 18).

Since the development of the grounded theory design, many researchers have made use of grounded theory as a research design hence the original theory became just one of many grounded theory approaches. Charmaz takes the stance that there are numerous social realities within an empirical world. Charmaz (2006) retained the key inductive grounded theory approaches of grounded theory but moved away from the objective position of the researcher and moved toward the acknowledgement of the researchers’ role in analysing data and the construction of the theory.

Charmaz (2000) states that the original position of Corbin and Strauss (2008) was that of an objective researcher, representing external reality as “accurately as possible”. This aligned with ontological critical realism and epistemological objectivity. Charmaz (2014: 14) takes the approach that grounded theory is a “systematic, qualitative procedure that researchers use to generate a general explanation that explains a process, action, or interaction among people”. As already stated, this approach was drawn to the constructivist view of grounded theory by Charmaz as her view offers a coherent method of analysis and reflexivity in the research process. Charmaz (2014: 232) emphasises shared experiences and relationships with participants and other sources of data in assisting the researcher to create new knowledge and theoretical interpretations.

The aim of grounded theory is to develop a substantive theory that is grounded in data that a researcher can use to build their own theoretical analysis of what is discovered, meaning that grounded theory enables the researcher to collect data, identify categories and connect these categories to form a theory which can be explained by the researcher (Charmaz 2014). Grounded theory involves the collection of data from research participants in a specific manner to ensure that the researcher collects as much information about the phenomena that is being studied as possible. New data that is collected must be constantly compared to previous data collected and analysed to assess whether the interview questions must be adjusted to get more information

out of the research participants to ensure that no information is missed by the researcher (Speziale & Carpenter 2003; Charmaz 2006). Grounded theory also involves how data is constructed through our past and current interactions with other people in order to form a view of the world as we see it.

3.3.1.3.1 Constructivist grounded theory

Charmaz's work was chosen to direct the method for this research because her work resonates with examining the experiences of people. The work of Charmaz (2014) stresses the importance of participants' voices in research and acknowledged constructivism in the process. This gave the researcher the opportunity to thoroughly explore and understand the perceptions of the PHC nurses, doctors and the individuals at high risk of contracting HIV with regards to PrEP therapy and to develop an implementation plan for the PrEP guidelines.

Charmaz (2014) used the term "constructivist grounded theory" in order to distance her theory from those of her predecessors, namely, Strauss, Glaser and Corbin. Charmaz critically selected the positive lessons of the early writings of her predecessors while at the same time retaining and building on some of their central ideas. Charmaz's constructivist approach was different from the social constructionism of the 1980s and 1990s; she argued that her predecessors failed to acknowledge the "processes of construction of the research and the structural and situational encroachments on it" (Charmaz 2014: 14). Charmaz further argued that creation of new knowledge has to take into consideration the social context and social worlds in which it is constructed. It is through these social interactions that researchers and participants can generate, "interpretative understandings" and develop new knowledge (Charmaz 2014: 14). The term "constructivist" was used to acknowledge subjectivity and the researcher's "involvement in the construction and interpretation of data" (Charmaz 2014: 13).

Charmaz's approach to grounded theory offers a coherent method of analysis while at the same time stressing general principles and flexibility rather than "formulaic

prescriptions" (Charmaz 2014: 3). The following are the general principles of this approach:

- **Linking the subjective with the social**

An important principle of using Charmaz's constructive grounded theory approach is to involve diverse human voices and experiences of people who have done the actual work within the social world (Charmaz, 2000; 2006; 2014). Making use of a constructive grounded theory approach, researchers need to be aware of the research setting as well as the lives of the participants. In-depth interest should be paid to meanings, understandings, and stories of the participants, because their collective and personal stories provide an in-depth understanding of the research problems as well as social issues (Charmaz 2014: 239). The researcher conducted interviews with the research participants in the PHC clinics, allowing participants to express themselves freely in their own environment.

Grounded theory aims to create a link between the subjective and the social, to value both the "micro and macro levels of analysis" (Charmaz 2014: 241). Combining interpretative and positivist assumptions about knowledge production creates insights from experiences lived by others, as well as outside reactions of structure, power, value and ideologies. Therefore, constructive theories are rooted in the views and experiences of the participants, as well as other deeper issues and their consequences.

- **Knowledge co-construction**

The social world is where knowledge is created and exists (Charmaz 2014). Symbolic interactionism refers to people that create their own meanings of life and act on them based on their interpretation, the way they are living and the world that surrounds them (Carter & Fuller 2015: 2). People have a tendency of developing subjective understandings through lived experience within "temporal, cultural, and structural contexts" (Charmaz 2000: 524). Charmaz further asserts that the social reality is multiple, therefore the researcher seeks to understand the meaning of the social reality through lives of the research participants. The participants shape their own

social world which must be understood by the researcher in-order for him/her to understand the phenomena that is being studied.

- **Limitations and positive aspects of grounded theory**

The value of grounded theory comes from its principle of avoiding assumptions and adopting a more neutral view of human action in a social context (Simmons 2006). Grounded theory can respond and change as conditions that affect behaviour change. It also provides a methodology that makes it easier to develop a proper understanding of the social phenomena (Engward 2013). It is best to use grounded theory when conducting an exploratory study because it is better at determining what actually happens (Simmons 2006).

Grounded theory has the advantage of producing an in-depth description of the elements being explored while acknowledging areas of conflict and contradiction (Milliken 2010). As an exploratory method, grounded theory is particularly well suited for investigating social processes that have attracted little prior research attention, where the previous research is lacking in breadth and/or depth, or where a new point of view on familiar topics appears promising (Milliken 2010).

Having provided a brief view of the possibilities of using grounded theory, the limitations of this theory also need to be highlighted. Myers (2009) is of the view that novice researchers can become inundated at the coding level with grounded theory, as open coding is an intense, tiring and extensive process. Furthermore, grounded theory generates lower level theories that have multiple limitations (Myers 2009). Grounded theory is a laborious process and needs an available mentor to assist novice grounded theorists in their journey of inquiry (Annells 1997: 177).

3.3.1.4 Methods

Methods refer to the procedures or actions used to gather data and the analysis thereof, focussing on the research questions (Crotty 1998). The methods used in this study will be discussed below.

3.4 STUDY SETTING

Data was collected in five public sector provincial PHC clinics who are involved in HIV prevention programmes, initiation of HIV treatment and HIV counselling and testing (HCT). These sites were selected as they covered a broad geographical area and offered HIV services to individuals that required assistance with regards to HIV. The clinics below were included in the data collection.

Poly Clinic A: This clinic is located in an urban area and serves both the rural and urban population, serving the 600 000 people that reside in the catchment area (City Population 2013). Professional nurses assess individuals attending the clinic for their PHC needs and refer them to the PHC doctor if necessary. The PHC doctors may also refer patients to a medical specialist should the need for specialist treatment arise. Such patients are referred back to the clinic once they are stable. Included in their service to the public is HCT as well as health education and reproductive health. They offer a full spectrum of HIV services to the public. Patients can also attend the clinic should they have minor ailments or a PHC issue.

Gateway Clinic B: This clinic is situated in a densely populated, rural area of the Ethekwini Health District, North Sub-District. This clinic serves approximately 160 000 people that reside in the catchment area and has a geographical area of about 5 915/km^2 (City Population 2013). The services offered at this clinic include: HIV/AIDS wellness programmes, HCT, ART roll out, PHC needs, minor ailments, chronic care, ante-natal care and post-natal care. The medical staff assist 150 to 200 patients on a daily basis and extend an outreach programme to the patients that cannot attend the clinic for the appointments. This clinic does not have a medical practitioner on-site and therefore the professional nurses have to refer patients out to the neighbouring hospitals should they require specialist care. The clinic was built over 20 years ago, and according to the staff at the facility, they could do with an upgrade to maintain the area that they work and serve patients in.

Gateway Clinic C: This clinic serves a population of 196 580 people that reside in its catchment area with a geographical area of 4 601/km^2 (City Population 2013). The area that the clinic serves is a combination of both urban and rural townships that are continuously growing and improving on infrastructure and buildings. The clinic services offered to the public include: care for HIV/AIDS, HCT, chronic illnesses (for example: asthma, cardiac, epilepsy, genetic clinic and diabetes), PHC needs, eye clinic and skin clinic. The clinic is situated within the hospital and has medical practitioners that examine and diagnose patients in the clinics. The medical practitioners mainly see new patients and the professional nurses attend to patients that have been previously diagnosed with an illness or injury.

Gateway Clinic D. This clinic servers the eThekwini area with a population of 176 989 with a geographical spread of 5 867/km^2 (City Population 2013). The catchment area is a combination of urban and rural townships. The PHC nurses manage HCT, ARVs, treatment initiation and ongoing treatment at site. The other services offered by this clinic include mother and child programme, general outpatient services, community outreach services and PHC services. There are no medical practitioners at the clinic site and therefore patients are seen by professional nurses and referred to the nearest government hospital should a specialist be required.

Gateway Clinic E. This clinic serves a population of 404 811 people that resides in the catchment area with a geographical reach of 8 529 per km^2 (City Population 2013). The area is densely populated with rural townships. The HIV services include: HCT, ARVs, initiation of treatment and the maintenance of HIV treatment. The clinic is situated within a government hospital and is linked to other clinics that specialise in PHC, maternity programmes, community outreach programmes, medical management of chronic illness and surgical outpatient clinic. PHC doctors are available at the clinic site to examine and assess patients. Patients that require specialised care are referred by the medical practitioner to a medical specialist situated in the hospital.

3.4.1 Sampling of research settings

Five eThekweni provincial clinics were included in this study. The KZN province has 775 clinics in this geographical area including provincial clinics, private clinics and local authority clinics. The services that the provincial clinics offer are based on the requirements of the individuals residing in the area. For example, a clinic that is based in an area where there is a high rate of teenage pregnancy focuses on family planning and maternity care. The five clinics that were selected for this study are based in the geographical area that the clinic serves and offer HIV care to their patients. The advice of the research committee from the KwaZulu-Natal Department of Health (KZN DoH) influenced the purposive selection of the clinics as they offered advice on which clinics were suited to the needs of this study. The selected provincial clinics provide HIV services to the public and there were different categories of staff should the researcher chose to interview them.

3.5 STUDY POPULATION

Study population refers to all units or elements that may be included in a study (Botma *et al.* 2010). The research population for this study included the following: PHC nurses, PHC doctors, support staff that work in the clinic and HIV negative individuals at high risk for contracting HIV.

The selected PHC nurses that were employed in the PHC clinics were interviewed first. These nurses then recommended to the researcher who to approach amongst the PHC doctors support staff and individuals at high risk of contracting HIV related to each PHC clinic. The reason for this range of participants was to search for new and rich data (Charmaz 2006). A hallmark of grounded theory research is that the researcher needs to seek and continue to collect data to refine categories that emerge.

3.5.1 Primary health care nurses

The PHC nurses were registered with the South African Nursing Council at the time of the data collection to ensure that they had a qualification in nursing and were involved in HCT in the clinic and had experience with HIV and the administration of

the related medication. Each clinic had three to six registered PHC nurses employed at the clinic.

Initially the PHC nurses were selected purposively by the researcher as the researcher had knowledge that they would supply the information that would address the research questions for this study. The PHC nurses that were purposively selected for this research study were working with HIV and AIDS services in the clinic. The nurses were permanently employed by the KZN DoH.

3.5.2 Primary health care doctors

PHC doctors are essential members of the health care team in PHC clinics. They diagnose patients and initiate treatment for individuals that require medication and play a major role in interpreting results for patients that have tested HIV positive. The doctors are permanently employed by the public sector and are present in the clinics from Monday to Friday to attend to the needs of the patients that attend the clinic.

The PHC doctors recruited for this study were referred by the PHC nurses. PHC doctors were interviewed to gain more insight into their perception of the challenges of PrEP therapy and their understanding of how it could be offered in the communities that they serve.

3.5.3 Primary health care support staff

A social worker and a data capture clerk were identified as participants that could contribute valuable information with regards to PrEP therapy implementation at the clinic level. All support staff were asked to participate in this research study and one social worker and one data capturer were available to participate.

It was noted that not all clinics have a social worker employed at the site of the PHC clinic. Social workers are responsible for helping families and individuals with issues or problems in their everyday lives to enable them to function normally. A social worker is also involved in HIV counselling of an individual regardless of the HIV status. A

social worker could be a crucial tool in identifying high risk individuals and starting the process of PrEP therapy implementation through HIV counselling. The social worker has many sites to visit and is mainly busy throughout the day with appointments with patients.

Data capturers are employed in clinics to capture data (as the title specifies), so data capturers are able to identify the needs of the community by looking at the data captured. Although, the data capturer does not deliver patient care, they have valuable input into the team regarding the patient categories attending the clinic. Data capturers are rich in knowledge of the specifics about patients and can identify services highly utilised or those underutilised. The interview with the data-capturer was conducted for this purpose and to identify what the needs of the community are with regards to PrEP implementation.

3.5.4 Individuals at high risk of contracting HIV

The individuals at high risk of contracting HIV were individuals that attended the selected PHC clinics for HIV care. These individuals were referred by the PHC nurses to the researcher for an interview as they fitted the criteria according to Bekker *et al.* (2016) of being individuals at high risk of contracting HIV. The individuals that were identified as high risk of contracting HIV were HIV negative and were attending the clinic for HIV testing or counselling.

3.6 SAMPLING

Sampling refers to the population that is used to collect the data on the phenomenon under investigation. Based on the research questions, the researcher had an idea of the phenomenon under investigation and was able to select a group of individuals that most represented participants who could give information on the implementation of the DoH PrEP guidelines (Corbin & Strauss 2008). Both rural and urban PHC clinics were selected for the purpose of understanding the PHC nurses, individuals at high risk of contracting HIV and PHC doctor’s perceptions and understanding of PrEP therapy.

In grounded theory there is a representation of concepts rather than persons because the aim of this design is to build a theoretical explanation of the phenomena being investigated (Corbin & Strauss 2008). This will be discussed later in this chapter in the data analysis section.

Sample size, according to Speziale and Carpenter (2003), is determined by the data generated and the analysis of the data. Grounded theory relies on theoretical sampling (Charmaz 2006). Initially information was collected from PHC nurses because the researcher had identified them as having knowledge about PrEP therapy. Once interviews had taken place with the PHC nurses I was referred by them to PHC doctors and support staff to gain more information on PrEP therapy in KZN. An understanding of the individuals at high risk of contracting HIV was noted during the interviews with PHC nurses and therefore I had in-depth interviews with individuals at high risk of contracting HIV as well. After each interview I analysed the data using the previous interviews I had conducted (which is referred to as constant comparison) to ensure that the research was keeping within the grounded theory methodology (Charmaz 2014). Theoretical saturation was reached when the data that was analysed from the participants showed no new emerging categories for the developing theory. Once theoretical saturation occurred, I stopped collecting data as there was no new information to add to the study.

The participants were initially purposefully selected for this study because they were able to help the researcher best understand the problem (Creswell 2009: 174). One interview at a time was conducted by the researcher to ensure that data was collected and transcribed and compared straight away to the data collected already. This research started with the interviewing of PHC nurses who dealt with individuals who were receiving HIV services or have interaction with them in either the rural or urban public primary healthcare clinics selected in KZN. Once emerging categories were identified by the researcher, she moved on to other research participants (PHC doctors, PHC support staff and individuals at high risk of contracting HIV) to collect more data or “concepts” that could contribute to the categories already identified. Once a concept was identified by the researcher from the data collected, it was

constantly compared to other data collected and if it was repeated in the new data collected it showed consistency of the data or emerging concept.

The researcher stopped interviewing participants once there was no longer new emerging information being collected. Theoretical saturation was reached after fourteen research participants were interviewed with a total of sixty-nine categories identified.

3.6.1 Recruitment of research participants

In recruiting participants for this study the main objective for the researcher was to follow the grounded theory method of recruiting participants who could share the most information regarding PrEP therapy implementation in the KZN province. Appendix K illustrates a poster about the research that was pinned on the respective PHC information boards for all to read.

3.6.1.1 Primary health care nurses

The PHC clinics were initially identified and appointments were made by the researcher with the nurse managers of the hospital and the PHC facilities to set up a meeting with the staff. Once the meeting was set up the researcher presented her proposal to the PHC team (this refers to all the PHC staff in the clinic) and asked for their participation in the study.

Some of the staff at the PHC clinics chose not to participate as they felt like they had contributed to previous research studies and they didn't have the time for an interview. PHC nurses had the freedom not to participate in this study. The researcher had made prior arrangements for a private room where the interviews could take place.

At times the researcher had to wait for many hours for primary health care nurses to be available to be interviewed as the primary health care clinics were very busy.

3.6.1.2 Primary health care doctors

The PHC doctors were recruited through the PHC nurses. It was suggested that more information regarding PrEP therapy would be gathered from the PHC doctors. The researcher discussed this study with the PHC doctors first and asked if they would participate in the study. When the doctors agreed to participate the researcher set up appointments at a convenient time for the doctors to be interviewed at the clinic where they worked. The interviews took place in the doctors rooms to maintain privacy the door was closed as well. The interviews took place after the PHC doctor had completed all consultations for the day so that it did not interfere with patient care at the clinic.

3.6.1.3 Primary health care support staff

The researcher set up a meeting with the social worker and the data-capturer in one of the PHC clinics once they were referred by the PHC nurses during the interviews. In the meeting the research proposal was explained to the social worker and the data-capturer and their assistance was requested. Once they agreed to be interviewed, the researcher ensured that there was a private room in the clinic where each interview would take place during the lunch break.

3.6.1.4 Individuals at high risk of contracting HIV

The individuals at high risk of contracting HIV in the primary health clinics were recruited by the PHC nurses after their consultation at the clinic. The PHC nurses in the selected PHC clinics were briefed by the researcher on how they could assist in the study: if they thought a particular individual at high risk of contracting HIV was suitable for the study, they asked the individual to participate, If they agreed the nurse gave them a letter of information to ensure that they understood their role in the study. Once the individuals at high risk of contracting HIV had read the letter of information and agreed to participate then the researcher took them to a private room to be interviewed once they had completed their consultation with the PHC nurse. The

individuals at high risk of contracting HIV were informed that all information gathered would be strictly confidential and that privacy would be maintained.

The researcher explained the proposal to the individuals at high risk of contracting HIV and asked for their assistance in contributing information to the study. An informed consent was signed by all participants before the interviews commenced. There were also leaflets present in the clinic for the individuals at high risk to read and gather more information about the study (Appendix J).

The first few interviews with the "high risk" individuals were awkward until I became familiar with my interview questions and changed them to more directly answer my research questions and keep the conversation flowing. It was a memorable experience.

3.7 DATA COLLECTION

Data was collected through in-depth interviews where an interview schedule was used to guide the interview (Appendix A). Approval for data collection was given by IREC which is approval from the ethical committee at DUT. Once that was obtained permission was granted by the DoH ethical committee to collect data and then individual hospital managers approved the request. This was all done prior to the interview process. According to Polit and Beck (2004: 346), an interview schedule is used by an interviewer to ask a certain number of specific questions of the research participants, who are then probed further with more questions that allow the researcher to explore the phenomena being investigated.

Data was collected and analysed after each interview and compared to data collected earlier until there was theoretical saturation. Concurrent immersion during data collection and analysis was applied to this research. Charmaz (2000) states that concurrent immersion focuses on grounded theory approaches, directing efforts and supporting the researcher in taking control of the data under collection. Immediate analysis of data ensures additional data collection about developing themes and questions. The researcher applied concurrent immersion by immediately transcribing

and analysing data after it was collected. This allowed for the development of categories which were then focused on in the next interview with a research participant.

The interviews were voice recorded and thereafter transcribed verbatim by the researcher.

3.7.1 Interviews

One-on-one interviews are a popular data collection strategy (Creswell 2011: 218). It is a process where the researcher asks the participant open-ended questions and probing questions and allows them to respond. An interview schedule was used during interviews and probing questions were used to clarify information.

Charmaz (2014: 34) states that theoretical development can be supported by thoroughly listening to the participants, whereby the researchers learns the implicit or presumed meanings. This approach assisted the researcher to form evolving research questions to gain data that formed the theoretical categories.

Interviews took place in a quiet room at the PHC clinics to maintain confidentiality For example, if the researcher was interviewing a PHC nurse then the interview took place in a consulting room that was private in the PHC clinic.

An interview guide was used for the different categories of research participants (Appendix A). The number of interview questions was limited to allow for flexibility during the interview (Charmaz 2006). The researcher ensured that the interview included the following techniques: listening, reflection and paraphrasing during the interviews to ensure that the researcher captured maximum data from the participants.

The initial questions that the participants were asked were developed by the researcher arising from the literature review. The questions were constantly revised after each interview was analysed by the researcher to ensure that the phenomena for this study was explored to the fullest and that new questions were formed

depending on the participants' response. An interview schedule was drawn up for the PHC nurses (Appendix C), high risk individuals (Appendix D), PHC doctors (Appendix E) and support staff (Appendix F).

The main focus of the interview guide was to gain information from the research participants about PrEP therapy and to formulate theoretical questions that would gain more information from the participants.

3.8 ANALYSIS

Data was analysed using the grounded theory constant comparative technique developed by Charmaz (2014). This form of data analysis is not just data description.

Grounded theory involves an interactive, simultaneous process of data collection and analysis. Glaser (1978) states that data analysis should be done line by line to form categories. There needs to be a recurrence of the category so that it can be compared with new data collected.

3.8.1 Transcription

The interviews were transcribed verbatim straight after each interview and verified by the research supervisor. The transcribing process allowed the researcher to become fully immersed in the data and become "one" with it. Reading and rereading the transcripts assisted with analysis by enabling the researcher to become familiar with the data.

3.8.2 Coding

Grounded theory coding can be defined as a process of "identifying incidents, events and activities and coding them into the property of the emerging category to develop and saturate the category" (Bronstein 2007: 4). Two aspects of grounded theory coding differentiate it from other forms of qualitative research. Grounded theory coding includes a close coding of statements, actions, events, and documents. This coding

does more than select, sort, and summarise data. Coding divides the data into components or areas and defines the actions that structure or support these data, thus, coding is done for processes, actions, and meanings. This assists researchers to find and explain connections between data. Furthermore, this approach to coding stimulates analytic questions from the start. These questions include:

- What is this data a study of? (Glaser, 1978; Glaser and Strauss, 1967)
- What do the data suggest? Pronounce? Assume? (Charmaz, 2006)
- From whose point of view? (Charmaz, 2006)
- What theoretical category does this datum indicate? (Glaser, 1978)
- When, how, and with what consequences are participants acting? (Corbin and Strauss, 2008).

According to Charmaz (2006) line-by-line coding needs to be done initially using “gerunds” which means that an action verb needs to be used when coding. Charmaz (2006) recommends using the following questions to guide the line-by-line coding:

- What process [es] is at issue here?
- How does this process develop?
- How do the participants act while in this process?
- How do they profess to think and feel while involved in this process?
- When, why and how does this process change?
- What are the consequences of this process?

An important aspect of grounded theory is to study emerging data as this informs the awareness of the researcher regarding implied meanings of the participants (Charmaz 2000; Glaser 1978). A good principle of a grounded theorist is to do the interviews, transcribe them and analyse them straight away. This ensures engagement with the information needed to set up the theoretical questions. In this study, once the data was transcribed by the researcher, the transcripts were read and reread by the researcher and both supervisors, searching for emerging patterns to form categories. These categories were then compared with categories from the new data collected. Similar actions, events and objects were grouped together to form these categories. This coding is known as substantive coding because the researcher categorises the substance of the data (Speziale & Carpenter 2007: 144).

Once the data was collected from the PHC nurses and analysed by the researcher, there was a total of twenty-seven emerging categories which were identified and were then reviewed to identify if there were any links between them. As a result there were 9 sub-themes and 5 categories that had emerged from the data collected.

3.8.3 Theoretical memoing

During this phase the researcher constructed categories through the process of theoretical memoing. Memoing refers to notes about ideas related to concepts, categories and their relationships and properties which emerge during the process of constant comparison (Charmaz 2006). Memoing captures thoughts, comparisons and connections that constitute and clarify questions and the direction to continue with the process, thus forming an important part of grounded theory (Charmaz 2006: 72).

In the current study, memos were written through a constructive process to explore emerging categories and codes and their potential relationships. Memoing prompted the researcher to analyse and code data from the beginning of the research process. Charmaz (2006) suggested that memoing should also include conversations by the researchers with themselves which can lead to new insights and ideas during analysis. The researcher wrote her own views freely in a note pad and later reflected on those memos to check if there were emerging categories.

3.9 TRUSTWORTHINESS IN GROUNDED RESEARCH METHODOLOGY

Trustworthiness in qualitative research ensures that procedures are followed and deals with a list of considerations to ensure the rigour of the research being done (Loh 2013: 1). According to Lincoln and Guba (1985) trustworthiness in qualitative data can be shown through the following criteria: credibility, dependability, confirmability and transferability. These will be discussed below.

3.9.1 Credibility

Credibility refers to the confidence in the truth of the data and the interpretation of them (Polit & Beck 2010 492). In keeping with the 'gold standard' laid out by Lincoln and Guba (1985) to ensure descriptively accurate and interpretive rich data in qualitative research, this research followed the steps of grounded theory by Charmaz (2014) which were documented throughout the study. This was done to ensure that the findings were believable and the tools that were used in this study were made available as well as memos written by the researcher and the reflections written by the researcher.

3.9.2 Dependability

Dependability refers to the 'stability' of the data over time and over conditions (Polit & Beck 2010 492). The researcher ensured that there was a documentation trail throughout the duration of this study. As each step of this research was conducted the researcher documented it. Another method of dependability employed by the researcher was member checking, involving the supervisors, at each step of the research. The members checked all data that was collected and offered feedback. The supervisors analysed data with the researcher to ensure dependability. Feedback was given to ensure that the correct data was gathered to answer the research questions. Data was also collected and stored so that data could be made available if needed.

3.9.3 Confirmability

Confirmability, according to Polit & Beck (2010), refers to objectivity which is related to the data's accuracy, relevance or meaning. Interviews were conducted on a one-on-one basis with the researcher and the research participant and were recorded and transcribed verbatim. Furthermore, the researcher analysed the interviews line by line. This was done so that the participants' voices were recorded and the views of the researcher did not influence the results.

3.9.4 Transferability

This research provided a ‘thick description’ of the data in this study enabling readers to evaluate the applicability of the data in regard to other contexts. As per Lincoln and Guba (1985), transferability refers to the extent to which findings can be applicable to other settings.

3.9.5 Researcher’s reflexivity

Reflexivity has become popular since about the year 2000 in the context of grounded theory (Mruck & Mey 2007). Reflexivity refers to the way a researcher allows themselves to be aware of what they see and what they inhibit themselves from seeing. Reflexivity looks at the way the researcher’s own assumptions and behaviours may impact the inquiry (Watt 2007). Reflexivity is important in the research journey as it is needed by the researcher to reflect on their assumptions as well as themselves through various stages of planning, fieldwork, analysis and writing up (Charmaz 2014: 241). Researchers should acknowledge the influence of prior work on their perspective by memo-writing which assists the researcher in realising the influence he or she has on the data collected for the research. However, there is a chance that the researcher becomes too reflexive and stifles the research, what Glaser (1978) called “reflexivity paralyses”. where the researcher must be able to be self-aware of his/her reflexivity within the research process otherwise they can block out the participants’ voices leading to the research report being biased (Gentles *et al.* 2014). The reason for the emphasis of reflexivity in this research is because grounded theory research reports are not straight forward and are shaped by the researcher who then represents it (Charmaz 2006). The researcher’s role in shaping of the participants’ experience must be acknowledged.

In this research reflexivity was used by the researcher to understand how the findings were constructed. Reflexivity is the influence and interactions that the researcher has toward the research participants and, according to Gentles *et al.* (2014), provides insight into how the substantive findings were constructed. I gathered data through in-depth interviews using open-ended questions. The interview schedule was used as a guide to assist with getting as much information as possible from the research participants. I used prompt questions to get more information but also for clarification

of information especially when there were non-verbal cues (like smiling, or shaking of the head) to further pursue participants' interests (Charmaz 2014). I had an influence on the interaction between the participant and the researcher through observing the participants and reflecting on these observations by writing notes and reflecting on the data collected (Appendix I includes an example of the memos taken by the researcher during data collection).

During the process of data analysis, I used the process of memoing, line-by-line coding, constant comparison and ensuring that the comparion of patipants was done one at a time to increase the reflexivity of this study.

3.10 ETHICAL CONSIDERATIONS

This research obtained ethical clearance from the Durban University of Technology Institutional Research Ethics Committee (number REC8917) before application to the DoH research committee. The application to commence research in the selected clinics in KZN was approved by the DoH research committee via an electronic request. The researcher then obtained consent from each medical manager of the selective clinics to conduct interviews with the staff of that clinic. Below is a description of the ethical principles that were adhered to in this research

3.10.1 Non-maleficence

Researchers should avoid harming the participants (Yin 2011: 46). A researcher should minimise harm and discomfort to participants in the research study (Polit & Beck 2010). Research participants were not harmed during the interview process. However, the researcher did offer all research participants the option of a debriefing session after the interview to ensure that there was no psychological harm done to the participants. All the participants declined this option.

3.10.2 Autonomy or self-determination

The values and the decisions of the research participants were respected in this research (Creswell 2011: 24). The participants of this study were given a choice to participate in this study. The participants were informed that participation was voluntary and they could withdraw at any stage without incurring any penalty or prejudice and their choice would be respected.

3.10.3 Informed consent

Information regarding the research was given to the research participants informing them that they would be allowed to ask any questions throughout the research process. Furthermore, an informed consent document (Appendix G) was handed out to the participants prior to the interview ensuring that they understand what was expected of them and how they contributed to the research (Creswell 2011: 24). Before the interview took place the research participant was informed about the research and asked to sign a consent form informing the participants of the study and what was expected of them as a research participant.

3.10.4 Confidentiality

The information that was gathered for this research was not made identifiable to any other participant or person to maintain the research participants' anonymity
(Yin 2011: 46). The data that was collected by the researcher after each interview was transcribed from an audio recording and notes that were made on a note pad during the interview. The notes that were made were locked in a cupboard at the researcher's house and the audio recordings were stored on a computer and password protected so that only the researcher had access to it. This was to maintain confidentiality of research documents. The participant were informed that all information that was gathered would remain confidential.

3.10.5 Gaining entry to research settings

The Institution's Faculty of Health Sciences Higher Degrees Committee, after reviewing the research proposal, granted approval for it to be forwarded to the (IREC).

A provisional approval was granted by the IREC subject to the researcher meeting the following stipulations:

- Preliminary of the interview schedule (this is discussed further in section 3.6.1); and
- Obtaining and submitting the necessary gatekeeper permission/s to the committee (Appendix B refers to the Gatekeepers permission letter).

3.11 CONCLUSION

This chapter outlined the methodology that was used for this research. A constructivist grounded theory research design was used in this research. Participants were sampled from PHC clinics in the eThekweni district and were interviewed one-on-one using an interview schedule. The interviews were transcribed verbatim and analysed using a constant comparative methodology. Participants included PHC nurses, PHC doctors, individuals at high risk of contracting HIV and PHC support staff. Once data was collected it was coded and categorised by the researcher. The data collected will be discussed in the next two chapters of this thesis where the analysis of the data (findings) will be revealed and a discussion of the findings will follow.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

This study focused on perceptions of the PHC nurses and individuals at high risk of contracting HIV with regards to PrEP therapy in the KZN province. PHC doctors and support staff that were employed at the clinic at the time were included in this research as research participants as they were referred to the researcher by the PHC nurses so that they could supply more information on this topic. This research focused on the development of an implementation plan for the DoH PrEP therapy guidelines for the initiation of PrEP therapy in KZN. It was noted through the duration of this study that PrEP therapy was not initiated at the clinics that were selected and that it was not discussed with individuals at high risk of contracting HIV. This chapter discusses the findings using the grounded theory approach which identified the main categories which influenced the implementation plan for the PrEP therapy guideline.

Through the coding system espoused by Charmaz (2012) and discussed in Chapter 3, the main categories appeared in each group of participants which will be discussed in this chapter. The categories where formed through the analysis of 14 interviews conducted by the researcher. The 14 research participants included five PHC nurses, three doctors, five individuals at risk of contracting HIV and two support staff. Table 1 shows the participants and their affiliations.

Table 4.1: Study participants

Participant	Nurse	Doctor	Support staff	At risk individual
Participant 1				*
Participant 2				*
Participant 3				*
Participant 4				*
Participant 5				*
Participant 6		*		
Participant 7		*		
Participant 8		*		
Participant 9	*			
Participant 10	*			

Participant 11	*			
Participant 12	*			
Participant 13			*	
Participant 14			*	

4.2 THE CATEGORIES

This chapter focuses on the five categories that emerged after analysis of the data that was collected through individual semi-structured interviews. The initial coding line-by-line coding (Charmaz 2014) generated a total of 69 codes. As previously stated by Charmaz (2012), once the initial coding is complete the researcher must analyse the codes further and group similar codes together and through this process they become more apparent. Five main categories emerged through this process. The categories which will be discussed in this chapter are as follows: *PrEP Readiness, Education, Challenging issues, Expectations* and *Creating awareness*. The table of how the categories emerged can be seen on Appendix L.

Grounded theory involves ‘active coding’ as the researcher interacts repeatedly with the data collected which results in new questions being created by the researcher to explore unforeseen areas (Charmaz 2006). In order to accomplish this the researcher started the interview process with a single PHC nurse in the PHC clinic. The researcher asked open-ended questions and probing questions of the research participant in-order to gain the most information pertaining to this research study. Once the interview was over the researcher manually transcribed the interview using the recording and the notes which were taken during the interview. The researcher then coded the first interview transcription line-by-line (Charmaz 2014). The codes were then translated to ‘action codes’ (Charmaz 2014). The second interview that was conducted by the researcher differed slightly in the questions that were asked of the participant. This was for two reasons, namely: to get more information out of the research participant and to fill the codes that were already identified in the first interview. The researcher followed the same process as the first interview which involved manually transcribing the interview and coding it line-by-line, but what was different was that the researcher made use of constant comparison meaning that the researcher compared the initial codes that were found in interview one with the initial

codes that were found in interview two. The researcher also took note of emerging new codes to ensure that they were fully explored. This process repeated itself through the consecutive interviews until there was no new information that could be added to the codes that were already identified. This is also known as theoretical saturation which is when the researcher stopped the interview process for this study. After the initial coding the researcher moved on to what Charmaz (2012) called focus coding. The researcher grouped together codes that were similar in-order to form categories which are discussed in this chapter.

4.2.1 Initiation of PrEP

The topic 'Initiation of PrEP' emerged as a category from the participants' response as to whether they were ready for the initiation of PrEP therapy in the respective clinics that they were employed in or if they were ready to start receiving PrEP therapy if the participant was identified as an individual at high risk of contracting HIV. This category contained the following core categories that were identified during the interviews with the participants: staff readiness, client readiness, staff attitude, client attitude and access to PrEP, as presented below.

4.2.1.1 Unprepared for PrEP therapy

The participants in this study had some knowledge regarding PrEP, however there was a lack of experience with the drug in that some PHC nurses and medical practitioners had never seen it or dispensed it. It was evident that the PHC staff had heard about PrEP previously but had not enquired about dispensing PrEP at the clinic to individuals that fitted the criteria to receive PrEP. Participants were probed further to understand what the meant by never being exposed to PrEP therapy and it was deduced that the knowledge of PrEP was present (although limited) but they had never handled the drug itself.

> *I didn't ever administer or dispense this medication to any patient.* (Participant 14)

I haven't seen it being used … it's used as a preventer. (Participant 11)

The individuals at high risk of contracting HIV had no experience of taking PrEP therapy as a form of prevention, however they were aware of PrEP therapy. There was no concern or thought of making an enquiry by these participants. Their perception seemed to be that when PrEP became available then only would they start taking it. They seemed to be content that they were not on a form of prevention for HIV.

I have not had any experience with it. (Participant 2)

I have not had any personal experience with it but I have heard about it. (Participant 1)

Participant 1 explained further that he had heard about PrEP during an education talk that he had attended where a pharmaceutical representative gave them information about PrEP at the local clinic. PrEP readiness involves education of the community to ensure that they are aware of what is available to them, however, he made no further enquiry about PrEP therapy after this talk.

With the introduction of something new to a clinical environment, routines and challenges need to change. One participant explained that these clinics already offer many services and there are huge patient loads that attend the clinic on a daily basis and should another service be included then it could upset the daily running of the clinic. It appeared that the existing routine of the daily running of the clinic inclusive of its patient load and the services offered was satisfactory and participants did not want to change this as it could affect them negatively. The participant explained that an increased workload would have a ripple effect on other parts of the daily running of the clinic and could result in unhappy staff.

*… influx of patients, workload too, influx on workload … Have to be opened for longer hours, in other words more staff is needed … I am not happy unless my salary goes up … it will take us out of routine. (*Participant 13)

One participant discussed how challenging the current situation was already occurring at that time in the clinic with regards to patients being compliant with medication given to them from the clinic. Patients that enter the clinic are consulted and advice is provided to suit the needs of the patient. It is however very challenging for staff when the patient that was given advice does not return to the clinic for their next consultation or treatment. It could be a time waster considering the number of patients that need assistance in the course of the day.

> *It's that psychological. Cause some people they agree but when they are outside they think otherwise… we found patient came today, test, talked to the patient, agreed to start treatment but she only start today and never came back again. Very challenging.* (Participant 10)

By saying "It's that psychological" the participant explained that the current programmes that they had running at the clinic were already a challenge with patients not keeping to their appointments and sometimes not taking their medication so introducing a new programme to what already exists may pose the more of the same challenges that were already experienced or could add new challenges. This could be very stressful for the PHC staff that are employed at the clinic as they may not cope with the implementation of PrEP therapy.

The lack of funding of the government sector led participants to question whether PrEP therapy initiation was feasible as the clinics in the KZN province lack resources and funds as there is sometimes no medication or resources to treat patients. There was a feeling of insecurity from the research participants regarding whether there would be enough financial support to fund PrEP therapy in the government clinics.

> *I am still unsure about the debate about it. The reason why government does not want to put it out there is because there is not enough money … I feel like it is a lack of funding as the government sector is in tatters. (*Participant 8)

The individuals at high risk of contracting HIV explained that they have not enquired further about PrEP therapy even though they knew about it. There was no interest in the availability of PrEP or to enquire for more information. However, if there was more information communicated to the public then there would be more interest.

> *It just skipped my mind. I have no interest in going there yet … I think if I knew more about it I wouldn't mind asking for it.* (Participant 4).

> *Maybe the lack of information. The fact that I don't know enough about it or how it will benefit me …* (Participant 5).

One participant shared a personal experience that she had with PEP where she had asked for PEP after being exposed to HIV. She explains how difficult it was for her to get PEP. She could not understand why it was so difficult to access the treatment and assumed it was just at the clinic level that such events occur. If PEP treatment is difficult to obtain, one has to think of the accessibility of PrEP and how difficult access will be for individuals at high risk of contracting HIV.

> *I will talk about myself when I asked it when the condom burst … the one thing I got is that no one is in a hurry to issue it out, you have to really have a story, a scary story … maybe it is just here. I don't know. I had to really dramatise my story to say that I want prophylaxis. (*Participant 13)

4.2.1.2 Positive about PrEP

Participants appeared to be comfortable with discussing PrEP although some of them had never seen the drug or had no personal experience with the drug. Most of the medical staff that were employed by the clinics were positive about having another prevention method for HIV/AIDS. There was an eagerness shown by the research participants to implement such a drug to prevent HIV infection.

> *It's going to bring the number of HIV positive patients down.* (Participant 13)

It is a great medication that is put out there … My feeling about PrEP is that it is quite a hopeful medication. (Participant 8)

If you weigh out the advantages and disadvantages there are more advantages to implementing it so I am for it … I know that Truvada is given as a pre-exposure and we need to start … (Participant 6)

Participant 6 explained what is meant by “advantages and disadvantages” by stating that the main advantage was that patients now have another option to prevent them from being infected with HIV, and the main disadvantage of PrEP was the side effects of the medication and the fact that it needs to be a chronic treatment.

The attitude of individuals at high risk of contracting HIV toward PrEP therapy initiation was positive and they perceived it as being a drug that would prevent people from being infected with HIV. It was evident that these participants had been exposed to public education from clinics and/or social media about the existence of such medication. Their responses in the interviews clearly indicated that that if PrEP therapy was made available to the public as a preventative for HIV then there would be individuals at high risk of contracting HIV that would ask for and take the therapy as prescribed.

All my friends talk about it. I mean like the sex workers that I am with. So we discuss these things. Our problem is that people don’t want to use condoms so this will benefit us. (Participant 3)

If there was more awareness around PrEP I would ask for it. (Participant 5)

If we could get this information out on the street to the people like us then it will help. (Participant 4)

4.2.2 Education

Education regarding PrEP therapy was a major issue for all the participants in this study. Participants either discussed the lack of knowledge or the need for more training and education on PrEP therapy for both the PHC nurses and the individuals at high risk of contracting HIV. There were participants that had received tertiary education on PrEP therapy and still felt that it was not sufficient as information is changing all the time and they need to keep abreast of it.

4.2.2.1 Lack of knowledge

All the participants in this study had some knowledge of PrEP therapy otherwise known by the brand name of Truvada. The PHC nurses discussed their lack of knowledge and poor knowledge in procedures or guidelines for PrEP therapy. There was confusion in the responses received as some participants linked Truvada to PEP instead of PrEP, showing that there was a lack of knowledge with regards to the use of Truvada. In the PHC clinics, as previously stated, Truvada is also used as a PEP for individuals that are HIV negative and have been potentially exposed to HIV. In such cases, Truvada is taken in combination with other ARVs by the individual within 72 hours of exposure to prevent the individual from seroconverting to HIV (Van Dyk 2005). Truvada is also taken in combination with other ARV's by individuals after they have tested positive for HIV as chronic treatment to decrease the HIV viral load within the body.

> *I know that PrEP is to prevent erm patients from getting HIV. It's all about staying negative. It's for those that have multiple sex partners … I haven't seen or heard about guidelines. Is there any out there?* (Participant 14)

> *It's ARV's, this one, it's pre-exposure. We using it for patients who exposed to HIV whose sleeping with people who they don't have their status. They have an accident, then you preventing them from being contaminated with HIV. That's why we call it pre-exposure prophylaxis. Cause you need to contact then prevent. (*Participant 10)

Participant 10 explained that an “accident” refers to a condom bursting while having sexual intercourse and the individual will be exposed to HIV if the partner is HIV positive. There was confusion amongst the PHC nurses as to when PrEP is given. Participant 10 stated that an individual first has to be exposed to HIV in order to receive PrEP and this will prevent the individual from contracting HIV. Some participants understood the indications of PrEP although the knowledge of PrEP proved to be limited.

> *I have heard about it … As we have been told that Truvada is used as a preventer and er … I haven't seen it being used. I'm not sure if it has been used around the clinic but all I know is that it is a preventer. It's on the market.* (Participant 11)

Participant 11 explained that she heard about PrEP from a colleague at the primary health clinic where she is employed. She is aware of it being in the clinic and available to patients however she has never seen it being dispensed.

> *I know it's used for er… cases like rape cases or cases were condoms have burst and patients are issued with PrEP. It's a preventative measure against HIV.* (Participant 13)

> *I have been exposed to PrEP in em … this year. Prior to in 2017 I knew there was some sort of medication preventing you from getting HIV and AIDS but er there was a company that explained more about it … my knowledge is still quite fresh. I don't know much about it. (Participant 8)*

> *This medication is used for treating people without HIV. They must take it every day … I don't know of the guideline but the patient must take it every day.* (Participant 12)

Two of the medical staff participants were educated regarding PrEP therapy in their tertiary education but also admitted that they lacked knowledge of how to apply PrEP therapy. These participants were only exposed to theoretical knowledge and not

practical experience with PrEP therapy so they had not previously dispensed PrEP or scripted it for any individual at high risk of contracting HIV.

> *I have been exposed with lectures. I studied in Pretoria and they have not implemented it as yet. All the lectures and talks, that's where I came to know about it … but the pharmacokinetics I don't know much about.* (Participant 6)

> *We go for annual updates and stuff ... world AIDS conferences like that. To date all the data shows that it works.* (Participant 7)

The individuals at high risk of contracting HIV demonstrated knowledge on PrEP but requested to have more information available for them as their knowledge of PrEP is very limited. Participants were aware that Truvada prevents HIV but that's where the knowledge stops. High risk individuals required more knowledge to enable them to enquire about PrEP therapy and to spread the communication about its availability.

> *It is a drug that you take when you are exposed you are em … that you take when you exposed more than usual or more than normal people to HIV. You prevent HIV… I don't know enough about it.* (Participant 5)

Participant 5 explained that being more exposed to HIV refers to people having more than one sexual partner at a time which increases their risk of HIV exposure. PrEP according to Participant 5 should be given to these individuals.

> *To me it sounds like a way of prevention … of HIV and AIDS so it's a safety mechanism. Prevention rather than cure … it safeguards a person against HIV meaning that if you are exposed to HIV and you are taking PrEP then you won't become infected with HIV*. (Participant 1)

> *I have heard about it from my friends. Just that it was some kind of thing that can prevent you from getting HIV. Its medication probably. My knowledge is very minimal. (*Participant 2)

I have heard that it prevents HIV. That you can take this drug … you can get this drug from the clinic but I'm not sure how it works. (Participant 4)

The suggestions for dealing with the lack of knowledge of PrEP therapy was to offer education and guidance to the nurses and the individuals at high risk of contracting HIV. Participants spoke of educational meetings that could be held at the clinics for both the medical staff and the patients that attend the clinic. It was suggested that training for PrEP can occur during these meetings. Training must be on an ongoing basis to ensure that everyone's knowledge is up to date.

The thing is there must be criteria or like a guideline so that everyone give … Education from nurse's side and what health education we are going to give the patient. On the patient side they need to understand about the drug and who should take it. I mean there is a lot of training involved. (Participant 14)

We have to explain to them what the drug exactly is, and follow up with education for patients … our clinic knows the drugs we have er … we have team meetings and there is training in there and we do in fact have speakers as well … it is very important for our nurses to know what's happening and what to do in that situation and how to help the patient. (Participant 7).

Health education is also a problem … In-services to the nursing staff, the doctors already know er … when it comes to medication now it's embarrassing if the patient comes up to you and you don't know. (Participant 11)

Participant 11 explained that "health education is a problem" refers to not enough training for the staff at the clinic and if patients want to know more information about something then they should be able to get it from the nurse.

Educate the patient and educate the staff. It's not about, it's about the competent staff as well. Those that are able to deal with clients. It's really important to deal with something that you really understand. (Participant 10)

4.2.2.2 The need for training

The lack of knowledge of PrEP therapy was identified by all participants in this study. It was a general feeling that there was a lack of training for PrEP therapy in their area where they worked or resided.

> *My knowledge on PrEP is quite fresh. I don't know much about it. It's something that you should take each every day… once people know about it from a basic level then they will start using it.* (Participant 8)

Participant 8 explained that education of people needs to start at the beginning meaning that people need to refresh their minds on HIV and protection and then only can we introduce PrEP to them. The participant explained that the only reason that people will ask for PrEP is if they have basic knowledge of HIV and understand how and what PrEP is used for.

> *If nurses are educated then it would not be a problem. So maybe er … introduce what it is and maybe the guidelines to the nurses. It's mostly the issue of them not knowing, you going to have an issue.* (Participant 6)

Participant 6 explained that if the nurses (at the PHC clinics) know about PrEP then they can inform patients about PrEP. It's a concern if the nurses do not know about PrEP because if a patient wants to know more about PrEP the nurse is then not able to give them any assistance.

One participant expressed concern with monitoring of the patients on PrEP therapy and that routine bloods need to be done to check for resistance to PrEP therapy. This shows a lack of education as the patient would have to sero-convert in-order for resistance testing to be monitored. Monitoring of patients is a cumbersome task and would be an increase in workload for the staff at the clinic. This also means that there needs to be more consultations with medical doctors at the clinic to interpret blood

results and suggest treatment regimens arising from the results, meaning that there needs to be an increase in the number of doctors that are employed in the clinics.

> *The patients need to be monitored and er … bloods need to be done routinely because Truvada comprises of Tenofovir which could lead to renal failure … we are going to need resistance testing … (Participant 7).*

Participants expected there to be ongoing training for staff to increase knowledge of PrEP therapy for all people to ensure implementation and continuing success of the therapy. The idea of staff being over worked and not being prepared to take on more work comes through very strongly from the PHC nurses. However this could be due to shortage of staff in the primary health care clinic where staff now have to take on extra workload. The PHC staff were unsure of how to approach and engage with patients on their sexuality and assessing their risk for HIV. It could also be seen that staff do not understand enough about PrEP therapy to confront patients as they have not received sufficient education to do so. One participant stated that although PrEP therapy was available in the government sector at that time (this research was conducted in July 2018) it has not been prescribed to individuals that require the medication which is a waste of time as nothing has been done about it. The notion that staff are aware of PrEP therapy being available and have not implemented it due to routine and work overload leads one to the conclusion that there is no desire or urgency within the staff to do so.

4.2.2.3 The need for client communication

Participants suggested that in order to create a demand for PrEP from the community, education needs to occur. To achieve this the high risk individuals need to be identified and educated. Participants stated that the rural areas may not be educated on HIV and therefore do not understand how to protect themselves.

> *Basically we need to identify the people at risk, go to areas where HIV is more prone like different suburbs and mostly rural areas. They are uneducated on the HIV virus. Most people know about it. People don't know about protection*

and they don't know how it is transmitted … most of them are not using protection. Identify those areas and tell them about PrEP. (Participant 6).

At-risk participants also felt that education needs to come from the medical staff in the clinic. They should talk to individuals about PrEP therapy so that they can be more knowledgeable about it.

I would appreciate it if nurses spoke to me about it when I go to the clinic … if it would help me then I would like to ask. I would be able to ask for it. (Participant 2)

The patient needs to sign a document stating that the doctor has explained what they will be receiving and that they understand what the consequences of the drug is. Patient education and commitment is essential for PrEP therapy to be successful and this will be a useful tool for the clinic to implement when PrEP therapy is initiated.

Patients need to sign a consent and they need to understand. So while they are signing the consent the doctors need to explain this and that and you can still contract the virus and they have to agree so either way the doctors can say that they explained it to the patient. (Participant 6)

I mean the patients need to have all the support as well, can't just take a tablet. They need to know why they are taking it. (Participant 14)

Add more staff, add more counsellors … (Participant 9)

Coz at the end of the day if we really bring PrEP in, more people know about it, more exposure to it, so it's going to bring the number of HIV positive patients down … Education if done right then its more people that aware of PrEP, but no one knows about it. Staff knowledge … mmm … I'm actually surprised by this … disappointing because we wasted three years. (Participant 13)

Participant 13 explained that “wasted three years” refers to her knowing that PrEP has been around and available for three years already and that it has not been dispensed to the public to date.

> *In-services and training should be done throughout because people are changed all the time*. *People are employed in the clinic and don’t know about PrEP and must be educated.* (Participant 11).

4.2.3 Challenging issues

This category focused on the barriers, issues or concerns that the participants thought would be experienced if PrEP therapy were to be implemented at the local clinics. This category looked deeply into how the participants felt about PrEP therapy and what they would do if it were to be implemented in the KZN clinics. There were great concerns expressed by the research participants related to resources, financial restraints, infrastructure and education (as stated in the point above).

4.2.3.1 The concern with PrEP therapy initiation

Most of the participants felt like they were ready for the initiation of PrEP therapy, however there was a feeling of lack of experience with handling PrEP and were concerned about having never initiated PrEP therapy before.

> *Patients have asked for it but we don’t have guidelines, like how we going to distribute it? You like how they going to take it or when they going to take I t… I have never given it out. (*Participant 14)

There was also a feeling of doubt; participants were not sure if PrEP was in the clinic already, and confusion arose when Participant 11 was not sure if it had been used in the clinic.

> *I haven’t seen it being used. I’m not sure if it has been used around the clinic.* (Participant 11)

I haven't actually had an experience with PrEP. (Participant 5)

Participant 8 expressed concern about how PrEP would be introduced to the public and whether it would work after being introduced. He explained that his concern was whether the public would actually take PrEP as instructed or would the medical staff have problems with poor adherence.

> *… it is quite a hopeful medication but I really want to know how it's going to be introduced to society … er … even if it has been proven to work medical, will it work socially in ways that it is introduced to society?* (Participant 8)

There was a general feeling of poor functioning at the clinic level identified by the participants. An issue was raised that if the workload for the medical staff was increased then there should be an increase in salary and numbers of medical staff considering all that they already do. This feeling could be due to the routine that is already established on a daily basis in the PHC clinics and staff did not want to diverge from what is known. If there was an increase in the staff that were employed in the PHC clinic then more work could be done (meaning that more patients could be seen) and it would decrease the work load of the staff that are already employed at the clinic.

> *Other people from other communities will come in and we won't be able to manage with the people coming in coz we got one nurse to every 60 patients and that will be too much.* (Participant 14)

> *Add more staff … add more counsellors … only one counsellor here.* (Participant 9)

> *Clinic will have to be opened for longer hours, in other words more staff is needed, work load, longer hours and need more staff … I will not be happy unless my salary goes up. It's no, I won't be a happy chappy. It will take us out of routine.* (Participant 13)

Participant 8 stated that the government sector was in “tatters” and explained that he meant the government (or public sector) clinics do not always have medication available for the patients and that the infrastructure is poor. He explained further when asked what he means about the infrastructure being poor, that “*there is not enough space for the patients to sit in the waiting room. I feel there is not enough nurses and doctors in the clinic and they do not have funds to supply better services to the patients.”*

There is a concern that there might be periods where there would not be sufficient medication to supply the patients and this could be related to PrEP. If there is a shortage of the drug then the individuals at high risk of contracting HIV would not be able to have access to medication leading to other problems such as being vulnerable to HIV once again.

> *The government sector is in tatters. Its dysfunctional and a ticking time bomb. They don’t even have basic medication.* (Participant 8)

Research participants explained that there was a staff shortage with no plans to hire more staff at the clinic due to the posts being put on hold. This had already impacted negatively on the staff as their workload had increased and if there was another increase in the patient load then they would have to work longer hours and see more patients. Doctors at the clinic also presented with time constraints. Individuals at high risk of contracting HIV felt that they had to wait for long periods before being consulted by the doctors.

> *The doctor prescribes it … it takes very long for the patients to see the doctor. (*Participant 12)

Participant 12 explained that there were two doctors in the clinic that consult with patients during working hours. The doctor only has time to consult with new patients which takes so long that patients sometimes do not get seen by the doctor as the time runs out.

*As a nurse, I'm not allowed to give medication. The doctor decides you can get this medication. (*Participant 9)

*It needs to come from the top … data shows that it works, for some reason it has not been rolled out by the government yet. We haven't received anything from national that needs to be implemented yet or to that effect … it [PrEP] is used as a first line treatment when they are diagnosed … in South Africa. (*Participant 7)

There was a general understanding regarding the difference between PrEP and PEP amongst the research participants. PEP otherwise known as post-exposure prophylaxis is used in South Africa as a post-exposure drug for an individual that has been exposed to HIV and PrEP (otherwise known as Truvada) is used by individuals that are HIV negative but are high risk of contracting HIV as a preventative measure to remain HIV negative. PrEP has different applications in the government sector where it is used prophylactically as a drug that is taken after being exposed to HIV (PEP) or as a drug that is used as an ARV treatment for individuals that have become HIV infected to slow down sero-conversion of the HI virus.

I know that some patients getting Truvada but it's those patients that are failing on regime two. (Participant 9)

Participant 9 explained what is meant by "failing on regime 2":

*Patients that start treatment on regime 2 and if it fails to help them then the doctor puts them on regime 3 which has Truvada as one of the drugs to be taken … Also, if the patient has side effects from regime 2 the doctor will put them on regime 3. (*Participant 9)

*It is a first line treatment in South Africa … when they are first diagnosed … we giving out Truvada anyway. (*Participant 7).

Participant 7 explained that Truvada is in the clinic and they dispense it to patients for treatment of HIV and it should not be a problem to give out Truvada as PrEP as they are already dispense it.

> *I didn't try to access it because I didn't know that it was available.* (Participant 2).

4.2.3.2 Barriers to PrEP therapy initiation

Finances are always a concern especially when it comes to health care. Participants expressed their concern with regards to PrEP therapy requiring more money from the government in order to initiate the PrEP programme. Besides the expense of the drugs, one also has to consider the testing that needs to be done on a regular basis and monitoring of the patient which could increase the cost factor.

> *I'm assuming the PrEP is quite expensive and more expensive than ARVs. I am not sure but I am assuming … they are not using it as there is a lack of funding and nowadays meaning the capacity meaning resources, manpower and leadership and will to distribute it. So lack of hope. It will take years before people have it … this year I decided to do a male circumcision. Also for protecting myself. And the clinic was short of medication, which was at Clicks for R20 … this was one of the good clinics.* (Participant 8).

Participant 8 stated that there is a "lack of hope". He explained that he has no hope of PrEP being dispensed at the clinic as there is poor infrastructure and lack of staff. He further stated that there are no finances available for adding another medication to the public sector.

> *So if you have somebody on PrEP and they become resistant, are we still going to be able to use combination or are we going to need resistance testing which is going to increase costs? ... it needs come from the top, we can script the patient privately but they cannot obtain this from this facility and the patients cannot afford it.* (Participant 7).

Participant 7 explained that the patients that come to the clinic can barely make it to pay for the taxi fare to reach the clinic for their appointment. They have limited money for their monthly expanses and therefore will not be able to purchase Truvada from a private pharmacy as they cannot afford it.

A barrier to issuing PrEP therapy is the availability of the drug at the clinics for the individuals that choose to utilise PrEP. The participants questioned that if the drug was to be initiated, would there always be a supply of PrEP or will they run into shortages and be unable to deliver the drug to the patients that require the therapy resulting in poor adherence and HIV vulnerability for the those individuals at high risk of contracting HIV.

> *If we start giving out the medication and we run out, the patient will be left without medication …* (Participant 12).

Patients are required to frequently visit the clinic when on PrEP therapy to ensure that they receive medication and are monitored. The concern for the participants was that patients do not often visit the clinic timeously for various reasons and some patients have a lack of interest which could result in defaulting patients. This could also lead to resistance of the drug. More importantly patients might not want to continue taking the drug as it could cause side effects which could cause harm to a patient that is not ill in the first place.

> *Maybe I don't get to the clinic as often as I should. Erm … time and transport is an issue and money is tight … If I was given the chance and it was accessible to me then I would. If I could get it easily. If it was supplied or given to us or if the clinic came to us like a mobile clinic* (Participant 1)

> *I come to the clinic every eight months. We don't find time to come to the clinic.* (Participant 2).

Participant 2 explained that she works during the week and does not have time to go to the clinic as the clinics are closed on weekends. If she does not go to work she does not get paid for the day and she sometimes does not have money to take the taxi to get to her nearest clinic.

> *More defaulters to medication, makes it difficult, makes it a big problem here, stress … because like this clinic is for HIV, if a patient does not adhere to medication you have to do adherence counselling every time the patients come. You know the queue, the waiting time will be more.* (Participant 9)

> *If I had all the information that would provide security that it would not make me ill in other ways in the future, because medication is not really a good friend of mine, or if it will sort out that it is chronic medication that I will be taking every day and they can tell me how it's going to act long term on my body. Then if I get this information I will take it.* (Participant 5)

> *I think implementing this drug in the public domain will not be a difficult thing. I think that the problem will be minor. I think the people will ask like will the shape of my bum change, get something like contraception.* (Participant 8).

One participant explained that if an individual at high risk of contracting HIV seroconverts while on PrEP therapy there will be consequences that will impact negatively on the individual and to the community as a whole if there is resistance found since it is a first line drug that is used when a patient is newly diagnosed with HIV.

> *Because we are using it as pre-exposure, if there is a slip in the system and the patient seroconverts, it's likely that we might be resistant to it. It is used as a first line treatment in South Africa when they are first diagnosed.* (Participant 7)

The research participants felt that the introduction of PrEP therapy could lead to increased irresponsible behaviour like a decrease in condom usage or sending out a

message to people to behave in an irresponsible manner. Participants questioned whether PrEP therapy would influence the public in a positive or a negative way. It is possible that individuals taking PrEP therapy would feel protected enough that they would stop using other means of prevention like condoms.

> *When PrEP awareness is fully out, people will suddenly decline in using condoms. Well now a lot of people don't want to use condoms. Will PrEP be more of an incentive not to use condoms? Does PrEP prevent other STIs because it's not just AIDS. And also when people hear about STIs they only think it's HIV or AIDS … Will it advance sexual behaviour? If people who are taking preventative measures like condoms they say it gives less pleasure. I feel like people that do not behave irresponsibly will now start behaving irresponsibly after taking PrEP coz they feel like they will be protected if they take PrEP. They will say finally I can stop using a condom.* (Participant 8)

> *I use a condom, only for rich clients I don't use … our problem is that they don't want to use condoms so this will benefit us … People who are busy should take PrEP especially when they don't want to use condoms.* (Participant 3)

The participants felt like it was the place of the doctor to discuss initial treatment of PrEP therapy with the high risk individuals and thereafter be monitored by nursing staff in the clinics. However participants discussed that there was a culture barrier which compromises the care that they receive and sometimes limits it to what can be understood but it is important that the patient understands what has been explained to them.

> *Coz the thing is that with the patient population there is a race barrier. Patients might not open up to doctors but will open up to nurses so it's very important that for our nurses to know what's happening and what to do in that situation and how to help the patient.* (Participant 7)

In South Africa we are still fighting against stigma and it still is a concern for the high risk individuals that will be taking PrEP therapy. The participants expressed their

concern of what the public will think of people that are currently taking PrEP therapy and associate them with being promiscuous and ‘dirty’.

> *So what we are going to do is make little packs for them, you know like er … even if the condoms are packed in it. Put the condom and the PrEP inside and hand it out to patients. You know like if we get a sponsor like naarjties with condoms so they can take it to their community so they won’t be judged coz they packaging is covered so the condoms inside are not visible.* (Participant 14)

One participant spoke about the stigma related to asking for PrEP therapy and how difficult it would be to access it as the individual would be embarrassed to ask for the drug. This is a matter of educating the public and ensuring that both staff and high risk individuals are ready to implement PrEP therapy. PrEP therapy is like any other treatment that should be made available to the public with no discrimination or stigma attached to it.

> *They will judge us. They will asking you what are you using it for and then if you tell them you are a sex worker they will look at you differently. Like you are bad … they will look at us funny … How can we ask them if we are engaging in unsafe sex? How can we tell them we want this because we don’t want to use condoms, serious, we have to make money somehow. There is a stigma attached to it. I’m too embarrassed to ask. (Participant 3)*

4.2.4 Creating awareness

This category emerged from the participants’ ideas on how to get more awareness of PrEP out to the communities and medical staff. It is imperative for the public to be aware of PrEP therapy and to be educated on it to assist them in maintaining a negative HIV status, and it is equally important for the medical staff implementing PrEP therapy to be educated on it to provide the best service they can to the community.

4.2.4.1 Lack of communication

Social media plays a vital role in getting new information out to the public at a fast pace. Participants explained to the researcher that there is a lack in advertising in the social media for PrEP therapy and as a result many people don't even know about the drug. There is a lack in communication when it comes to PrEP therapy for the public.

> *I also think that people do not know about PrEP and I come from a community or a township that will definitely use this to erm … I'm also university educated and I don't know much about it ... we need to channel all the information through social platforms that people are using … there is no PrEP awareness. People know a lot about HIV and ARVs.* (Participant 8)

Participants said that social media has a vital role to play in promotion of PrEP therapy as most individuals communicate via social media so it will be a good platform to start communication on PrEP to educate the public. Television, according to the research participants, is also an excellent way to educate and communicate about PrEP therapy as most households have access to a television and can be easily educated in this manner. To encourage visits to the clinic for educational talks about PrEP therapy, there could be meals provided for the public. The general idea is to get communication out about PrEP therapy to the community and there are numerous ways to do so according to the participants.

> *I think from the government they need to advertise more, they must make it like how they had ARVs if you are infected, so if you not infected you must get PrEP. It must be accessible to all. Must be in the newspaper, TV, SABC news, on eTV news, must be more on social. The doctors and clinics must have posters. Not only for sex workers, it must be for everyone because everyone has unsafe sex.* (Participant 3)

> *More advertising where we work, advertising and reminders. That's the important part. Possibly on cell phones where you get prompts on your cell phone. Technology the way it is now, is the easiest way to get direct access to*

someone. I think that if people have a facility of a cell phone then it would get to them. Most people have cell phones so it would be a reminder, your subconscious and your conscious would remind you to take it. (Participant 1)

I think you should promote it more on the streets and maybe put it out on the TV ads or have campaigns about it on a weekly basis at the hospitals or clinics … if we can this information out on the street to the people like us then it will help. (Participant 4)

The only thing I can think of is television and social media. Because this is a pandemic and you have to reach the people out there. If it's available people are going to go for it. (Participant 7)

We need to look at statistics and the clinics that are exposed, have high HIV incidences and you know like lectures at those clinics. We can offer them something in return like lunch, something after to attract more people. We can't do much until we have authorisation. (Participant 6)

I think we must go to where there are more people, like ranks, bus stations, schools then do more visits as well. (Participant 10)

4.2.4.2 Lack of client awareness

Participants also suggested creating awareness through newspapers, posters and road signs about PrEP therapy.

…they need to advertise on TV only for the negative patients, put it in the newspapers. All the street corners must have signs up. Create a buzz about this. (Participant 14)

Put the posters up on the board. You can ask HR to help you. Talk to the patients that come to the clinic everyday. (Participant 12).

Participants identified community outreach as a form of creating awareness for PrEP therapy and also creating a demand for the drug. It is suggested that once the public are aware of PrEP therapy availability, there will be a demand created for it.

> *Basically we need to identify the people at risk, go to areas where HIV is more prone like different suburbs and mostly rural areas … People don't know about protection and they don't know how it is transmitted … most of them are not using protection. Identify these areas and tell the people about PrEP.* (Participant 6)

> *Talks in schools, in rural areas where grannies and little kids are being raped. So let everyone know.* (Participant 13)

4.2.5 Expectations

This topic was developed from what the participants would expect once PrEP therapy was implemented in the PHC clinics.

PrEP therapy initiation is not only dependent on one individual but on a whole team to ensure the success of the drug. There needs to be involvement of the multi-disciplinary team and the high risk individuals to ensure the success and maintenance of PrEP therapy.

> *We will have to find a way how we going to distribute this medication also doctors need to be involved in order for this to be multi-disciplinary … to service the people in the community.* (Participant 14)

An essential part of PrEP therapy is that the individual takes the medication timeously for it to work effectively which means that the individual needs to ensure that they have the PrEP therapy to take on a daily basis and that they have access to the treatment to ensure that they can receive more medication.

If I was given the chance and it was more accessible to me then I would. If I could get it easily. If it was supplied or given to us or if the clinic came to us like a mobile clinic. (Participant 1)

Participant 5 suggested that the medical professionals are not giving out information that is needed by the individuals at high risk of contracting HIV and that they are avoiding approaching the subject of PrEP with individuals that enter into the clinic. It could be that health care professionals are not 'brave' enough as they have not received adequate education on PrEP therapy and have never been exposed to the drug with regards to giving out the prophylaxis. The participant mentioned going to the clinic about five times and being recognised by the health care professionals however not being approached by the medical professionals although they know that this participant is at risk of contracting the HI virus. This seems to be a case of medical professionals also sticking to their daily routine and not going beyond what is asked of them.

I think medical professionals, whether doctors or nurses. I think that they should be more open. Explaining to prepare someone see like how when I walked in and doing my HIV test, if you know my face by the fifth or third time in certainly you should explain to me something that would be a preventative measure that would work better for me that would be a good thing if they could get more exposure and relate it to the patient. (Participant 5)

4.3 CONCLUSION

By interviewing research participants that were either involved in HIV care and treatment of individuals or affected by HIV, it was possible to understand how best to use the information gathered to build an implementation plan for the DoH guideline for the implementation of PrEP therapy. There were five main categories that were discussed in this chapter namely: PrEP readiness, Education, Challenging issues, Creating awareness, and Expectations Each category was unpacked to better understand the perspectives of the research participants. It was found that although PrEP therapy is known by primary health staff and individuals at high risk of

contracting HIV, their knowledge was limited and they required more information to understand the treatment. There were good reviews on PrEP therapy and it was welcomed by both the PHC staff and the individuals at high risk of contracting HIV. However, there was concern that implementation of another programme in the government sector would pose more challenges to what is already a very challenging situation in the clinics.

There needs to be more focus on marketing of PrEP therapy to create awareness of its availability and to educate the public to create a demand for the therapy. The research participants expressed their concerns with PrEP therapy and their desire for support for the implementation of the DoH guideline for the implementation of PrEP therapy in the KZN government clinics.

CHAPTER 5: DISCUSSION OF FINDINGS

5.1 INTRODUCTION

This research aimed to understand the perceptions and challenges of PHC nurses, medical practitioners that practice in PHC clinics, support staff in PHC clinics and individuals at high risk of contracting HIV infection, on the implementation of PrEP therapy and to develop an implementation guideline for the DoH guidelines on PrEP therapy in the KZN public sector PHC clinics. The result of this research is an implementation plan that was developed to assist with the implementation of the PrEP therapy guidelines set out by the DoH. Chapter 4 represented the data that was collected from the research participants through one-on-one interviews that were analysed and coded by the researcher, guided by Charmaz's grounded theory principles. Chapter 5 includes a discussion on the data found and theory to substantiate the information so as to form the guide that will assist with the implementation of PrEP therapy in PHC clinics in the KZN province.

5.2 SITUATING THE STUDY

Research in HIV and AIDS has grown considerably since the discovery of the virus in the 1980s (Gallo & Montagnier 2003). The focus of the research has been around prevention and eradication of the virus. To date there have been many programmes including the 'ABC' programme and those generated by private organisations that have brought awareness about HIV and AIDS and has driven prevention strategies and the introduction of PEP which has given individuals the opportunity to live a healthy life with HIV. PrEP is another prevention option that has been made available to the South African public at high risk of contracting HIV (Bekker *et al.* 2016). PrEP offers a reduced chance of becoming infected with HIV (after being exposed to the virus) if the therapy is taken as prescribed.

This study investigated the perceptions of the PHC nurses, PHC support staff, medical practitioners and individuals at high risk of contracting HIV to understand what can be

done to assist with the implementation of PrEP therapy guidelines in the public PHC clinics.

Research into PrEP therapy has placed a lot of emphasis on testing the drug and has produced phenomenal results when looking at how PrEP reduces the risk of HIV infection in individuals that are at high risk of contracting HIV (Grant *et al.* 2010). The iPrex study (Grant *et al.* 2010) is a clear indication that by taking PrEP therapy as prescribed there will be a reduction in the chance of an individual contracting HIV. Another study conducted by the CDC in Botswana showed a 63% reduction in risk of contracting HIV in HIV negative heterosexual men and women (Roehr 2011). Studies like these have sparked the initiation of PrEP therapy guidelines to assist health care workers with identifying individuals at high risk of contracting HIV and for maintaining these individuals on PrEP therapy for however long they choose to take it. The guidelines are available for health care providers to access and apply the principles, although it has been noted that there is a lack of knowledge of how to apply the PrEP therapy guidelines and therefore the guidelines have not been applied in the public PHC clinics.

5.3 THE RESULTS

The discussion below includes the categories that were found by the researcher after the data collected had been coded. The findings were then linked to literature which is discussed in this chapter which led to the development of an implementation plan for the DoH guidelines for PrEP therapy.

5.3.1 PrEP readiness

The category of “PrEP readiness” emerged from the research participants’ attitude toward PrEP therapy initiation. It involved the understanding of the participants concerns of what was needed for PrEP therapy to be initiated. The lack of knowledge of PrEP therapy was very prominent in this category. The research participants’ knowledge was minimal on PrEP and ranged from hearing about PrEP briefly from other colleagues or friends to having never seen the drug or dispensed it. Staff that

are dispensing PrEP therapy need to be comfortable with prescribing PrEP therapy as this will be the first contact with patients that receive the medication and require support and education on PrEP (Sharma *et al.* 2014). This requires staff to be trained on PrEP so that they can give holistic care to patients according to the WHO guidelines for PrEP (2016). Education on PrEP therapy is essential for medical staff as they will be the initiators of the treatment and are required to be confident to ensure the best care is given to the patient.

The research participants were confident that once PrEP therapy was implemented it would be another method of prevention to assist in decreasing the number of HIV infected persons in the KZN province. Participants were sure that PrEP therapy would gain popularity once the awareness and education about PrEP therapy was disseminated in the community and that there would be a demand for PrEP therapy at the clinics.

PrEP therapy was not being used as a HIV prevention strategy in the PHC clinics in the KZN province that were included in this study. This could be due to the DoH PEP guidelines (2019) that suggest the use of Truvada as a post-exposure prophylaxis for patients that have been exposed to HIV and require treatment for up to 72 hours of being HIV exposed. There has been no enquiry from the medical staff as to whether PrEP can be used as a prevention strategy for HIV negative individuals. Pebody (2015) has suggested that one of the reasons why medical practitioners might be resistant to prescribing PrEP could be a lack of awareness of the drug. WHO guidelines for PrEP (2016) suggests that there needs to be adequate knowledge given to the community to create awareness and medical staff also need to have adequate knowledge to provide holistic care to the patient. If there was more awareness around PrEP therapy in the community then this would create a demand for PrEP therapy which will force staff to be more knowledgeable on PrEP therapy in-order to serve the community.

The participants discussed adherence as being an issue with PrEP therapy. As it stands there seemed to be a lack of adherence with chronic medication for patients that attend the clinics. PrEP therapy requires the individuals who are taking the

medication to be consistent. The individual needs to be 100% compliant for effectiveness of PrEP therapy. In-order to optimise PrEP therapy adherence Marcus *et al.* (2014) suggest support should be given to the individual taking the drug on a daily basis and also medication education and importance of adherence must be explained to the patient before the commencement of any medication. A system needs to be set up prior to the initiation of PrEP therapy to assist with compliance of the therapy for the individuals that choose it. The system must be user friendly and enable monitoring of the individual taking PrEP therapy and be informative to the individual so that they are aware of what PrEP is about. Bekker *et al.* (2016) explain that education on monitoring of PrEP usage should be done with the staff at the clinic to ensure that patient monitoring and maintenance on PrEP therapy is done. There is a project which can be used in the education of people regarding PrEP which is called 3P for PrEP. This was intended for heterosexual individuals who are sexually active. The 3P project was introduced in Cape Town aimed at delivering oral PrEP and HIV prevention guidance to people for a period of one year (Smith *et al.* 2010: 1203). The primary purpose was to check whether giving people encouragement could assist them in the use of PrEP until the disappearance of side-effects. The secondary aim was to verify if existing means of creating attention in PrEP were functioning as well as expected.

5.3.2 Education

As effective as PrEP therapy is, there seems to be a low uptake on this prevention treatment strategy in countries that have it available (Dolezal *et al.* 2015). The interest in a new prevention method may pique the interest of an individual who the prevention method appeals to, but education needs to be provided to the broader public to improve the uptake of PrEP in individuals at high risk of contracting HIV. To increase the uptake of PrEP therapy there needs to be improved knowledge amongst health care providers who need to be competent to discuss PrEP therapy with individuals and know where to access the drug (Petroll *et al.* 2017: 2).

There should be sufficient education provided about PrEP therapy to individuals at high risk of contracting HIV and the PHC staff that are involved with PrEP therapy.

Education in PrEP therapy will empower PHC staff to confidently assess individuals that require PrEP therapy and then implement PrEP therapy. Some people are unwilling to make further enquiries regarding the therapy, so education needs to be very precise and at the same time comprehensive to ensure that anyone who learns about the drug learns almost everything about the therapy in that first session. It can also be said that many people are not fully educated regarding PREP therapy and still lack facts about PrEP. This was noted by the research participants' responses. According to participants, many clients requested more information regarding the therapy. This supports that people are undereducated regarding the therapy. The lack of education in PrEP therapy in the community and the lack of training of the providers of PrEP therapy can be a downfall for PrEP therapy implementation and maintenance (Arnold *et al.* 2012). The key to maintenance of PrEP therapy is education and on-going education for both the provider and the community. It is suggested by Schneider *et al.* (2008) that there should be staff trained to go out into the community to test individuals for HIV and educate the public. These workers are already active in South Africa and are known as community health care workers (CHWs).

According to Bil *et al.* (2018) it is necessary to establish the perception of health workers on PrEP before involving them in a PrEP programme. Krakower and Mayer (2012) agreed it is critical to understand PrEP providers' knowledge, practices and attitudes towards PrEP prescribing, and to develop strategies for engaging and training providers to provide PrEP. Some HCWs still believe myths about HIV and PrEP (Kambutse *et al* 2018). As already stated in the literature chapter, PHC nurses have been trained on PrEP, but this study's results indicated that because of their daily workload and the perceived lack of information on PrEP they do not give enough time to PrEP administration. Although the CHW can decrease the workload of the pHN, as been done with TB and directly observed treatment (DOTS), they are not yet used for the education of PrEP. There is no research about CHW involvement in introducing and educating communities on PrEP in South Africa.

Research participants indicated that education and awareness must be conducted in places where it will reach large parts of the communities for example schools, community centres, rural areas and the local clinics. This will mean that the majority

of the communities would be made aware of PrEP therapy. WHO (2017) state that one of the main keys in implementing PrEP therapy is to ensure that the knowledge is increased amongst the PrEP users. When the awareness of PrEP is high, so will be the demand. However, numerous individuals who could use PrEP are still uninformed of the availability of this HIV prevention strategy. The awareness of PrEP should be put together with education (McCormack *et al.* 2016:57). People should not just be briefly informed of PrEP rather, they should also be educated at the same time in order to remove the stigma and other barriers such as lack of sufficient knowledge which may hinder them from being ready to use the prevention strategy.

Commitment to daily PrEP adherence has proven to be a challenge. The active use of therapy should be monitored in every health visit where the distribution of or prescriptions for PrEP are made. Humans generally fail to consistently use prescribed drugs (Menza *et al.* 2009: 552). Methods used in other programmes like DOTS used in TB management may be successful to increase the uptake of PrEP. These methods use cell phone reminders and involve taking pills based on a day-to-day routine.

5.3.3 Challenging issues

All new treatment interventions are faced with challenges when they are introduced (Venter 2018), and the introduction of PrEP into the South African is no different. As observed and proved by results from the interviews with PHC nurses, PrEP therapy had never been implemented due to a lack of experience with the programme. Research participants expressed their concerns should PrEP therapy be implemented in PHC clinics and offered some solutions as to how the challenges that such introduction might experience may be overcome.

A concern that was brought up repeatedly by the doctors and PHC nurses was that the workload would be increased if PrEP therapy was introduced to the PHC clinics. This would require more work to be done by the PHC nurses at the clinic with an increased number of patients requesting PrEP therapy. The doctors and the nurses expressed that they were already overloaded with work and could not cope with more work added to their daily routine. Monitoring of the patients on PrEP therapy treatment

and the initiation and counselling of patients need to be conducted by the nursing practitioner according to Blackwell (2014). Furthermore, the nursing practitioner needs to develop a plan for the patient on PrEP therapy with regards to their behaviour and well-being (Cohen & Baden 2012). This can be time consuming for the PHC nurses considering the amount of patients that they already deal with on a daily basis. Individuals at high risk of contracting HIV that use PrEP therapy must be provided with a month follow-up to assess ongoing eligibility, tolerance, safety and adherence. Hepatitis B vaccination and STI treatment, condoms and condom-compatible lubricant, risk reduction counselling, adherence and support needs to be given to these individuals (Marrazzo *et al.* 2015: 512).

Research participants complained about the shortage of staff at the PHC clinics and that there are barely enough staff members to get through the number of patients seen in the day. Govindasamy, Ford *et al* (2012) stated that in-order to retain patients on PrEP therapy there needs to be more enrolments of individuals for the therapy however there is a shortage of nurses in sub-Saharan Africa (which includes South Africa) which has a negative effect on both adherence and treatment of an individual. *The Citizen* newspaper (2017) published an article about the nursing shortages in South Africa pointing out that the country is heading for a national crisis. According to the KZN Health MEC, Nomagugu Simelane-Zulu (Nxumalo 2019), staff shortages have become a serious problem in the province, with most health facilities understaffed and carrying a heavy patient load A suggestion by the research participants was to hire more staff at the PHC clinics to assist with the implementation and maintenance of PrEP therapy.

There is limited access to PHC doctors in the PHC clinics as there are a small number of doctors who cannot see all patients due to time constraints because of the number of patients visiting clinics on a daily basis with chronic and other diseases. Some clinics have to refer patients to other clinics to see a doctor as there may be no doctors that are scheduled to work in there, especially in the rural areas. In such clinics the PHC nurses are expected to examine and initiate therapy for patients.

In-order to meet the requirements to receive PrEP therapy an individual needs to be assessed according to the DoH guidelines for initiating the PrEP therapy programme. Once this assessment has been conducted PrEP is initiated by the PHC doctors and maintained by the PHC nurses on frequent visits to the clinics by the individual on the therapy. This will cause an increase in work load for staff possibly resulting in more staff taking sick leave or losing their motivation to work which will impact negatively on the individuals seeking PrEP therapy (Colvin *et al.* 2010).

Individuals on PrEP therapy need monitoring on a frequent basis and need to attend regular follow up clinic visits. PrEP is adversely affected if the clinic is short staffed (WHO 2017). There is the possibility of individuals on PrEP therapy defaulting on medication due to long waiting periods to be seen or lengthy timelines between appointments. Furthermore these individuals on PrEP therapy require counselling, blood tests and analysis for drug resistance testing and there must be monitoring of side effects. PrEP therapy must be delivered in a setting where other methods of prevention can be re-enforced and an individual on PrEP therapy can have regular testing and monitoring of compliance to the PrEP therapy (Molina *et al.* 2015). This all points to the need for there to be sufficient staff to implement and monitor individuals taking PrEP in order for PrEP to be effective in preventing an individual from acquiring HIV.

PrEP therapy cannot just be seen as a drug that is taken as a preventative against HIV. If an individual decides that they want to commence with taking PrEP therapy there are certain expectations that the individual must abide by. According to Volk *et al.* (2015) individuals taking PrEP therapy need to change their risky behaviour and, along with PrEP, use other protective measures (such as condoms and reducing the numbers of sexual partners) to assist them to remain HIV negative This goes hand in hand with counselling, including side effects, of the individual that want to start PrEP to explain what is expected once they start the therapy.

The cost of preventative strategies in countries like South Africa where HIV is considered to be an epidemic, have proved to be higher compared to countries that do not experience such an epidemic (Gómez-Olivé *et al.* 2013).

Numerous research participants acknowledged that HIV-related stigma pose particular challenges which may negatively influence the use of PrEP. Stigma may prevent high risk groups such as sex workers, drug users and men who have sex with men, making use of PrEP (Liu *et al.* 2014: 5).

5.3.4 Creating awareness

Services provided by medical facilities, including PHC providers, need to be in accordance with CDC guidelines and those approved by the SA HIV Clinician Society for PrEP, in order for PrEP therapy to be utilised effectively (Eaton *et al.* 2015: 248). PrEP is only fully effective when it is adhered to exactly as prescribed and also does not protect against other STIs, therefore it needs to be delivered as part of a comprehensive sex education approach (Liu *et al.* 2014: 4).

Peterson *et al.* (2007: 27) assert that risk-reduction psychotherapy can be used as an addition to training in the correct use of PrEP. This can be used as a method of developing awareness. Counselling is then accompanied by follow-up visits. The main goal of risk-reduction counselling is for individuals to set a genuine objective for change of behaviour which will then lower their risk of acquiring HIV (Bernstein *et al.* 2012). This is very effective if it is non-prejudicial and user-centred. Risk reduction counselling may be offered by any healthcare provider that is trained and should address the following:

- Discover the context of a person's particular sexual practices, and help in identify which of their activities are related to a greater risk of HIV infection. Clinicians also ought to be aware that some individuals may not at all times recognise their own risk, or they could be in denial about it;
- Identify the sexual health fortification requests of the people and help them reflect on their main concerns;
- Strategise with the individuals on ways which they may accomplish a reduction in risks and
- Come to an agreement on which tactics the person may be willing to explore, and direct them to choose their implementation.

5.3.5 Expectations

Although PrEP may offer a real safeguard against HIV, it does not guard against other diseases that are sexually transmitted as well as illnesses which are blood-borne such as Hepatitis C, gonorrhoea and syphilis (Marrazzo *et al.* 2015: 512). The author further explains that the efficiency of PrEP is narrowly allied to adherence implying that if a person is taking the drug and then regularly missing daily doses, this would substantially increase their risk of getting HIV. This needs to be explained to the individual that starts taking PrEP in the counselling session and it must be understood by the individual. Therefore, it is crucial that any plan offering PrEP delivers it as part of a blended package of prevention initiatives based on an individual's circumstances, with support and advice on the importance of PrEP adherence.

PrEP therapy that is taken daily has proven to lower the risk of getting HIV from sex by more than 90% and from injection drug use by more than 70%. People can combine additional strategies with PrEP to reduce their risk even further (Peterson *et al.* 2007: 27). The presence of PrEP in the bloodstream prevents seroconversion in the body. PrEP will not be as effective if it is not taken daily as prescribed (Peterson *et al.* 2007: 27).

Regular HIV testing is necessary while taking oral PrEP. If a person using PrEP gets HIV, PrEP use must be discontinued as soon as possible, to reduce the risk of developing drug resistance. If a person’s HIV becomes resistant to the drugs in PrEP, those same drugs may not work to treat HIV.

PrEP will not suit all clients. PrEP should be considered for clients who are most likely to benefit from this specific prevention strategy as part of a package of HIV prevention services. The therapy usage requires commitment. Usage requires commitment from both the staff and the user to ensure success. Providers may need to be innovative in providing support to these users (Marrazzo *et al.* 2015: 512).

PrEP availability and community knowledge of the availability will increase the uptake of the drug. In order to understand what role counselling and behavioural implementation can play in an individual that is taking PrEP, one first needs to understand the risks associated with taking PrEP over long periods (Calabrese *et al.* 2014). This, according to Calabrese *et al.,* depends on feedback from both the providers and the high risk individuals taking the medication.

5.4 CONCLUSION

Chapter 5 discussed the findings integrated with relevant literature to substantiate what was found in this study. In some instances there was no literature available to support the findings therefore this is now added as new literature to the body of knowledge. The study has highlighted what challenges are being faced by both PHC staff and individuals at high risk of contracting HIV when it comes to the implementation of PrEP therapy in the PHC clinics in KZN. The results of this study underpin the implementation plan that was developed for the implementation of the PrEP therapy guideline which will be discussed in Chapter 7.

Chapter 6 concludes this study with a summary and recommendations for future research.

CHAPTER 6: SUMMARY OF THIS STUDY, RECOMMENDATIONS, LIMITATIONS, CONCLUSION AND REFLECTION

In this chapter, the summary of the study is discussed as well as the recommendations, limitations and conclusion to this study. The reflection of the researcher is included in this chapter.

6.1 SUMMARY OF THIS STUDY

The main aim of this study was to develop a guideline for the implementation of the DoH PrEP guidelines for the PHC clinics in KZN. The research involved discussions with medical practitioners, PHC nurses, support staff at the PHC clinic and high risk individuals. The results of the discussion leaned toward the following topics: PrEP therapy readiness, education on PrEP therapy, challenging issues, creating awareness and expectations. The results built a foundation for the formulation of the implementation plan for the DoH PrEP therapy guidelines. Chapter 6 includes the conclusion, limitations and summary of this study.

6.1.1 PrEP readiness

Knowledge of PrEP therapy was minimal amongst the individuals at high risk of contracting HIV and primary healthcare nurses. All the participants were aware that PrEP exists and that it is a preventative measure that can be used to prevent HIV infection but there were many questions that would still need to be answered if it were to be rolled out. There was uncertainty regarding whether it would be accepted by the community and whether there is sufficient infrastructure and person power to implement PrEP therapy.

6.1.2 Education

The participants of this study made it clear that for the community to gain access to PrEP the infrastructure needs to be strengthened in the PHC clinics. Access is a

matter of time and education on the topic of PrEP therapy for both the PHC staff and the high risk individuals meaning that there needs to be more time allocated in a day for more individuals to be counselled and educated on PrEP therapy and regular visits by individuals to get medication. There also needs to be on-going education for the community and the PHC staff to keep abreast and be updated with PrEP therapy for efficient delivery of PrEP to people at high risk of contracting HIV.

6.1.3 Challenging issues

There was a positive attitude toward PrEP therapy as another preventative measure that can be used to prevent HIV infection, however both the medical staff and the high risk individuals expressed concerns about PrEP therapy initiation regarding barriers that would prevent PrEP therapy being successful and issues that would need to be dealt with first. The issues/barriers and concerns included: having no experience with the drug and not knowing the risk factors or having enough knowledge to initiate PrEP therapy, lack of compliance and monitoring of individuals on the therapy, issues about PrEP therapy availability and out of stock issues that might occur, high risk individual issues with regards to follow-up appointments and lack of interest, insufficient funds for PrEP therapy, uneducated staff and culture barrier.

6.1.4 Creating awareness

The main idea was to get more publicity about PrEP therapy by means of social media and advertising. More needs to be done to increase the awareness of PrEP therapy among the public and to make it available at all PHC clinics to decrease the number of individuals becoming infected with HIV.

6.1.5 Expectations

Once PrEP therapy is initiated in a PHC clinic there needs to be commitment from the PHC staff to ensure that there are sufficient members availabe to ensure that individuals at high risk receive PrEP therapy as well as are monitored on the therapy and receive counselling to assist them to adhere to the therapy. The PHC staff need

to be updated on PrEP therapy knowledge so that the correct standard operating procedures are adhered to when evaluating if an individual is at high risk of contracting HIV. The PHC staff need to understand how to approach individuals to offer them PrEP therapy if they are seen as individuals at high risk of contracting HIV. It is essential that PHC nurses have the knowledge to counsel individuals at high risk of contracting HIV on the importance of attending regular clinic appointments and adhering to medication to maintain their HIV negative status.

6.2 RECOMMENDATIONS

Arising from this study the following recommendations are proposed for consideration in further research:

- To extend the research to more disciplines within the PHC clinic environment to better understand their perspective of PrEP therapy within the provincial sector.
- To develop the implementation plan further so that it can be used across other treatment programmes that are being introduced to PHC clinics.
- To study PrEP therapy implementation in the private sector to add more information to the field of PrEP therapy implementation.
- To include PrEP therapy in nursing education

For practice:

- Advocate adoption of the DoH guideline for PrEP implementation using the implementation plan.
- Develop community collaboration to create PrEP awareness.
- Develop a marketing strategy to improve awareness about PrEP availability and access.
- Broaden knowledge of PrEP therapy among PHC staff and public.
- Assess the workload of existing staff to ascertain whether PrEP will add significantly to their workload.
- Add a policy for continuing professional development (CPD) for nursing on PrEP therapy to increase knowledge.
- Evaluation of the implementation plan across all sites in KZN.

- Technology is seen as key in this day and age. The public sector depends on paper and pen to keep records and monitor patients. This approach is time consuming and it is difficult to keep abreast of all patients when it is not computerised. The government sector needs updated technology to assist with monitoring of individuals that are taking PrEP therapy as an HIV preventer to facilitate the decrease in the amount of newly HIV infected individuals.

6.3 LIMITATIONS

The study was conducted using the grounded theory methodology where in-depth interviews were conducted on a one-on-one basis with the researcher. A limitation of the study could be the participants that were interviewed. This research included the perspectives of PHC nurses, PHC doctors, PHC support staff that worked in the clinic with patients and individuals at high risk of contracting HIV. More research participants of different categories could have been included. Future research could include more research participants from different disciplines that have interaction with PrEP therapy for example pharmacists, hospital management and district office staff.

Some of the staff of the PHC clinics volunteered to participate in the research study, but were many staff members that chose not be a part of the research as they had participated in other studies and did not want to contribute to it. Valuable information could have been received from those staff that chose not to participate in the study, however, there was sufficient information received from the PHC staff members that did choose to participate in the study. There was also the concern that there was a shortage of all categories of staff and that there was no time to participate in other activities in working hours (such as being interviewed by a researcher). Time should be allocated to PHC staff to engage in research as the medical environment is forever evolving; this would make it a better environment for both the patient and the staff. The staff attitudes toward research should be more open as research serves as a tool that can improve medical health care.

6.4 CONCLUSION

This chapter concludes the research study on the implementation plan for the DoH PrEP guidelines. The summary of the study highlights the main findings of this study that assisted to develop the implementation plan for the DoH PrEP guidelines. The study found that the perceptions of PHC doctors, PHC nurses, PHC support staff and individuals at high risk of contracting HIV were interrelated and paved the way to discover why PrEP therapy was not being initiated in the provincial PHC clinics in KZN as a preventative therapy for HIV infection.

6.5 RESEARCHER'S REFLECTION

The journey of this research has opened my understanding of how the provincial health care sector functions, plans and interacts with the public. In the one and a half years spent on collecting data I have become aware of what the PHC clinic staff deal with on a daily basis.

I have had the opportunity of interacting with different categories of staff employed by the provincial sector. Having grown up with a private medical aid and the ability to walk into any private hospital and be treated almost immediately or by appointment left little room for understanding how the government sector is organised. Patients seeking medical attention in the government sector sometimes wait for six to eight hours after arriving at the clinic three hours before the clinic is opened for service so that they can be seen early. The long hours of waiting to be seen as a patient could impact negatively on individuals that want to collect PrEP at the clinic as it will take a whole day to collect a month's medication with most individuals not being able to afford taking off work or having the patience to wait long hours to receive medication. The PHC nurses have to deal with volumes of patients on a daily basis to the point where sometimes patients are given tickets to return the next day as the clinic hours for the day had expired. The nurses seemed tired and not motivated to take on more workload. The introduction of PrEP could put more stress on the workload for nurses as they cannot cope with their current workload, unless there is a strategy put in place that will assist the nurses to implement and monitor individuals on PrEP therapy so that they are not burdened with more work.

Patients that were waiting in line to receive treatment at the PHC clinics verbalised that they did not have the finances to afford transport to the clinic every month and had to skip visits until they had sufficient money to get to the clinic for medication. The patients explained that they sometimes depleted their medication and had to wait until they had money before they could return to the clinic to get more medication. In the meantime they did not have any medication to take. It is imperative that individuals that are at high risk of contracting HIV take PrEP therapy on a daily basis as prescribed to prevent them from contracting HIV and if this not done then it makes them susceptible to being infected with HIV. Alternative methods of getting PrEP therapy to individuals at high risk of contracting HIV needs to be considered to facilitate the daily dose of the prevention therapy.

PrEP therapy may seem like just another strategy to prevent HIV that has not taken off in the province. However with the right tools (education, staff and resources) it can be a miraculous prevention strategy that can decrease the amount of individuals being infected with HIV.

CHAPTER 7: IMPLEMENTATION GUIDE FOR THE DoH PrEP THERAPY GUIDELINES

7.1 THE IMPLEMENTATION GUIDE FOR THE DoH PrEP THERAPY GUIDELINES

The implementation plan for the Department of Health (DoH) guideline for provincial clinics in KZN was developed through a qualitative study. The implementation plan was developed to assist primary healthcare (PHC) nurses with the implementation of the DoH guidelines for pre-exposure prophylaxis (PrEP) therapy implementation.

Implementation guide for the DoH PrEP therapy guidelines

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Acronyms

ART Anti-retroviral Treatment

HIV Human Immunodeficiency virus

KZN KwaZulu Natal

ARV Anti-retro viral

DoH Department of Health

HRI High risk individual
PHC Primary health care
PrEP Pre-exposure prophylaxis

Glossary

The human immunodeficiency virus (HIV) refers to a virus that causes AIDS. Once a person has been tested for HIV through blood identification of the HIV antibody, it means that this person has been exposed to the HI virus and therefore infected with it (Van Dyk 2013: 496).

Antiretroviral (ARV) refers to a class of drugs which inhibit the activity of retroviruses such as HIV (Oxford Dictionary 2016).

Pre-exposure prophylaxis (PrEP) refers to the use of antiretroviral medication to prevent HIV infection. PrEP agents may come in the form of topical gels, rings, oral tablets and injectable formulations (Bekker *et al.* 2016: 2078).

1. Principles of policy development

The principles on which this implementation plan was developed are those identified by the following authors: Hollon *et al.* (2014), Boivin *et al.* (2010) Kish (2001) and Shekelle *et al.* (1999). A guideline is “a systematically developed statement to assist practitioner and patient decisions about appropriate health care and for specific clinical circumstances” (Qaseem *et al.* 2010: 366).

The following steps were taken into consideration when developing the implementation plan for the DoH PrEP therapy guidelines.

1.1 Choose a topic

There must be sufficient evidence available for review to justify the development of the implementation plan.

1.2 Specify the purpose

The implementation plan must clearly state the purpose for which it has been developed.

1.3 Specify the target population

The purpose of whom the guidelines are developed for. Be specific if there are any exclusions.

1.4 Specify the target audience

Specify who the guidelines are for at the beginning of the guideline.

1.5 Specify desired outcomes

If an implementation plan is adopted, then what is the desired outcome.

1.6 Evidence review

Specify how evidence was collected and reviewed.

1.7 Formulation of recommendations

2. Introduction

HIV/AIDS has long been a concern within the KwaZulu-Natal (KZN) province where there are options of prevention that are available to individuals that have not acquired the virus. Some of these options include the ABC campaign, the introduction of anti-retroviral therapy (ART) in the mid 90s and the 90-90-90 strategy introduced by the Joint United Nations Programme on HIV and AIDS (UNAIDS) in 2016. These preventative strategies were implemented with the intent to lower the HIV rate.

PrEP was introduced in 2015 and, according to the National Department of Health (2018), is an additional therapy that can be taken to prevent an individual from acquiring HIV. PrEP therapy has proven itself in the iPrex study by Grant *et al.* (2010) which showed that there was a reduction in the rate of acquiring HIV if an individual was taking the PrEP therapy drugs as prescribed. The DoH has since then developed a guideline for PrEP therapy implementation that can be used by health care practitioners. However, this research has shown that there was no implementation of PrEP therapy in the PHC clinics that were involved in this research. Therefore, this research study has developed an implementation plan for the DoH guidelines for PrEP therapy implementation.

3. Purpose

The purpose of this implementation plan is to facilitate the implementation of the DoH guidelines for PrEP therapy in primary health care (PHC) clinics in the KZN province.

4. Scope and contents

This implementation plan can be applied to all PHC clinics in the KZN province.

4.1 Knowledge of PrEP

The knowledge of PrEP is essential for the PHC staff as they will be advising individuals at high risk of contracting HIV and monitoring these individuals. The following are strategies that are advised to increase the knowledge of the PHC staff:

- Academic coaching where experts in PrEP train PHC staff, helping them to identify individuals at high risk of contracting HIV, counselling individuals to encourage them to take PrEP, and monitoring individuals that are taking PrEP therapy.
- Information about PrEP therapy must be readily available for staff to refresh their knowledge and to use as a reference when the need arises. This could be in the form of an internet link, an application on hand held mobile devices, books or policies that they could refer too.
- Peer teaching at the clinic level could expand the knowledge of staff.
- Attending workshops and congresses for PrEP therapy and sharing that knowledge with the PHC team at the clinic level.

4.2 Financial planning

Financial management is required to ensure that HIV prevention strategies, of which PrEP is one, are effectively implemented, monitored and evaluated. The following strategies are advised when implementing PrEP therapy at the clinic:

- An available supply of PrEP therapy needs to be accessible for individuals at high risk who are on the treatment.

- Human resources need to be increased. There needs to be sufficient PHC nurses, doctors and counsellors for PrEP therapy implementation and monitoring to prevent burnout and increased stress levels of staff that are currently employed at the clinic.
- Infrastructure needs to be sufficient for the implementation of PrEP therapy. For example, if there is an increase in patient numbers that will be attending the clinic then there needs to be an increase in waiting room space.
- There will be added expense arising from screening of individuals for HIV and monitoring blood levels which need to be budgeted for.

4.3 Marketing of PrEP

The following marketing strategies are advised to increase the awareness of PrEP therapy:

- Make use of social media platforms to educate people about PrEP therapy.
- Partner with local communities to hosts talks and workshops about PrEP therapy.
- Advertise PrEP on television, stations, newspapers and posters.
- PHC staff to hold awareness campaigns at the clinic about PrEP therapy for the local communities.

4.4 Holistic support for individuals at high risk of contracting HIV

PrEP therapy involves a daily antiretroviral (ARV) tablet that needs to be taken by an individual to ensure that the body has a therapeutic level of ARVs to prevent an individual from contracting HIV. The following are the strategies that are advised in order to assist an individual to remain HIV negative:

- Education needs to be given to an individual at high risk of contracting HIV regarding the importance of daily treatment and maintaining their clinic appointments.
- Bloods need to be taken timeously to monitor the individuals' HIV status and drug resistance towards PrEP.

- Support groups via social media can be formed to assist an individual with compliance to PrEP therapy.
- Individuals need to be counselled on their risky behaviour and how to remain HIV negative.

5 Conclusion

Provincial clinics in KZN may use this implementation plan for the DoH PrEP therapy guidelines. The guideline can be adjusted to suit the needs of each clinic as they might differ. This implementation plan has identified categories that are important for the successful implementation of the DoH PrEP therapy guidelines.

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APPENDICES

Appendix A: Interview guide for research participants

INTERVIEW SCHEDULES

Primary health care nurses

1. Can you explain to me what your perception is about Pre-Exposure prophylaxis or PrEP?
2. What experience have you had with PrEP?
3. Describe what criteria you would look for in an individual to initiate PrEP or suggest they use PrEP?
4. Can you describe the challenges that you can foresee or experience if PrEP were to be initiated in this clinic?
5. Please can you elaborate on what can be done to assist with the implementation of PrEP therapy at the clinic?

Primary health care doctors

1. Can you explain what your perception is about Pre-Exposure Prophylaxis or PrEP therapy?
2. Please describe the challenges, if any, that you have experienced with PrEP therapy implementation at the clinic?
3. Please elaborate on what you think might assist with the implementation of PrEP at the clinic?
4. What do you feel can be done to create a demand for PrEP therapy?

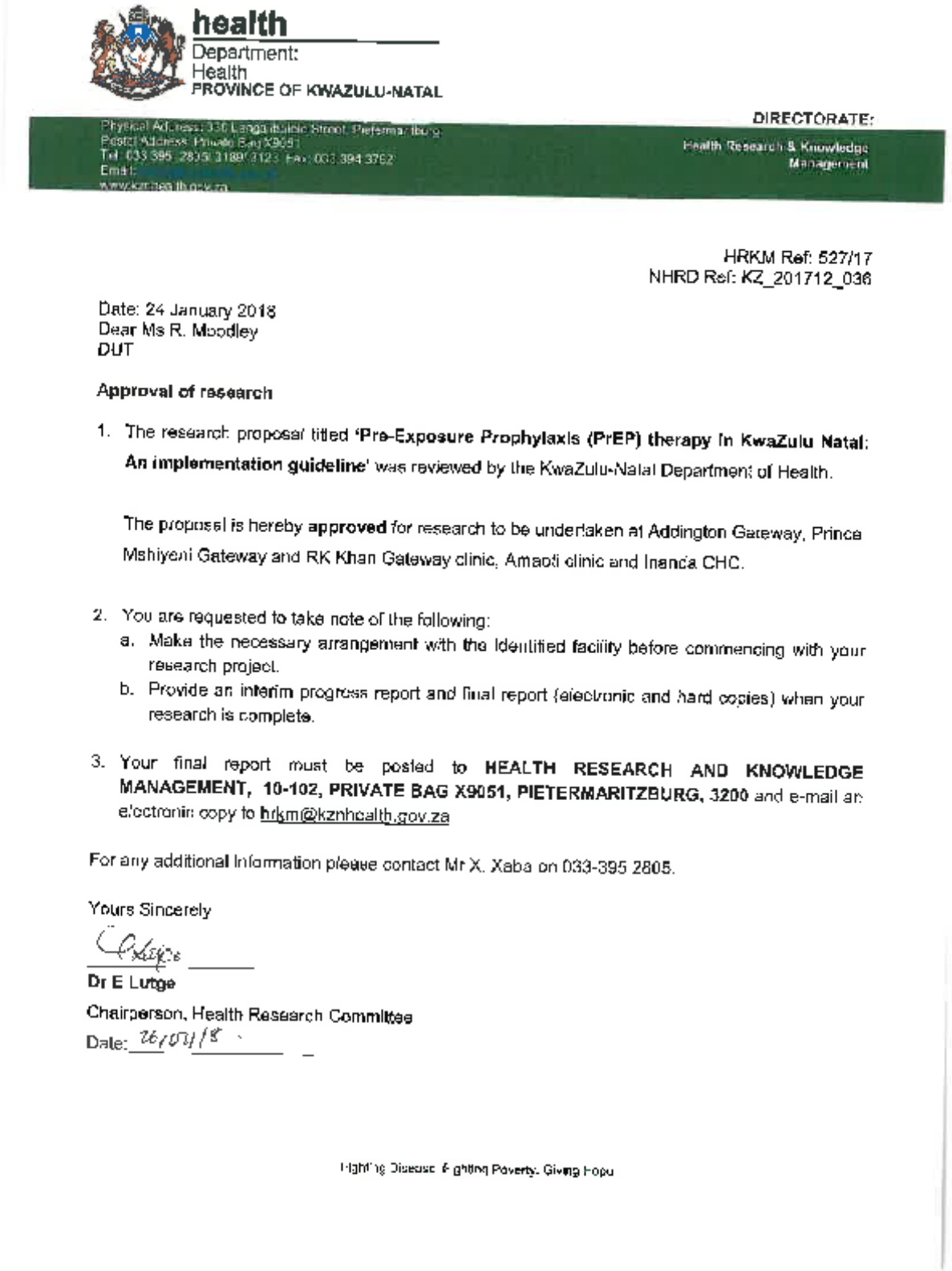
High Risk individuals

1. Can you describe what you understand about Pre-Exposure Prophylaxis or PrEP?
2. What experience have you had with PrEP?
3. Please describe what can be done to create awareness of PrEP therapy in the community?
4. Can you describe any challenges that you have experienced with regards to accessing PrEP therapy?

Support staff questions

1. Can you explain what your perception is about Pre-Exposure prophylaxis or PrEP?
2. Please explain your experience with PrEP?
3. Can you describe what challenges you can foresee with the implementation of PrEP in the clinic?
4. Can you describe what can be done to assist with the implementation of PrEP in the clinic?

Appendix B: Gatekeeper permission letter



health
Department:
Health
PROVINCE OF KWAZULU-NATAL

Physical Address: 330 Langalibalele Street, Pietermaritzburg
Postal Address: Private Bag X9051
Tel: 033 395 2805/ 3188/ 2123 Fax: 033 394 3762
Email:
www.kznhealth.gov.za

DIRECTORATE:
Health Research & Knowledge Management

HRKM Ref: 527/17
NHRD Ref: KZ_201712_036

Date: 24 January 2018
Dear Ms R. Moodley
DUT

Approval of research

1. The research proposal titled **'Pre-Exposure Prophylaxis (PrEP) therapy in KwaZulu Natal: An implementation guideline'** was reviewed by the KwaZulu-Natal Department of Health.

   The proposal is hereby **approved** for research to be undertaken at Addington Gateway, Prince Mshiyeni Gateway and RK Khan Gateway clinic, Amaoti clinic and Inanda CHC.

2. You are requested to take note of the following:
   a. Make the necessary arrangement with the identified facility before commencing with your research project.
   b. Provide an interim progress report and final report (electronic and hard copies) when your research is complete.

3. Your final report must be posted to **HEALTH RESEARCH AND KNOWLEDGE MANAGEMENT, 10-102, PRIVATE BAG X9051, PIETERMARITZBURG, 3200** and e-mail an electronic copy to hrkm@kznhealth.gov.za

For any additional information please contact Mr X. Xaba on 033-395 2805.

Yours Sincerely

Dr E Lutge

Chairperson, Health Research Committee
Date: 26/01/18

Fighting Disease, Fighting Poverty, Giving Hope

Appendix C: Interview questions for PHC nurses

Interview questions for primary health care nurses

Date:_____ Area/Place:_____

Gender:_____ Qualification:_____

Thank you for agreeing to participate in the following study. Your contribution is greatly appreciated. The interview will take place in a private room were a series of opened ended questions will be asked by the researcher to the research participant. The researcher will ask these questions while audio recording the interview. The participant would have already signed the informed and consent at this stage.

1. Please can you tell what you know about Pre-Exposure Prophylaxis therapy? Take me through any guidelines that you are aware of

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2. Tell me how you have implemented Pre-Exposure Prophylaxis therapy previously and if there was any challenges experienced?

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3. Why do you think PrEP therapy has not been implemented in many clinics?

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4. What other challenges do you think there is with the initiation of PrEP therapy by nurses in the primary health care clinic?

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5. What do you think will assist primary health care nurses with the implementation of PrEP therapy?

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6. What can be done to bring awareness to the high risk population to bring them to the clinic for PrEP therapy that has not already been done?

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Thank you very much for participating in my study and I hope through your participation we are able to assist others who might benefit from PrEP to access the medication more easily. Thank you.

Appendix D: Interview schedule for individuals at high risk of contracting HIV

Interview questions for individuals at high risk of contracting HIV

Date:_____ Area/Place:_____

Gender:_____ Age:_____

Thank you for agreeing to participate in the following study. Your contribution is greatly appreciated. The interview will take place in a private room were a series of opened ended questions will be asked by the researcher to the research participant. The researcher will ask these questions while audio recording the interview. The participant would have already signed the informed and consent at this stage.

1. Please can you tell me what experience you have with Pre-Exposure Prophylaxis (PrEP)?

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Prompt questions

1.1 What knowledge do you have about PrEP and where have you heard about it?

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1.2 How easy is it to access PrEP?

1.3 What challenges have you experienced with PrEP therapy with regards to access?

2. What do you think that can be done to assist the in being aware of PrEP therapy and accessing PrEP therapy?

3. Can you think of anything that will motivate individuals to start on PrEP therapy?

Thank you very much for participating in my study and I hope through your participation we are able to assist others who might benefit from PrEP to access the medication more easily. Thank you….

Appendix E: Interview schedule for PHC doctors

Interview questions for PHC doctors

Age:_____ Area/Place:_____

Sex:_____ Qualification:_____

Thank you for agreeing to participate in the following study. Your contribution is greatly appreciated. The interview will take place in a private room were a series of opened ended questions will be asked by the researcher to the research participant. The researcher will ask these questions while audio recording the interview. The participant would have already signed the informed and consent at this stage.

1. Please can you tell what you know about Pre-Exposure Prophylaxis therapy implementation in the KZN primary health care clinics?

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2. Can you please tell me if there are any challenges experienced being experienced with regards to PrEP therapy at district level?

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3. Are there any services that you can describe that have been implemented to assist the primary health care nurses with the implementation of PrEP therapy?

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4. What other challenges do you think there is with the initiation of PrEP therapy by nurses in the primary health care clinic?

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5. What do you think will assist primary health care nurses with the initiation of PrEP therapy?

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6. Can you assist with possible suggestions of individuals that play a vital role in PrEP therapy in the KZN area?

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Thank you very much for participating in my study and I hope through your participation we are able to assist others who might benefit from PrEP to access the medication more easily. Thank you

Appendix F: Interview questions for support staff at PHC clinics

Interview questions for support staff at PHC clinics

Date:_____ Area/Place:_____

Gender:_____ Qualification:_____

Thank you for agreeing to participate in the following study. Your contribution is greatly appreciated. The interview will take place in a private room were a series of opened ended questions will be asked by the researcher to the research participant. The researcher will ask these questions while audio recording the interview. The participant would have already signed the informed and consent at this stage.

1. Please can you tell what you know about Pre-Exposure Prophylaxis therapy? Take me through any guidelines that you are aware of

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2. Please explain your role in the PHC clinic and with HIV

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3. Why do you think PrEP therapy has not been implemented in many clinics?

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4. What other challenges do you think there is with the initiation of PrEP therapy by nurses in the primary health care clinic?

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5. What do you think will assist primary health care nurses with the implementation of PrEP therapy?

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6. What can be done to bring awareness to the high risk population to bring them to the clinic for PrEP therapy that has not already been done?

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Thank you very much for participating in my study and I hope through your participation we are able to assist others who might benefit from PrEP to access the medication more easily. Thank you.

Appendix G: Letter of Information and Consent Form

LETTER OF INFORMATION

Title of the Research Study: A framework for the implementation of Pre- Exposure Prophylaxis therapy in Kwa-Zulu Natal.

Principal Investigator/s/researcher: Roxann Moodley, BCur, Masters in nursing education

Supervisors: Dr P. Orton (PhD) and Dr. P. Basson (PhD)

Greetings to you and thank you very much for expressing an interest in my study. I hope the information below will give you a little view into what I plan to do and help you make an informed decision to participate, or not, in my study. I would be most appreciative of you participation.

I am a doctoral student at DUT in the Department of Nursing. I am a nurse who currently works as a pharmaceutical representative but I have a keen interest in Pre Exposure Prophylaxis for people who are HIV negative but at high risk of contracting HIV.

Brief Introduction and Purpose of the Study: This research study is based on the primary health care nurses and 'high risk' individuals' perceptions towards Pre-Exposure Prophylaxis (PrEP) therapy initiation in Kwa-Zulu Natal (KZN) public health primary care facilities. Since December 2015 PrEP therapy has been available in KZN to enable the individuals at high risk of contracting HIV to have access to the drug to prevent HIV infection in HIV negative individuals. There has been many guidelines published to assist primary health care nurses with the initiation and maintenance of PrEP therapy in 'high risk' individuals (Bekker et al 2016, Cohen and Baden 2012, WHO 2016, CDC 2016, UNAIDS 2016 and Molina et al 2013).

It has been my observation that there is poor implementation of PrEP therapy in the primary health care clinics. Therefore this research plans to investigate the perceptions of primary health care nurses and the 'high risk' population with regards to PrEP therapy initiation and awareness. A qualitative method will be used for research participants with opened-ended questions being asked by the researcher on a One on One interview that will take place at the primary health care clinic. The interview will be audiotaped with your permission.

The data that will be obtained by the researcher will be used to develop a framework for the implementation of PrEP therapy in the primary health care clinics in KZN.

Outline of the Procedures: You will be asked questions by the researcher in a private room in the primary health care clinic. The interviews will be on a One on One basis with the researcher and should last approximately 20 minutes. An audio recorder will be used to record the interview session so that the researcher will be able to transcribe data at a later stage. You have been specially selected, to participate in this study because of the rich information you have about Pre Exposure Prophylaxis as a staff member or as a client. Your details will remain confidential and no where will your name appear except on the informed consent. This will not be linked to the interview in any way and only the researcher will have access to the signed informed consent form.

Risks or Discomforts to the Participant: This research study does not pose a risk to any participants.

Benefits: This research aims at identifying any challenges being faced by the primary health care nurses in the primary health care clinics and high risk patients with regards to PrEP therapy. The benefit will be awareness of these challenges and to provide possible assistance for these challenges so that PrEP therapy initiation and distribution will be a smooth process.

Reason/s why the Participant May Be Withdrawn from the Study: Should you chose not to participate in this study for any reason, you may withdraw at any time without incurring any penalty or consequences.

Remuneration: Participants that chose to participate in this research will be given a hand lotion as part of the remuneration once the interview is complete.

Costs of the Study: There will be no costs to be paid by yourself.

Confidentiality: Your name will not be taken, instead you will be given a letter of the alphabet. This will ensure that you will remain anonymous.

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

Please contact the researcher (Roxann Moodley): tel no. 0833619654, my supervisor (Dr. P. Orton): tel no. 031 373 2537 or the Institutional Research Ethics Administrator on 031 373 2375. Complaints can be reported to the Acting DVC Research Innovation and Engagement, Prof S Moyo on 031 373 2577 or moyos@dut.ac.za

CONSENT FORM

Statement of Agreement to Participate in the Research Study:

 I hereby confirm that I have been informed by the researcher, _Roxann Moodley , about the nature, conduct, benefits and risks of this study - Research Ethics Clearance Number: _____,

 I have also received, read and understood the above written information (Participant Letter of Information) regarding the study.

 I am aware that the results of the study, including personal details regarding my sex, age, date of birth, initials and diagnosis will be anonymously processed into a study report.

 In view of the requirements of research, I agree that the data collected during this study can be processed in a computerized system by the researcher.

 I may, at any stage, without prejudice, withdraw my consent and participation in the study.

 I have had sufficient opportunity to ask questions and (of my own free will) declare myself prepared to participate in the study.

 I understand that significant new findings developed during the course of this research which may relate to my participation will be made available to me.

_____	_____	_____	_____
Full Name of Participant	**Date**	**Time**	**Signature/Right Thumbprint**

I, _____ herewith confirm that the above participant has been fully informed about the nature, conduct and risks of the above study.

_____	_____	_____
Full Name of Researcher	**Date**	**Signature**
_____	_____	_____
Full Name of Witness (If applicable)	**Date**	**Signature**
_____	_____	_____
Full Name of Legal Guardian (If applicable)	**Date**	**Signatur**

Appendix H: Bekker *et al.* 2016 Guidelines for PrEP

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Southern African guidelines on the safe use of pre-exposure prophylaxis in persons at risk of acquiring HIV-1 infection

Authors:
Linda-Gail Bekker[1]
Kevin Rebe[2]
Francois Venter[3]
Gary Maartens[4]
Michelle Moorhouse[3]
Francesca Conradie[5]
Carole Wallis[6,7]
Vivian Black[3]
Beth Harley[8]
Robyn Eakles[5]

Affiliations:
[1]The Desmond Tutu HIV Centre, University of Cape Town, South Africa

[2]Anova Health Institute, Johannesburg, South Africa

[3]Wits Reproductive Health and HIV Institute, Johannesburg, South Africa

[4]Department of Medicine, University of Cape Town, South Africa

[5]Right to Care and Clinical HIV Research Unit, University of the Witwatersrand, South Africa

[6]BARC, Johannesburg, South Africa

[7]Lancet Laboratories, Johannesburg, South Africa

[8]City Health, City of Cape Town, South Africa

Corresponding author and email:
Michelle Moorhouse
mmoorhouse@wrhi.ac.za

Read online:
Scan this QR code with your smart phone or mobile device to read online.

The Southern African HIV Clinicians Society published its first set of oral pre-exposure prophylaxis (PrEP) guidelines in June 2012 for men who have sex with men (MSM) who are at risk of HIV infection. With the flurry of data that has been generated in PrEP clinical research since the first guideline, it became evident that there was a need to revise and expand the PrEP guidelines with new evidence of safety and efficacy of PrEP in several populations, including MSM, transgender persons, heterosexual men and women, HIV-serodiscordant couples and people who inject drugs. This need is particularly relevant following the World Health Organization (WHO) Consolidated Treatment Guidelines released in September 2015. These guidelines advise that PrEP is a highly effective, safe, biomedical option for HIV prevention that can be incorporated with other combination prevention strategies in Southern Africa, given the high prevalence of HIV in the region. PrEP should be tailored to populations at highest risk of HIV acquisition, whilst further data from studies in the region accrue to guide optimal deployment to realise the greatest impact regionally. PrEP may be used intermittently during periods of perceived HIV acquisition risk, rather than continually and lifelong, as is the case with antiretroviral treatment. Recognition and accurate measurement of potential risk in individuals and populations also warrants discussion, but are not extensively covered in these guidelines.

Introduction

Pre-exposure prophylaxis

Pre-exposure prophylaxis (PrEP) involves taking a pharmaceutical agent prior to an exposure to prevent an outcome (e.g. infection by a microbe, such as malaria). PrEP for HIV involves the use of antiretroviral (ARV) medications to prevent HIV infection. Research into the use of existing and novel PrEP agents, as well as various delivery systems, including topical gels and rings (microbicide) and oral (tablet) and long-acting injectable formulations, is ongoing.

Tenofovir (TDF) and tenofovir/emtricitabine (TDF/FTC) in a single tablet fixed-dose combination (FDC) are the oral ARV agents used in oral PrEP studies to date. The present guidelines support the use of TDF/FTC in combination for effective PrEP. TDF-containing PrEP is recommended by the World Health Organization (WHO) for people at substantial risk of HIV infection.[1] In December 2015, the TDF/FTC combination pill was approved for use as PrEP by the Medicine Control Council, in combination with safer sexual practices.[2]

The aim of the this PrEP guideline is to:

- explain what PrEP is
- outline current indications for its use
- outline steps for appropriate user selection
- provide guidance to monitor and maintain PrEP users.

PrEP is indicated for HIV-negative men who have sex with men (MSM), transgender persons, heterosexual men and women (including adolescents) and people who inject drugs (PWID), who are assessed to be at high risk for HIV acquisition. PrEP should be used as part of a package of HIV prevention services (which may include regular HIV testing, condoms,

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lubrication, contraception, sexually transmitted infection [STI] management and risk reduction counselling). PrEP is also applicable to individuals at risk of HIV acquisition because they are unwilling or unable to consistently use male or female condoms, especially if in serodiscordant relationships. The user must be counselled on ongoing pregnancy and STI risk. PrEP can also be effective as part of a broader prevention package for people who use and inject drugs (PWID) in the comprehensive setting of needle and syringe exchange and opioid substitution programmes and access to ART for injecting networks. Harm reduction is an extensively proven HIV prevention intervention for PWID, but is not discussed further in these guidelines.

Recommendations

Daily PrEP may be used intermittently during periods of perceived HIV acquisition risk, rather than continually and lifelong, as is the case with ARV treatment. HIV testing, estimation of creatinine clearance, pregnancy screening, and STI and hepatitis B screening are recommended as baseline investigations. Hepatitis B vaccination should be offered to susceptible individuals. Daily oral tenofovir/emtricitabine (TDF/FTC) as FDC, along with effective use support, can then be prescribed for eligible users. PrEP should not be given to those with abnormal renal function, nor should it be commenced in individuals with acute viral symptoms. An initial three-drug post-exposure prophylaxis (PEP) approach may be used whilst confirming HIV-negative status in an individual presenting with acute viral symptoms and a concomitant history of recent potential HIV exposure. An alternative HIV risk reduction method should be used until HIV-negative status is confirmed. Once HIV-negative status is confirmed, switching to PrEP can be discussed. Three-monthly follow-up visits to assess HIV status, pregnancy, tolerance, renal function, adherence and ongoing eligibility is recommended. Six-monthly STI screens and annual creatinine levels to estimate creatinine clearance are also recommended. Hepatitis B vaccination should be provided to susceptible clients. Headache and gastro-intestinal symptoms with weight loss are relatively common although usually mild and self-limiting, occurring for the first 4–8 weeks after initiating PrEP. These can be managed with counselling support and provision of symptomatic relief. Although uncommon, ARV resistance is most likely to occur amongst those who initiate PrEP with undiagnosed acute HIV infection. There is ongoing potential for resistance development among those with sub-optimal PrEP use who become HIV-infected while on PrEP. PrEP, if taken correctly and consistently, will offer protection from HIV infection but not from other STIs or pregnancy, and clinicians should continue to support PrEP users to be aware of STI symptoms and other components of combination prevention. Research is ongoing to assess optimum dosing regimens, potential long-term effects and alternative PrEP medications. Recommendations for the use of PrEP among other at-risk individuals, and the components of these recommendations, will be informed by future evidence.

Background

Development of pre-exposure prophylaxis

Tenofovir disoproxil fumarate (TDF) alone or in combination with emtricitabine (FTC) was chosen for the evaluation of PrEP because of its high level of activity in inhibiting HIV replication; its acceptable safety profile; its high barrier to generating resistant virus; and its low levels of side-effects.[3] The protective activity of TDF and FTC has been shown in animal models, with best efficacy when both agents were used together.[4,5] In clinical trials, however, it has been shown that the difference in efficacy between TDF/FTC and TDF alone is insignificant. The use of TDF monotherapy for HIV prevention has not been investigated in some key populations such as MSM.

The Global iPrEx trial was the first randomised controlled trial to report decreased risk of HIV acquisition amongst at-risk MSM and transgender persons.[6] These findings were further confirmed in the IPERGAY and PROUD studies.[7,8] IPERGAY used an 'on-demand' dosing strategy. However, as yet there are no data to support such a dosing strategy in other at-risk populations, and the writing group recommends daily PrEP in all at-risk groups until further data emerge supporting 'on-demand' dosing.

The Partners PrEP and TDF2 trials were both conducted in Africa and showed high levels of protection with daily oral tenofovir-based PrEP in heterosexual men and women including those in serodiscordant couples.[9,10]

The Bangkok Tenofovir Study was conducted using tenofovir only as PrEP amongst PWID.[11] The risk overall in the study was reduced by 49%, and by up to 74% amongst those with detectable levels of tenofovir in their blood.

To date there have been 10 randomised controlled trials of TDF-based PrEP reporting HIV outcomes. The studies have involved more than 17 000 people and have demonstrated an overall reduction in HIV acquisition risk of 51% (women RR 0.57 [95% CI 0.34–0.94] and men RR 0.38 [95% CI 0.2–0.6]). Three studies in which there was high adherence to the study product (> 70% of drug detection) showed PrEP was most efficacious but HIV infection was also significantly reduced in those studies in which drug detection levels were moderate (41% – 70% detection). Unfortunately in the two studies with lowest adherence (< 40% drug detection), involving heterosexual women in southern and east Africa, PrEP had no effect.[12,13] The reasons for the particularly low uptake and use of oral PrEP in these two studies have been speculated on elsewhere and a range of potential reasons have been suggested, including structural, behavioural and/or psychological factors. Unfortunately this has led to some controversy around the effectiveness of oral PrEP in black African women. It is important to note, however, that two of the three studies considered by the US Food and Drug Administration (FDA) prior to licensure of PrEP as a prevention modality included women from Uganda, Kenya and Botswana. What does emerge clearly from all these

studies is the fact that protection strongly correlates with adherence to the study drug, assessed in most studies by random tenofovir drug levels.

Additional open-label demonstration projects and implementation science studies amongst different at-risk populations are ongoing (http://www.avac.org/ht/a/GetDocumentAction/i/3113) and confirm high rates of protection amongst the individuals with best effective use. No RCTs of tenofovir-based PrEP are currently underway, although alternative ARVs, new longer-acting formulations and alternative topical applications are planned or are still in earlier phase studies (Figure 1).

MSM, transwomen and HIV in Southern Africa

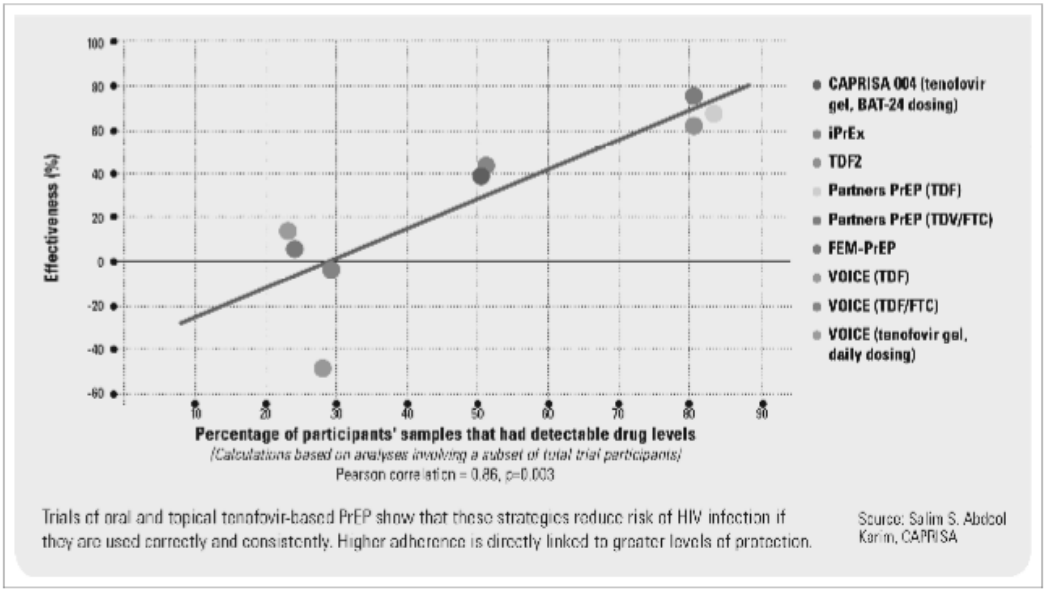
MSM is a behavioural term that describes MSM, regardless of social identity (gay, bisexual, heterosexual) or whether they also have sex with women.[14] MSM and transgender persons have been shown to be at disproportionately high risk of HIV acquisition and transmission.[15,16] Biological susceptibility (efficiency of rectal HIV transmission), behaviours (including condomless sex, anal intercourse and multiple partners) as well as structural and social factors (including homophobia and discrimination) have been associated with increased vulnerability to HIV.[16] Condomless receptive anal intercourse is the main risk factor for sexual transmission of HIV among MSM.[17] The high concentration of rectal cells vulnerable to HIV-1 infection (macrophages, T-cells and dendritic cells) and the single-cell layer of rectal mucosa, results in a per-act risk for HIV transmission that is 10–20 times greater than unprotected vaginal intercourse.[17,18,19]

There is emerging and consistent evidence about the high HIV burden amongst MSM in Southern Africa.[20] Unfortunately, little data exist on the trans populations in South Africa. HIV prevalence amongst MSM sampled in cross-sectional surveys in South Africa has ranged from 10% – 50%.[21,22,23,24] However, owing to the lack of accurate population size estimates, it is hard to assess attributable risk.[25] A 2009 modelling study on the modes of HIV transmission in South Africa estimated that 8% of all new HIV infections in South Africa occur among MSM.[26] High-risk sexual practices (including unprotected anal intercourse, multiple and concurrent partnerships, and sex work) and limited knowledge about HIV and substance use (alcohol, methamphetamines and heroin) have been associated with increased risk for HIV infection amongst MSM in South Africa.[15,22,23,24,27,28,29]

Many MSM also have female sexual partners. Almost half (49%) of the participants in a Soweto-based MSM study reported recent female sexual partners.[23] Homophobia, stigma and discrimination (including criminalisation of same-sex behaviours in some Southern African countries), healthcare worker ignorance (about MSM and transgender vulnerability to HIV and appropriate management of MSM clients) and the heterosexual focus of the HIV response have been contributing factors to the failure of Southern African public health services to address the health needs of MSM and transgender persons.[15,25,30,31,32,33,34,35,36,37]

Motivation for a pre-exposure prophylaxis guideline

The initial iPrEx trial results contributed to an earlier version of these guidelines and the development of interim guidance



Source: AVAC Report 2013: Research & Reality: http://www.avac.org/sites/default/files/infographics/PrEP_by_Numbers_jan2016.jpeg

FIGURE 1: Effectiveness and adherence in trials of oral and topical tenofovir-based prevention.

on the use of PrEP amongst MSM by the United States Centers for Disease Control and Prevention.[38] These revised guidelines include all at-risk populations consistent with all accrued clinical evidence, the CDC guidelines[39] and recent (2015) WHO recommendations.[1] Southern African guidelines will assist practitioners who may be considering, or are already, prescribing PrEP to people at risk.

Identification of potential pre-exposure prophylaxis users

Providers should educate and counsel potential PrEP users about PrEP and conduct an individualised risk-benefit assessment to assess eligibility (Box 1). The eligibility assessment requires that providers have developed sufficient client rapport to effectively assess risk based on these self-reported behaviours.

Indications for the use of pre-exposure prophylaxis

PrEP should be considered for people who are HIV-negative and at significant risk of acquiring HIV infection (see Boxes 2 and 3). PrEP may be suitable for:

- any sexually active HIV-negative *MSM or transgender person* who wants PrEP
  - those with HIV-positive sexual partner(s) who are not confirmed virologically suppressed
  - partner(s) of unknown HIV status
  - recent STI
  - multiple sexual partners
  - history of inconsistent or no condom use
  - commercial sex work
  - recurrent PEP users
  - history of sex whilst under the influence of alcohol or recreational drugs
- *heterosexual* women and men who want PrEP, targeting especially
  - those with HIV-positive sexual partner(s) who are not confirmed virologically suppressed
  - partner(s) of unknown HIV status
  - recent STI
  - multiple sexual partners
  - history of inconsistent or no condom use
  - commercial sex work
  - serodiscordant couples trying to conceive
  - recurrent PEP users
  - history of sex whilst under the influence of alcohol or recreational drugs
- people who inject *drugs*
  - HIV-negative PWID with HIV-positive/unknown status injecting partner(s)
  - share injecting needles and drug preparation equipment
- all of the above groups include *adolescents* and *sex workers*, which each constitute special groups meriting specific consideration
  - especially vulnerable are young MSM and adolescent girls.

PrEP should be provided as part of a combination prevention package.

Contraindications to pre-exposure prophylaxis

- HIV-1 infected or evidence of possible acute infection
- suspicion that patient might be in the window period for HIV testing following potential exposure
- adolescents < 35 kg or < 15 years of age who are not Tanner stage 3 or greater should not be given TDF

BOX 1: Risk behaviour assessment for sexual HIV acquisition.

Risk behaviour assessment for MSM and transwomen
In the past 6 months:
1. Have you had sex with men, women or both?
2. How many men have you had sex with?
3. How many times did you have receptive anal sex with a man who was not wearing a condom?
4. How many of your partners were HIV-positive or of unknown HIV status?
5. With these positive/unknown status partners, how many times did you have insertive anal sex without wearing a condom?

Risk behaviour assessment for heterosexual men and women
In the past 6 months:
1. Have you had sex with men, women or both?
2. How many men/women have you had sex with?
3. How many times did you have vaginal or anal sex when neither you nor your partner wore a condom?
4. How many of your partners were HIV-positive or of unknown HIV status?
5. With these positive/unknown status partners, how many times did you have vaginal or anal sex without wearing a condom?

Source: Adapted from HHS guideline (Preexposure prophylaxis for the prevention of HIV infection in the United States – 2014 clinical practice guideline)

BOX 2: Indications for the use of pre-exposure prophylaxis.

1. Any sexually active HIV-negative **MSM or transgender person** especially:
   - those with HIV-positive sexual partner(s) who are not confirmed virologically suppressed
   - partner(s) of unknown HIV status
   - recent STI
   - multiple sexual partners
   - history of inconsistent or no condom use
   - commercial sex work
   - recurrent PEP users
   - history of sex whilst under the influence of alcohol or recreational drugs.
2. **Heterosexual** women and men especially:
   - those with HIV-positive sexual partner(s) who are not confirmed virologically suppressed
   - partner(s) of unknown HIV status
   - recent STI
   - multiple sexual partners
   - history of inconsistent or no condom use
   - commercial sex work
   - serodiscordant couples trying to conceive
   - recurrent PEP users
   - history of sex whilst under the influence of alcohol or recreational drugs.
3. People who inject **drugs:**
   - HIV-negative PWID with HIV-positive/unknown status injecting partner(s)
   - share injecting needles and drug preparation equipment.
4. All of the above groups include **adolescents** and **sex workers**, which each constitute special groups meriting specific consideration:
   - Especially vulnerable are young MSM and adolescent girls.

BOX 3: Eligibility criteria for pre-exposure prophylaxis use.

Eligibility criteria for PrEP use include:
- anyone identified by the provider and client as being at high risk for HIV exposure (see text box on indications for the use of PrEP)
- no contraindications to FTC/TDF FDC
- HIV-negative by routine rapid antibody test and not thought to be in the window period for HIV seroconversion
- absence of symptoms of acute HIV infection (recent acute viral illness) and, if symptoms reported, HIV-negative by 4th-generation HIV test or other HIV antigen test if available (this reduces, but doesn't eliminate, the window period)
- willing and able to attend 3-monthly PrEP maintenance visits, inclusive of HIV counselling and testing, clinical review and safety monitoring procedures
- client understanding that the protection provided by PrEP is not complete, and does not prevent other STIs or unwanted pregnancies, and therefore PrEP should be used as part of a package of HIV prevention services (inclusive of condoms, lubrication, contraception, risk reduction counselling and STI management)
- recurrent use of PEP.

TABLE 2: Summary of pre-exposure prophylaxis visits and procedures.

Visit	Recommended procedures
Screening	Educate about the risks and benefits of PrEP
	Assess risk and eligibility
	Conduct HIV counselling and testing, serum creatinine level, hepatitis B and STI screen, pregnancy test
	Contraceptive counselling and offer services
	Arrange follow-up visit
PrEP initiation	Conduct HIV counselling and testing
	Confirm eligibility (including investigation results and creatinine clearance calculation)
	Commence hepatitis B vaccination if indicated
	Provide STI treatment if indicated
	Pregnancy test
	Educate client about PrEP side-effects and management
	Educate client about signs and symptoms of acute HIV infection
	Discuss behaviours that promote bone health, such as weight-bearing exercise and avoiding alcohol, tobacco and recreational drugs
	Initiate a medication effective use plan
	Provide condoms and lubricant
	Contraceptive counselling and offer services as appropriate
	Provide one-month TDF/FTC (FDC) prescription and follow-up date
One-month follow-up	PrEP initiation visit, PLUS:
	• Assess tolerability, side-effects and effective use
	• Actively manage side-effects
	• Measure serum creatinine and calculate creatinine clearance
	• Contraceptive services
	• Provide three-month TDF/FTC (FDC) prescription and follow-up date
Four-month follow-up and 3-monthly maintenance visits	Repeat procedures done at one-month follow-up
	Measure serum creatinine and calculate creatinine clearance at four-month follow-up, and 12-monthly thereafter
	Conduct 6-monthly STI screen, including urine dipstix and rapid syphilis test
	Complete hepatitis B immunisation at 6 months

FDC, fixed-dose combination; FTC, emtricitabine; PrEP, pre-exposure prophylaxis; STI, sexually transmitted infection; TDF, Tenofovir.

Risk reduction counselling

Risk-reduction counselling is a behavioural intervention that attempts to decrease an individual's chances of acquiring HIV and other STIs,[41] and should be implemented together with effective use counselling and contraceptive counselling at follow-up visits for PrEP users. The main objective of risk-reduction counselling is for clients to set a realistic goal for behaviour change that could reduce their risk of contracting HIV. This is most effective when it is non-prejudicial and user-centred. Risk reduction counselling can be provided by any trained healthcare provider and should address the following points:

- explore the context of the user's specific sexual practices, and assist in recognising which of their behaviours are associated with higher risk of HIV infection. Clinicians should also be aware that clients might not always perceive their own risk, or may be in denial about it
- identify the sexual health protection needs of the user and reflect on what their main concerns appear to be
- strategise with the user on how they can manage these concerns or needs
- agree on which strategies the user is willing to explore, and guide the user to decide on how to implement the strategy (Box 4).

For effective use support, see Box 5.

Adherence to daily PrEP medication, as shown in the iPrEx study and other PrEP trials, is a challenge. Effective use counselling should be implemented at each visit where PrEP prescriptions or distributions are made. In iPrEx, participants who took PrEP more consistently and had evidence of drug detection in their blood, had higher levels of protection than those who did not.[3] These findings have been duplicated in other PrEP studies in different study populations. Users will need to be made aware of the fact that drugs only work if present at adequate levels in tissues and, preferably, that drug levels should be adequate before and after exposure to HIV has occurred. The use of cellphone reminders, pillboxes, and linking pill taking with a daily routine activity are currently being evaluated for their impact on improving PrEP effective use. Clinicians and clients could use any of these or other strategies to assist in maximising effective use (see Box 6 on tips to support effective use). Any trained healthcare worker can implement effective use counselling. A client-centred approach is recommended. Drug level testing for tenofovir levels in plasma is available, but is expensive. Drug level testing may be useful to assess effective use in the future.

BOX 5: 'Adherence' versus 'effective use'.

These guidelines use the term 'effective use' rather than 'adherence'. Adherence is often understood by healthcare workers, especially when applied to ARV treatment adherence, as life-long and at correct dosing intervals to ensure viral suppression. Oral PrEP must be taken, ideally daily, during times of HIV exposure risk, although there are some data suggesting that less than perfect adherence is still highly effective in MSM. There may be times when it would be appropriate to cycle off oral PrEP, for example when MSM move out of 'seasons of risk', or when female sex workers (FSW) return home to visit family, taking a break from sexual activity. If appropriate consistent use of oral PrEP is measured with the same standard as we measure ARV treatment adherence, it may show up as lacking, when in fact the population at risk has used the drug effectively. The term 'effective use' is preferred to when discussing whether ARV-based prevention has been used successfully; this is akin to 'effective use of condoms' as we seldom talk about condom adherence.

BOX 6: Tips to support effective use.

Include user-focused effective use counselling at each contact. Provide a clear explanation of the benefits of effective use. In a neutral manner, ask if the user has any challenges that may make taking PrEP difficult. Also explore possible facilitators to pill taking. Include identified facilitators when developing strategies to improve effective use of PrEP.[42]

Options to improve daily pill taking:

- Use reminders (cellphone, alarm clock, diary, partner reminder).
- Link with daily activity (breakfast, brushing teeth).
- Use a pillbox.
- Food is **NOT** required for pill taking.
- Join an on-line support group, e.g. Facebook: PrEP Rethinking HIV Prevention or #wethebrave.

Managing abnormal screening results

Clients with abnormal renal function (estimated creatinine clearance < 60 mL/min) should not be placed on PrEP. An abnormal estimated creatinine clearance result could be rechecked after 2 weeks and, if renal function returns to normal and other PrEP eligibility criteria are met, PrEP may be initiated. Those who are susceptible to hepatitis B should be immunised. Clients with acute or chronic hepatitis B can be safely initiated onto PrEP but may require LFT monitoring.[6] Clients with a history of pathological bone fracture, a family history of osteoporosis, or decreased bone mineral density on DEXA scanning, should be educated on ways to improve bone health, such as weight-bearing exercise and avoiding alcohol, tobacco and recreational drugs.[43] Clients who are ineligible for PrEP require support to access other prevention options (see HIV Prevention text box). Treat STIs syndromically as per national guidelines.[44] Consider empiric gonorrhoea and chlamydia treatment for MSM who are highly sexually active, even in the absence of symptoms (especially where STI laboratory screening is not feasible). Most MSM with gonorrhoea and chlamydial infection are more likely to be asymptomatic than symptomatic.[45,46] and can be managed in line with STI treatment guidelines (refer to latest national guidelines).

Safety monitoring and maintenance

PrEP users require an initial one-month follow-up to assess ongoing eligibility, tolerance, safety and effective use. Hepatitis B vaccination and STI treatment (as appropriate), condoms and condom-compatible lubricant, contraceptive services, risk reduction counselling, effective use support, a 3-month prescription for TDF/FTC FDC and a follow-up date should be provided at this visit. Thereafter, 3-monthly visits are recommended (Table 3). Check the creatinine at the first-month and fourth-month visits, and thereafter 12-monthly. Check rapid HIV every 3 months.

Each visit should be viewed as an opportunity for counselling and risk assessment. Discuss with the user at each visit whether PrEP is still needed. Emphasise the importance of effective use of PrEP to gain maximum ongoing benefit from PrEP.

TABLE 3: Hepatitis B immune status and pre-exposure prophylaxis eligibility.

Hepatitis B surface antigen (HBsAg)	Hepatitis B surface antibody (HBsAb)	Action
Negative (-)	Negative (-)	Start PrEP, vaccinate concurrently
Negative (-)	Positive (+)	Start PrEP, no vaccine needed
Positive (+)	N/A	Refer for evaluation

N/A, not applicable; PrEP, pre-exposure prophylaxis.

By mutual agreement, PrEP should be stopped if: HIV test is positive; the client no longer meets eligibility criteria; the client does not need PrEP; the client feels that adherence to PrEP is too onerous; or it is perceived by the clinician that the risks of PrEP outweigh potential benefits. Users who are ineligible for PrEP require support to access other prevention options (see HIV prevention text box).

PrEP users should be reminded that PrEP is not conceptualised as a life-long therapy. It should be used while there is risk of sexual or other exposure to HIV. PrEP users are therefore expected to cycle on and off PrEP as dictated by their current level of sexual risk. A reminder should be given that, if restarting PrEP, adequate protection only occurs after 7 days of dosing for anal sex and 20 days of dosing for vaginal sex or needle risk in PWID. HIV-negative status should be confirmed before restarting PrEP. If stopping PrEP, medication should be taken for 28 days after the last potential exposure to HIV.

Managing abnormal follow up visit results

PrEP should be stopped if estimated creatinine clearance < 60 mL/min. Repeat creatinine clearance should be rechecked after 2 weeks; if renal function returns to normal and other PrEP criteria are met, PrEP may be restarted. STIs should be treated syndromically (refer to latest national guidelines).

Risks and side-effects

Antiretroviral resistance

At the time of writing the guideline, the only HIV resistance documented to date amongst PrEP users has been amongst clients who initiated PrEP when they were already HIV infected (during acute HIV infection). Predictably, the FTC resistance mutation M184V was the first to occur.[3] To prevent the risks of developing ARV resistance, clinicians must focus on not commencing or reinitiating PrEP after a break, during acute HIV infection (Box 7).

HIV testing should be done 3-monthly, and should be accompanied by an HIV exposure assessment, symptom screen and a targeted examination to exclude acute HIV infection (Box 8). HIV testing should also be repeated whenever symptoms of a viral illness are present. Clinicians should advise clients on the need for an HIV test before resuming PrEP if it was stopped, particularly if they have potentially been exposed to HIV during this period.

Side-effects

There is a large TDF/FTC FDC safety database derived from millions of HIV-positive individuals receiving ART.[6] In addition, the 17 000 individuals exposed during the clinical trials and an increasing number of individuals in demonstration projects confirm the extremely good safety profile of TDF/FTC FDC use in HIV-negative individuals.[6]

BOX 7: Strategies to reduce the likelihood of antiretroviral resistance.

Feasibly exclude acute HIV infection before initiating PrEP by:
• conducting antibody HIV testing before commencing or re-prescribing PrEP
• enquiring about pill taking patterns and whether any pills were missed
• among persons with a negative HIV antibody test, conducting a clinical screen to detect signs and symptoms of acute HIV infection – history of fever, sore throat, rash, joint pain, cough in the past month and a targeted examination (temperature, ENT and skin exam) (see Acute HIV infection text box)
• considering time period between last potential HIV exposure and window period of tests being used
• If symptoms or signs of acute HIV infection found: ▪ At screening: postpone PrEP until symptoms subside and rapid antibody test remains negative at 2–4 weeks' follow-up ▪ At screening: do not initiate PrEP until follow-up HIV antigen/antibody testing (2–4 weeks) complete ▪ At follow-up: may elect to continue PrEP while awaiting results of follow-up HIV antigen/antibody testing (2–4 weeks) or may decide to withhold PrEP until follow-up tests available ▪ Note that, if PrEP has been taken consistently, breakthrough infection is unlikely. Withholding PrEP may put an effective user at greater risk for HIV acquisition
• Support client to maximise effective use and include effective use counselling at each visit
• Stop PrEP should requirements for PrEP eligibility not be fulfilled or if client recognises risk profile has altered or wishes to use a different combination of prevention
• Counsel client that recommencement will require all of the above steps again.

BOX 8: Acute HIV-infection.

Severity of the syndrome ranges from mild non-specific 'viral' or 'flu-like' symptoms to a severe infectious mononucleosis-like illness with immune dysregulation and transient profound CD4 depletion.[47,48]
Symptom:
• malaise • anorexia • myalgias • headache • sore throat • sore glands • rash.
Sign:
• fever, sweating • generalised lymphadenopathy • hepatosplenomegaly • non-exudative pharyngitis • orogenital herpetiform ulceration • truncal rash (maculopapular or urticarial) • viral meningitis • Guillian-Barre syndrome • *Pneumocystis* pneumonia† • cryptococcal meningitis† • oral/oesophageal candidiasis.

†, Extremely rare.

The major toxicities associated with TDF/FTC have been extremely rare in PrEP exposure to date. Minor side-effects have been relatively common, but mild and self-limiting (approximately 1 in 10 individuals in the first 1–2 months).

Gastrointestinal side-effects

The side-effects related to TDF/FTC FDC use in PrEP trials (nausea, weight loss) were mostly self-limiting mild start-up symptoms (first month), but these may adversely affect persistent PrEP effective use. Supportive counselling and symptomatic treatment (anti-emetics) of these symptoms is often sufficient to assist the user to persist beyond the first month, after which the symptoms tend to subside. This may also be accompanied by mild headache and some malaise. Rates of other GIT symptoms (bloating, abdominal tenderness, flatulence) amongst PrEP trial participants who took TDF/FTC FDC were not significantly different from those who took placebo.[6]

Renal toxicity

Modest, transient increases in serum creatinine have been noted in completed PrEP studies, but these did not persist after stopping PrEP nor recur on rechallenge. Proteinuria, decreasing glomerular filtration rate (GFR) and Fanconi's syndrome have been described in the setting of ART, and decreased GFR has been described in the setting of PrEP but has not caused clinical harm.[6] Renal function needs to be measured prior to commencement and monitored in clients using PrEP by measuring serum creatinine and calculating the estimated creatinine clearance. These parameters should be measured at baseline, at month 1, month 4 and then annually thereafter. Hypertensives, diabetics and those with existing glomerulonephropathies (if the benefit of PrEP is still deemed to outweigh clinical risk) should be monitored more frequently. TDF/FTC FDC-based PrEP should be avoided in patients who require the use of other nephrotoxic drugs, such as aminoglycosides for the treatment of drug-resistant tuberculosis (TB). Clients with creatinine clearance < 60 mL/min should not be placed on PrEP and, if found during maintenance, PrEP should be discontinued.

Decreased bone mineral density

Decreases in bone mineral density associated with TDF and FTC/TDF FDC have been observed in completed PrEP trials. Decreases were less than those observed in HIV-infected individuals treated with the same drugs, and appeared to stabilise over time.[49,50] No difference in fracture rates was seen. Recreational drugs (amphetamines and inhalant use) were associated with reductions in bone mineral density in HIV-negative MSM taking TDF, suggesting some synergistic impact.

Hepatitis B management

TDF and FTC both have hepatitis B antiviral activity. The potential risk exists that exposure to these antivirals may treat unidentified chronic hepatitis B infection, with a consequent viral flare (rebound) upon drug withdrawal that can result in severe liver injury.[51] This phenomenon has not been described with PrEP use to date. However, it is recommended that screening for hepatitis B surface antigen and antibodies occurs prior to PrEP commencement.

It is recommended that, if hepatitis B surface antigen (HBsAg) is positive, the client be investigated prior to commencement of short-term PrEP (Table 3). PrEP is not contra-indicated in those with HBV but we recommend that additional liver function monitoring should be performed. PrEP users with persistently elevated or abnormal liver function tests should be referred for assessment. A possible approach to those with chronic hepatitis B infection may be to prescribe long-term TDF/FTC FDC. Liver function tests should be checked after stopping PrEP in those with chronic hepatitis B infection. Users who are negative for both HBsAg and hepatitis B surface antibody (HBsAb) should commence a hepatitis B vaccine schedule. People with chronic hepatitis B infection

may choose to continue using TDF and FTC to control their hepatitis, even if they do not require these drugs any longer for the indication of PrEP. Users with a history of injecting drug use should be screened for hepatitis C and, if positive, referred for further care.

Other side-effects

Hyperpigmentation may occur as a side-effect to FTC. The clinician should explain that this is not harmful. Lamivudine (3TC) can be substituted but this will increase the pill burden, which may have an impact on effective PrEP use. PrEP studies to date have used either TDF or TDF in combination with FTC, rather than 3TC.

Risk compensation

This term refers to the theoretical risk that individuals commencing PrEP will neglect other safer-sex measures, and put themselves at increased risk of HIV exposure. To date, evidence of this has not been borne out in PrEP trials. It may be, however, that during counselling it is apparent that a client may not be able to or simply cannot use condoms or other safer-sex modalities. In these cases, PrEP if used consistently during HIV exposure may significantly reduce HIV infection. Providers should gauge this during risk reduction and effective use counselling opportunities.

HIV prevention package for pre-exposure prophylaxis users

The prevention of HIV acquisition requires a comprehensive approach, inclusive of a combination of biomedical and behavioural/psychosocial interventions tailored to individual needs. Where feasible, condoms and condom-compatible lubrication are key components of all HIV prevention packages, supported by contraceptive services, STI detection and treatment, appropriate use of ART (PEP), and counselling around the identification of high-risk practices and ways to circumvent or reduce risk. Individuals should be encouraged to understand what each component of the prevention package offers and, together with the provider, should devise the optimal package for their own lifestyle.

Stopping pre-exposure prophylaxis

PrEP should be stopped: (1) whenever an HIV test is positive, (2) at client request, (3) for safety concerns (particularly if creatinine clearance < 60 mL/min) and (4) if the risks of PrEP outweigh the potential benefits. Ongoing linkage to appropriate HIV prevention services and contraceptive services should be encouraged, as well as the use of other HIV prevention strategies, as needed.

The duration of PrEP use may vary and individuals are likely to start and stop PrEP depending on their risk assessment at different periods in their lives – including changes in relationship status, behaviours and ability to adhere to a PrEP maintenance programme. Clients should be advised that an HIV test at minimum should be done before PrEP is recommenced. Clinicians may want to discuss the options of when to discontinue PrEP with their clients.

Other notes for pre-exposure prophylaxis prescribers

Pre-exposure prophylaxis will not suit all users

PrEP should be considered for clients who are most likely to benefit from this specific prevention strategy, ideally as part of a package of HIV prevention services (Box 9).

Pre-exposure prophylaxis usage requires commitment

Usage will require commitment from both the provider and the user to ensure success. Providers may need to be innovative in providing support to PrEP users and also find ways to make participation in a PrEP programme as easy and convenient as possible. This requires ensuring that structural, logistical barriers are minimised as much as possible and that participants are provided with an encouraging and positive approach from providers.

Special clinical considerations

Women who become pregnant or breastfeed on pre-exposure prophylaxis

HIV-negative women in serodiscordant relationships are at risk of acquiring HIV infection whilst trying to conceive through unprotected sex. Pregnancy itself is also associated with an increased risk of becoming infected with HIV. The use of PrEP around the time of conception and during pregnancy offers a means of protection to the uninfected partner. Unfortunately, data relating to the safety of PrEP specifically with regard to the developing foetus are limited, and consequently the onus is on the clinician to discuss potential risks and benefits of PrEP initiation or maintenance during pregnancy with the client.

BOX 9: HIV prevention for pre-exposure prophylaxis users.

General factors to consider:

- accessibility of condoms and compatible water-based lubricant should be addressed
- no single HIV risk reduction intervention is likely to suit all users
- combinations of prevention options, tailored to address specific risks, should be offered ('menu of prevention choices'), inclusive of biomedical and psychosocial/behaviour change interventions
- prevention options are likely to increase as new evidence becomes available.

Biomedical:

- male or female condoms and compatible lubrication
- access to frequent HIV testing
- early access to ART
- post-exposure prophylaxis
- pre-exposure prophylaxis
- voluntary medical male circumcision
- STI screening and treatment
- needle syringe exchange and opioid substitution therapy for people who inject drugs.

Psychosocial:

- education: risk and safer sex practices
- regular HIV counselling and screening
- reducing number of sex partners
- reducing alcohol and substance abuse
- addressing mental health needs
- couple counselling and programming
- harm reduction counselling and support for clients who use drugs.

PrEP trials involving heterosexual women excluded pregnant women from enrollment, and those who fell pregnant during the conduct of the study were discontinued from PrEP. One study of 46 uninfected women in serodiscordant relationships demonstrated no adverse effects on the pregnancy or cases of HIV transmission when TDF was used around the time of conception. There are several ongoing demonstration projects that will allow women to continue PrEP if they fall pregnant, which will provide some data to inform future recommendations. In addition, the Antiretroviral Pregnancy Registry shows no evidence of adverse outcomes amongst infants exposed to these medications when used as antiretroviral therapy *in utero*.

In serodiscordant couples, the infected partner should be initiated on ART and virologically suppressed, ideally for 6 months, before any attempts to conceive.

In South Africa, the use of TDF/FTC as PrEP in pregnant or breastfeeding women is contra-indicated. However, as the risk of seroconversion during pregnancy is high, the risks and benefits of PrEP should be discussed with potential PrEP users, allowing these women at high risk of HIV acquisition to make an informed decision regarding PrEP use.[2]

Exposure to PrEP via breast milk has not been extensively studied. However, HIV-negative babies born to HIV-positive mothers on PMTCT B+ programmes and lifelong ART are exposed to TDF/FTC. The risk of HIV infection against the risk of ARV exposure to the infant should frame a discussion with a potential PrEP user who is pregnant or is planning conception.

The future of pre-exposure prophylaxis

Whilst recommendations for safe and effective PrEP use in correctly identified users to prevent HIV acquisition are strong, questions still remain on optimising the user selection, the ideal distribution platform and optimal monitoring schedule. Ongoing health service research aims to address these knowledge gaps. For more information, consult the AVAC website http://www.avac.org/prevention-option/prep.

Please report adverse events occurring on PrEP to the National Adverse Drug Event Monitoring Centre, which is housed in the Division of Pharmacology at the University of Cape Town. The reporting guideline is available at: http://www.mccza.com/genericDocuments/2.11_ADR_reporting_Jun11_v2.doc.

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Competing interests

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Authors' contributions

M.M. is the corresponding author and prepared the first draft of the manuscript. L-G.B. and K.R. co-chaired a meeting of the PrEP Guideline Development Committee, where the principles of the guideline were agreed upon. The remaining authors were involved in the discussions that guided the development of the manuscript and also reviewed the first draft. All authors developed the recommendations.

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Appendix I: Memos

Memo: How one perceives the world

16th July 2018

It was very insightful to sit in the waiting area with patients that are waiting to be assessed by the PHC nurses in the clinic. There are many conversations that take place amongst the patients about their diagnosis and what they are attending the clinic for. Patients in the clinic hold the PHC is high esteem, expecting them to know what is the problem with them and more importantly how to 'fix' them. Research participant 2 stated, 'I would appreciate it if nurses spoke to me about it when I go to the clinic.' This is an assumption that nurses at the PHC clinic know about PrEP and is able to assist patients with this need of wanting more information. However it was noted that participant 11 stated, 'I'm learning as I just started now.' This gives me the impression that although patients expect nurses to know about every diagnosis and treatment and prophylaxis that is available, it is sometimes not the case.

When the nurses do not have the knowledge of what is available to patients then that leaves patients in a situation where they do not get the treatment that is needed. This requires more investigation on how can patients empower themselves with knowledge that is needed for their health and how to keep nurses updated on what is current in the medical industry.

Memo: we need more money

01 June 2018

This refers to the financial needs of the provincial sector. The clinics that I conducted my research in had a constant flow of patients that needed to be consulted by nurse or a PHC doctor in the clinic. A lot of the times the waiting area was full and patients found themselves in a line outside the entrance of the clinic. The patients expect there to be sufficient supply of medication and resources to attend to their medical needs

when they visit a clinic however participant 8 states that '… lack of funding… the government sector is in tatters, they sometimes don't even have basic medication.'

A concern that was brought up by a participant was if they had started taking PrEP and there was insufficient funds to continue to supply PrEP to him then what would happen. PrEP needs to be taken daily to maintain the levels of the drug within the body to prevent an individual from contracting HIV and if there is no PrEP to take then the patient could be in a situation that leaves them more susceptible of contracting HIV. Before PrEP is given out to individuals there needs to be a plan put in place to ensure that there is sufficient supply of the drug the community.

Memo: Over burdened

18th April 2018

This refers to the both the PHC staff and the patients that attend the clinic. All 5 primary health staff members stated that they are over worked and short staffed within the clinic. There is already so much work that PHC nurses do for the copious amounts of patients that they see on a daily basis and there was resistance to adding PrEP to part of their daily routine. This could be due: not wanting to change their routine, not enough staff to cope with the introduction of PrEP and manage patients on PrEP and not being educated on PrEP.

Because the staff are over worked and understaffed, there is a longer waiting period for patients to wait to be seen by them. This could impact negatively on patients that have time constraints to attend the clinic and tiresome for some clients that have to wait long hours.

More investigation needs to be done to understand how can PrEP be introduced into the system of the PHC clinic without creating a burden on the staff and the patients.

Memo: Technology is the way to go

June 2018

In the diverse world that we are living in, social media is the platform for most communication. There is also a percentage of people that do not have cell phones and means of media that still live in the KZN area. All participants that were interviewed till this stage suggested that more information should be broadcasted on social media. They spoke about TV's, cell phones and any other media that is used by people.

Google has a vast amount of knowledge that is often used by people however PrEP is not widely searched according to the responses from the participants. Another form of communication to the public is having talks, putting up posters and boards at the clinic to educate people on PrEP.

This leaves me with the thought that if the message about PrEP being available to the public was broadcasted more then where would that leave the usage of PrEP at? More information needs to be gathered about PrEP being available and would it be accepted and used by the individuals at high risk of HIV and would the PHC nurses be comfortable issuing PrEP to these individuals along with the aftercare.

Appendix J: Recruitment of research participants poster

Pre Exposure Prophylaxis

VOLUNTEER FOR AN HIV PREVENTION STUDY TODAY

You may qualify if you are:

- 18 years or older
- If you are sexually active (Gay, lesbian, transgender or bisexual)

This study is designed to create exposure of Pre Exposure Prophylaxis therapy and experiences of individuals with regards to PrEP therapy.

Contact: Roxann Moodley (Researcher) to find out more information and if you wish to participate

0833619654

Lets be positive about HIV together

You may also talk to your health care provider at this clinic to find out more information

Appendix K: Editing certificate

DR RICHARD STEELE
BA, HDE, MTech(Hom)
HOMEOPATH
Registration No. A07309 HM
Practice No. 0807524
Freelance academic editor
Associate member: Professional Editors' Guild, South Africa

110 Cato Road
Bulwer (Glenwood), Durban 4001

031-201-6508/082-928-6208

Email: rsteele@vodamail.co.za

EDITING CERTIFICATE

Re: **Roxanne Moodley**
DUT doctoral thesis: **Pre-Exposure Prophylaxis (PrEP) therapy in KwaZulu-Natal: An implementation guideline**

I confirm that I have edited this thesis and the references for clarity, language and layout. I returned the document to the author with track changes so correct implementation of the changes and clarifications requested in the text and references is the responsibility of the author. I am a freelance editor specialising in proofreading and editing academic documents. My original tertiary degree which I obtained at the University of Cape Town was a B.A. with English as a major and I went on to complete an H.D.E. (P.G.) Sec. with English as my teaching subject. I obtained a distinction for my M.Tech. dissertation in the Department of Homeopathy at Technikon Natal in 1999 (now the Durban University of Technology). I was a part-time lecturer in the Department of Homoeopathy at the Durban University of Technology for 13 years.

Dr Richard Steele
15 April 2020
per email

APPENDIX L

Education

Category	Core	Sub-core	
Education	Staff education	Lack of knowledge Unaware of policies Exposed to tertiary education	6 staff 4 staff 3 staff
	Client education	Lack of knowledge Need for client education	4 clients 7 staff
	Staff training	Minimal training Introduce nurse guideline	7 staff 1 staff
	Client training	Need for client guideline	2 staff
	Client communication	Education from practitioners	5 clients

Creating awareness

Category	Core	Sub-core	
Creating awareness	Staff awareness	Need for advertising	9 staff
	Client awareness	Introduce outreach programs Attract people to talks	5 staff / 2 clients 1 staff
	Communication	Need social media Promotion of PrEP	6 staff/ 4 clients 1 client

Issues/Barriers/Concerns

Category	Core	Sub-core	
Issues/Barriers/Concerns	Staff issues	Increased patient load	3 staff
		Time consuming	4 staff
		Challenging job	5 staff
		Salary complaint	1 staff
		Poor function at clinic	1 staff
	Client issues	Time constraints	2 clients
		Affordability	1 staff
	Staff concerns	PrEP used as PEP	1 staff
		Defaulting clients	2 staff
		Lack of compliance	1 staff
		Lack of monitoring	3 staff
		No experience	9 staff
		PrEP availability	3 staff
		Stock shortages	1 staff
		Miscommunication to the public	2 staff
		Increase in irresponsible behavior	5 staff
		Seroconversion	2 staff
		Resistance testing	1 staff
		Increase financial spend	2 staff
	Client concerns	No approach	5 clients
		Decrease in preventative methods	3 clients
		No STI prevention	2 staff
		Lack of funds	2 clients
	Staff barriers	Restricting protocol	2 staff
		Limited resources	5 staff
		Staff shortages	2 staff
		Lack of funds	4 staff
		Cultural barrier in communication	1 staff
		Lack of government support	4 staff
	Client barriers	Infrequent clinic visits	2 clients
		Lack of follow-up	1 client
		Stigma	2 clients / 2 staff

Expectations

Category	Core	Sub-core	
Expectations	Staff expectations	Patient commitment MDT involvement Training Awareness	1 staff 1 staff 7 staff 5 staff
	Client expectations	Accessibility Increase knowledge Availability	5 clients 4 clients 3 clients

PrEP Readiness

Category	Core	Sub-core	
Readiness for prep initiation	Staff readiness	Never dispense Mentally challenging Change of routine	5 staff 1 staff 1 staff
	Client readiness	No experience	4 clients
	Staff attitude	Positive about PrEP therapy Not ready for initiation	5 staff 1 staff
	Client attitude	Positive about PrEP usage Lack of interest Comfortable asking for PrEP	6 clients 2 clients 2 clients
	Access to PEP	Difficulty	1 client