A PROTOCOL FOR PROFESSIONAL NURSES REGARDING THE MANAGEMENT OF NURSE INITIATED MANAGEMENT OF ANTIRETROVIRAL THERAPY (NIMART) IN THE EHLANZENI DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA

by

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DECLARATION

I declare that the mini-dissertation “A protocol for professional nurses regarding the management of Nurse Initiated Management of Antiretroviral Therapy (NIMART) in the Ehlanzeni District, Mpumalanga Province, South Africa” hereby submitted to the University of Limpopo has not previously been submitted by me for a degree at this or any other university; that it is my work in design and in execution, and that all material contained herein have been duly acknowledged.

Signature:…… Date: 17 September 2014

Sekatane PT (Miss)

DEDICATION

This dissertation is dedicated to all NIMART trained professional nurses in the Ehlanzeni District and my husband Tumelo Give Modipane; my sons Dikgang and Khama; my father Sekatane Allion Diphasoa and my mother Cecilia Thoko; my mother-in-law Moriri Chester; my brothers, Collen Thabiso, and Elvis Geofrey; my sister Thandy Bonisi; my sister-in-law Phisegelo Junior and brother-in-law Don Denzil Modipane; my colleagues at the Nelsville / Valencia Clinic and the Tekwane Clinic, especially the operational manager Mazibane Nomshado; and my friend Gugulethu Mabele.

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ABSTRACT

The purpose of the study was to develop protocol for professional nurses regarding NIMART management that is based on data and specific challenges that are faced in the Ehlanzeni district by professional nurses. A quantitative, descriptive and cross-sectional research design was used for this study. The population consisted of all professional nurses who are NIMART trained, managing and initiating patients on ARV's at primary health care clinics. Systematic random sampling method was used to select 135 respondents. Data was collected through the self-developed questionnaire. The questionnaire was pre tested. Reliability was ensured through self-administered questionnaire and with the guide of literature review. The questionnaire was also pre tested by conducting a pilot study. Validity was ensured through undertaking extensive literature review, giving operational definitions of concepts, questionnaires were given to supervisors, questions constructed according to the objectives of the study and congruence was ensured between research questions, objectives, findings and recommendations. Data analysis was done through descriptive studies, using SPSS statistics 21.0 programme of data analysis with the assistance of the statistician. The findings indicate that challenges faced by professional nurses regarding nurse initiated and management of antiretroviral therapy are be lack of professional nurses, fear of infecting themselves while treating HIV positive patients, patients do not come on their return dates, encountering problems when they trace defaulters and shortage of retroviral drugs. The study recommends that staff shortage should be addressed, medicine supply should be monitored, a competent HIV trained doctor should be appointed and dedicated outreach team should be appointed.

Keywords*:* NIM-ART, HIV/AIDS, Professional nurse

DEFINITION OF CONCEPTS

Challenges

Challenges refer to things that are difficult and that test someone's ability or (Oxford Mini Dictionary & Thesaurus, 2008). In this study, challenges refer to problems encountered by professional nurses in relation to nurse initiated management of antiretroviral therapy.

Professional Nurse

According to the Nursing Act No. 33 of 2005(SANC, 2005), a professional nurse means a person registered as such at the South African Nursing Council in terms of Section 31. In this study, a nurse refers to a professional nurse who manages patients on ARVs.

NIMART (Nurse initiated management of antiretroviral therapy)

NIMART refers to the initiation of antiretroviral drugs by professional nurses who have attended training. In this study, NIMART refers to professional nurses who manage patients on antiretroviral drugs (Cameron, Gerber, Mutyabule, Swart & Mbatha. 2012).

Protocol

According to the Oxford Mini Dictionary and Thesaurus (2008), protocol refers to 'an official formality and etiquette'.

LIST OF ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ALT	Alanine transaminase
ARF	Acute renal failure
ART	Antiretroviral therapy
ARV	Antiretroviral
AST	Aspartate aminotransferase
ATP	Adenosine triphosphate
AZT	Zidovudine
CD4	Cluster of Differentiation 4, a glycoprotein that is found primarily on the surface of helper T cells
CHC	Community health centre
CrCl	Creatinine clearance
D4T	Stavudine
DoH	Department of Health
EFV	Efavirenz
FDC	Fixed Dose Combination
GFR	Glomerular filtration rate
HAS	Human Immunodeficiency Virus, Acquired Immune Deficiency Syndrome and Sexually transmitted infection.
Hb	Haemoglobin
HIV	Human Immunodeficiency Virus
HIVAN	HIV-associated nephropathy
ILO	International Labour Organisation
LDH	Lactate dehydrogenase
Lpr / r	Lopinavir / Ritonavir
MSF	Doctors without Borders
NGO	Non-governmental organisation
NIMART	Nurse initiated management of antiretroviral therapy
NVP	Nevirapine
OSD	Occupation Specific Dispensation
PEPFAR	President’s emergency plan for AIDS relief

PHC	Primary Health Care
PLWHA	People Living With HIV / AIDS
PMTCT	Prevention of Mother to Child Transmission
PPE	Personal protective equipment
RHAP	Rural Health Advocacy Project
SANC	South African Nursing Council
SGPT	Serum glutamic pyruvic transaminase
STI	Sexually transmitted infection
TAC	Treatment Action Campaign
TB	Tuberculosis
TDF	Tenofovir
UNAIDS	Joint United Nation's programme on HIV / AIDS
UNICEF	United Nation Children's fund
VCT	Voluntary Counselling and Testing
VL	Viral load
WHO	World Health Organization

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CHAPTER 1
ORIENTATION OF THE STUDY

1.1 INTRODUCTION AND BACKGROUND

Access to good quality ARV treatment has transformed the prognosis for people living with HIV and AIDS (PLWHA) in the developed world. Although it is also feasible, and desirable, to deliver ARV drugs in resource-poor settings, very few of the 95% of PLWHA, who live in developing countries, receive such drugs (Furber, Hodgson, Desclaux & Mukasa, 2004). The rapid scaling-up of ARV therapy in Sub-Saharan Africa is generating considerable public health gains. As of December 2008, 44% of adults and children in need of ARV therapy in the region were estimated to be receiving these services in comparison with five years earlier when the estimated regional treatment coverage was only 2%. Although treatment scale-up is having a profound effect on HIV related morbidity and mortality in the Sub-Saharan Africa important access gaps remain (UNAIDS, 2009).

The national ART programme in Uganda acknowledged that in the long term tasks performed by physicians should be shared and should involve other health care providers; such as clinical officers and nurses of whom there were greater numbers (Okero, Aceng,Namagala & Serutoke, 2005).

In 2000, the government of Botswana declared a state of emergency and initiated the first state-funded ART programme in Africa as part of its response to the epidemic. In 2002, the programme was launched and the aim was to deliver care with high level of clinical monitoring and a low tolerance of adverse effects. In 2006, 74 000 people in Botswana were on ART, and the aim of the programme was to reach 80% by 2009 of all eligible HIV-infected citizens (ACHAP Review, 2005).

The strategic framework of the World Health Organisation (WHO) for the emergency scale-up of ART involves training a range of community-based health care staff to support the delivery and monitoring of HIV / AIDS treatment. This is a significant shift from the centralised, physician-lead model of HIV care that prevails in high income nations (WHO, 2003). The WHO recognises that a public health approach to HIV / AIDS treatment should include strategies to reduce dependence on highly trained

physicians, thus enabling a larger number of people to have access to ARVs (WHO, 2011a).

A 2010 change in the WHO guidelines recommended that people living with HIV should start treatment, when a CD4 count was below 350 cells / mm^3. The recommended CD4 count at which treatment should begin was changed from a CD4 count of < 200 cells / mm^3 to < 350 cells / mm^3 (WHO / UNAIDS / UNICEF, 2010). At the time, 33.3 million people were living with HIV worldwide (UNAIDS, 2010). The release of new guidelines resulted in an increase in the number of people considered to be eligible for treatment, from 10 million to 14.6 million. As a result, treatment coverage figures for 2009 changed significantly from 52 per cent, under the previous 2006 guidelines, to 36 per cent, under the new 2010 guidelines (WHO / UNAIDS / UNICEF, 2010 & 2011).

In Sub-Saharan Africa, which accounts for 73 per cent of antiretroviral therapy need in low- and middle-income countries, treatment coverage increased from 41 per cent to 49 per cent, between 2009 and 2010. However, coverage within this region varied widely; in the most highly affected areas of Eastern and Southern Africa, coverage was higher (56 per cent) than in West and Central Africa (30 per cent) (WHO / UNAIDS / UNICEF, 2010).

Goal number 6 from the HIV, AIDS and STI strategic plan for South Africa for 2007 to 2011 was to enable people living with HIV and AIDS to lead a healthy and productive life in order for them to be able to care for their families (DoH, 2004).

As the antiretroviral drug prices decreased, the key constrain to delivering treatment had become human resources. Human resource capacity was generally weak in resource constrained settings, particularly in Sub-Sahara Africa (Kober & Van Damme, 2004).

1.2 PROBLEM STATEMENT

Nurse initiated management of antiretroviral therapy started in 2010 both in the Limpopo and Mpumalanga Provinces, which involved training of professional nurses to take a lead in HIV care such as ART monitoring, adherence, and dispensing. During the same year (2010), the National Department of Health adopted

recommendations by World Health Organisation (WHO) to start patients with CD4 of < 350 cells / mm^3 on antiretroviral therapy. As a result, the number of patients eligible for ARVs started to accelerate at a fast rate (WH0, 2011a).

In the Ehlanzeni District, the researcher observed that the number of patients on ARTs increased daily, and it appeared that nurses were faced with challenges, such as shortage of professional nurses. The researcher was interested to find out what the challenges were that professional nurses were experiencing in relation to NIMART in the Ehlanzeni District.

1.3 RESEARCH QUESTIONS

The following research questions guided the study:

- What is the demographic information of the professional nurses?
- What are the challenges encountered by professional nurses with regard to the management of nurse initiated management of antiretroviral therapy (NIMART) in the Ehlanzeni District?
- What protocol should be implemented to support professional nurses in the Ehlanzeni District with the management of NIMART?

1.4 AIM OF THE STUDY

The aim of the study was to:

- Develop a protocol for professional nurses regarding NIMART management that is based on the demographic data and specific challenges that are faced by professional nurses in the Ehlanzeni District.

1.5 OBJECTIVES OF THE STUDY

The objectives of the study were to:

- Determine the demographic information of the professional nurses with regard to NIMART management.
- Describe the challenges encountered by professional nurses in relation to the management of NIMART in the Ehlanzeni District.

- Develop a protocol that could assist with the challenges experienced by the professional nurses in terms of the management of NIMART.

1.6 RESEARCH METHODOLOGY

The study was conducted at the Mbombela and Bushbuckridge Clinics in the Ehlanzeni District, Mpumalanga Province, South Africa. A quantitative method was used to obtain data. This study attempted to develop a protocol for professional nurses with regard to NIMART in the Ehlanzeni District, Mpumalanga Province, South Africa. A descriptive cross-sectional design was used because data was simultaneously collected in two sub-districts of Ehlanzeni. The population consisted of 207 professional nurses who were NIMART trained, and who were managing and initiating patients on ARVs at primary health care clinics in the Ehlanzeni District, Mpumalanga Province. Five professional NIMART trained nurses were used for a pilot study and were excluded from the main study. The sample size was determined by using Morgan and Krejcie's formula for determining the sample size for research activities. Hundred and thirty five (135) NIMART trained professional nurses managing and initiating patients on ARVs at primary health care clinics of the Ehlanzeni District, Mpumalanga Province were sampled by using systematic sampling.

A self-designed questionnaire with the assistance of a statistician, supervisor and co-supervisor was used for data collection. The questionnaire consisted of three sections, namely: Section A that required demographic data, Section B dealt with challenges with regard to NIMART, and Section C enquired about policies and guidelines. The questionnaire consisted of nine pages and contained 51 closed-ended questions. A statistician from the University of Limpopo assisted to analyse the data. The IBM SPSS statistics 21.0 program for data analysis was used to analyse data. Descriptive statistics including counting, percentages, and frequency distribution were used to determine the demographic information of the variables and also to describe the challenges encountered by NIMART professional nurses in the Ehlanzeni District. Details about the research methodology are discussed in Chapter 3 of the study.

1.7 SIGNIFICANCE OF THE STUDY

The recommendations of this study could increase the body of knowledge to help professional nurses with the challenges they are facing in relation to NIMART. The findings of the study identify strategies to overcome those challenges encountered. These findings will also improve the nursing care of the patients.

1.8 CONCLUSION

Chapter 1 introduced an overview of the research problem, purpose, research question, objectives, methodology, and significance of the study. Chapter 2 discusses the literature review conducted for this study.

CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

This chapter discusses the literature review conducted by the researcher on a protocol for professional nurses with regard to the management of nurse initiated management of antiretroviral therapy (NIMART).

The purpose of the literature review was to:

- Familiarise the researcher with the scope of the study field.
- Identify trends and developments in the research field.
- Examine existing research on a protocol for professional nurses with regard to the management of nurse initiated management of antiretroviral therapy (NIMART).

2.2 ADHERENCE TO ARV THERAPY

The main barrier to the initiation of and compliance to ARV therapy is the stigma associated with HIV and AIDS (Department of Health. 2006). The stigma also discourages people from seeking voluntary counselling and testing (VCT) services. A study on barriers to ART adherence for PLWHA conducted in Botswana using both qualitative and quantitative methodologies indicates that patients state their health providers as having significantly impacted upon their lives in the medical, social, and psychological realms. The study further states that physicians and nurses are often cited by patients as their primary source of support in coping with the challenges of living with their illness (Weiser, Wolf, Bangsberg, Thior, Gilbert, Makhema, Kebaabetswe, Dickenson, Mompati, Essex & Marlink, 2003).

The key challenges in scaling up ART therapy programmes in the public sector as stated by Jumbo and Poole include continuing lack of human resources (nurses, doctors, pharmacists, nutritionists, dieticians, and counsellors). While not all of these positions need to be filled on a full time basis at the most accessible level of care, it is crucial that the primary health care facility must have knowledgeable personnel with

adequate training on ARTs to be able to operate and manage the programme (Jumbo, Poole, George & Grey, 2004).

They also identify the following key challenges:

- Lack of adequate infrastructure (including water, sanitation, electricity, communication, and consulting rooms) and weak support systems (laboratory services, transport, and medicine supply).
- The lack of essential services (accessible VCT and effective PMTCT programmes, particularly in resource constrained areas).
- The lack of capacity to monitor and evaluate the ARV therapy programme at all levels of delivery, starting at the facility level.
- Lack of a strong monitoring and evaluation system. The ability to track and treat patients, regardless of where they present, is most important to ensuring suitable levels of adherence and monitoring of treatment outcomes.

El-Khatib and Richter (2009) report that the Free State Province has the third highest HIV-prevalence (31%) in the country since December 2008. The Free State Provincial Department of Health (DoH) stopped initiating ARTs because of drugs that were out of stock and lack of funding. This situation contributes to high morbidity and mortality, and to a lack of trust in the health system. This also impacts negatively on adherence of existing patients on the ART programme, and can lead to life threatening effects with emerging drug resistant strains of HIV.

El-Khalib and Richter (2009) further report that patients already on ARTs share their medication with neighbours, relatives, or friends who experience delays in receiving ARTs. This practice raises serious public health concerns about drug failure, subsequent and more expensive drug regimens, and the spread of drug-resistant strains of HIV.

The majority of children in South Africa are managed at secondary and tertiary centres or dedicated ARV centres for HIV treatment; these facilities are not necessarily located near where people live. This results in the cost of transport being a barrier to consistent attendance and even causing hardship, such as when people have to prioritise the expense of transport over other competing household expenses

with a limited budget that ends up with a negative impact on ARV adherence (Michaels, Eley, Ndhlovu & Ruttenburg, 2006).

2.3 HUMAN RESOURCES

Scaling up antiretroviral (ART) delivery requires tens of thousands of health care workers with the experience and training needed to treat people with HIV, a complex health problem. There is, therefore, an urgent need to develop simple and sustainable models of delivering ART and its associated care that minimise the potential of existing human resources in a less-developed health care delivery system. Physician-based models of care adapted from industrialised countries do not suffice for the treatment of the majority of patients in resource-constrained settings; therefore, the use of non-medical staff members should be considered (Curran, Debas, Arya, Kelly, Knobler & Pray, 2005).

Secrecy has also been responsible for the increased workload of nurses as reported in the study done by Hall (2009) in South African hospitals. Since the HIV-status of most patients was unknown to the nurses in the study they had to apply universal precautions while treating all patients in their care. They felt that these precautions took more time to administer and affected their productivity. The heavier workload of these nurses also caused poor record keeping. Since the recording of HIV test results was sometimes inadequate, patients had to go for HIV testing more than once and at different facilities. At the same time, 22.8% of nurses in the study felt that caring for AIDS patients was, in itself, demanding and time consuming because of factors, such as longer recovery times and a lack of support from the families of patients. Nearly 80% of the participants indicated an increase in workload since the year prior to the investigation, which they attributed primarily to patient increases and staff shortages (Hall, 2009).

South Africa has lost a number of professional nurses through either emigration or the decision to change profession (Hall, 2004). Nurses qualified annually and enrolments from higher education showed a decline for the period 1990 to 2000 (SANC, 2003). Unsatisfactory working conditions at public health facilities contribute to the shortages of health professionals. They are expected to provide health care to increasing numbers of patients amidst insufficient resources, poor maintenance,

outdated or faulty equipment, and a lack of proper incentives (Landman, Mouton, & Nevhutalu, 2001; Swanepoel, 2001)).

A study conducted in Cape Town indicates that a lack of staff; including nurses, pharmacists, and auxiliary staff, such as social workers and counsellors; are most commonly cited as the major obstacles to increasing access to treatment for HIV infected children. Unfortunately, even when resources are allocated to augment the staff complement, certain provinces experience difficulties in getting suitable applicants and posts are often re-advertised and remain vacant due to a lack of applicants (Michaels, Eley, Ndhlovu & Ruttenburg. 2006).

The Health Systems Trust, a non-governmental organisation that has been monitoring the AIDS treatment programme in South Africa since 2003, acknowledges that the single most significant obstacle to attaining public health goals is the lack of adequate human resources. It concludes that the strategies outlined in the Strategic Plan of the Department of Health, 2004 have not been effective in addressing the issue (DOH, 2004).

The subsequent HIV and AIDS and STI National Strategic Plan 2007-2011 (National Strategic Plan 2007-2011). acknowledged that there was an imbalance between the public and private health sectors in respect of the availability and training of health care personnel, with the informal and rural areas being most disadvantaged. The policy cited the introduction of a rural and scarce skills allowance and the "improvement of conditions of work in the public sector" as remedial measures to improve the human resource shortage. However, the policy did not explain what improvements were to be implemented in the work environment or to what extent these measures had been successful. The significant lack of adequate human resources at the time of this current study is a clear indication that these mechanisms have been unsuccessful in achieving the desired outcome (SA National AIDS Council, 2010).

The latest NSP 2012-2016 is rather vague on the question of the human resource capacity required for the implementation of the plan. The issue receives passing reference when dealing with the need for a 'skilled and capable workforce' in terms of

the Medium Term Strategic Framework and for 'workplace / occupational health policies on TB and HIV' (South African National AIDS Council, 2010).

The study done by Daniella, Christopher, Simons, Lara, Max, Kerry, Merrick, Beverly & Beteman (2012) in South Africa indicates that nurses in all facilities repeatedly affirm that paperwork demands in the health system as a whole are onerous, and has been increased by NIMART. It is likely that the increase in administration work for NIMART is related to the increased numbers of ART patients rather than unusually intense recordkeeping for ART patients. This burden is compounded by weak and fragmented information systems that are insufficiently staffed and resourced.

2.4 THE RISK OF INFECTION

HCWs in HIV / AIDS treatment facilities are at increased risk of contracting communicable diseases, either by direct contact (for example gastroenteritis and scabies) or by droplet spread (for example tuberculosis, pneumonia, and meningitis). By virtue of the nature of their patient base, they are also at risk of contracting blood-borne infections, such as Hepatitis B or HIV via accidental exposure to blood or other body fluids, e.g. cerebrospinal fluid (WHO / ILO, 2010).

HIV may be transmitted in the health care setting from patient to health care practitioner (DENOSA, Department of Health, UNAIDS & WHO, 2000). The average risk of HIV infection from all types of reported percutaneous exposure to HIV-infected blood is 0.3%. The risk of infection increases: When the injury is deep, when there is visible blood on the device causing the injury, when the device has previously been placed in the source patient's vein or artery, and when the source patient has advanced HIV-disease (AIDS) (Department of Health, 2000).

Health practitioners are at a low risk of becoming infected with HIV if they follow normal precautionary measures. The occupational risk of becoming HIV-infected from patients in health care settings is low (approximately 0.3%, as noted above) and in most cases it is associated with needle-stick injuries stemming from a patient with HIV. The estimated risk of becoming infected with HIV after a puncture with a contaminated needle is less than 1%. For a needle-stick accident to lead to HIV-infection, a sufficient amount of infected blood must be injected into the nurse's body.

The risk of transmitting HIV is dependent upon the practices of health care personnel, the prevalence of illness, and the amount and frequency of exposure (DENOSA, DoH, UNAIDS & WHO. 2000). The risk after mucous membrane (via the mouth) or skin exposure (without any injury) depends on the volume of blood and load of HIV in the blood (HIV viral load). However, these risks are much lower; they are reported to be approximately 0.1% and less than 0.1% respectively. The risk of skin exposure (e.g. skin splash, not an injury) is likely to be higher when there is prolonged contact with the skin, the contact involves a large area of the skin, the skin is unhealthy (i.e. open wounds, diseased, inflamed), and when there is a high viral load in the source patient's blood (Evans, 2000). Factors that increase the risk of occupational HIV-infection are shortages of plastic gloves, protective aprons, and proper disposal facilities (Knussen & Niven, 1999) Simpson's (2003:53) study in Scotland reveals that nurses are unnecessarily at risk of HIV-infection because of an insufficient supply of protective gloves. That study about nurses' experiences of working in a high-risk environment for contracting HIV / AIDS also reveals that nurses perceive that they are exposed to risk due to faulty gloves.

The possibility of becoming infected with the HIV virus is a major concern for nurses. Various authors have reported nurses' fear of becoming infected in the course of their professional duties (Fusilier, Manning, Santini Villar & Rodriguez, 1998; Horsman & Sheeran. 1995. Horsman and Sheeran (1995) indicated that the fear experienced is normally far greater than the actual risk of infection. Also, nurses' perceived risk of infection after exposure to other infectious diseases, such as the Hepatitis B-virus, is low if compared to their perceived risk of contracting HIV.

However, in South Africa, the enormous increase in the number of infections, together with a lack of enforced precautions by government, continuously fuels the fear of infection among health workers, especially those workers operating in trauma units (Wessels, 1997). Klewer, Lauschke, Raulinaviciute, Sasnauskaite, Pavilonis & Kugler (2010) also indicate that how health care students assess their chances of infection is partially determined by the HIV prevalence rate in a particular country, as well as the amount of contact that they have had with HIV patients at work. The fact that the disease is still incurable and that nurses are usually not familiar with the status of patients might also increase their fear of infection.

In the study done by Hall (2009) in South African hospitals, 46.4 % of nurses reported that they were afraid that they might infect their partners and children because of HIV / AIDS exposure at work. A quarter (32.6%) indicated that their partners were concerned about their being in close contact with patients who suffered from infectious diseases such as HIV / AIDS. The increased risk of infection was further confirmed by the study of the impact of HIV / AIDS on health services (sub-study no. 3), where it was found that patients and health workers were at risk of nosocomial (hospital-acquired) transmission because of inadequate implementation of universal precautions, the lack of reliable infection control programmes, and the unavailability of sterilising equipment. The extent of fear of infection was such that 16.2% of nurses would consider alternative employment and 7.7% another profession if they perceived the risk of infection as increasing in their current work environment.

The WHO advocates primary, secondary, and tertiary prevention programmes to curb the risk of and / or effectively treat occupational exposure to HIV and TB. Primary prevention includes measures aimed at preventing exposure to pathogens (for example; respiratory and eye protection, immunisation against Hepatitis, and safe needle technology) and evidence of its efficacy has been well documented. Primary prevention measures are closely related to environmental factors and are only as effective as the working conditions permit, as is explained in the following section (WHO / ILO, 2010).

In contrast to primary prevention measures, documentation on the efficacy of secondary prevention (the prevention of disease following exposure, for example post-exposure prophylaxis) is limited. Tertiary prevention encompasses the treatment and rehabilitation of the HCW once disease has manifested. These measures are primarily aimed at allowing HCWs to return to work as soon as possible. As such, it has been suggested that national policies are necessary in order to prioritise the health workers' access to prevention, treatment, and care services with respect to occupation-related diseases (WHO / ILO, 2010).

For HCWs employed at the ARV clinics, there is a risk of infection by blood-borne pathogens; such as Hepatitis B and, to a lesser extent, HIV. This risk is increased by the inadequate supply and incorrect use of personal protective equipment (PPE),

also referred to as “universal precautions and negligent 'sharps' and waste disposal methods” (Vawda & Variawa, 2012).

Research conducted by a group of the South African Municipal Workers Union (SAMWU) members at 38 municipal clinics over an 18-month period reveals minimal legal compliance with respect to health and safety requirements. The study also reveals that many clinics do not even have such basic supplies as soap (Vawda & Variawa, 2012).

2.5 ENVIRONMENTAL CHALLENGES

It is a reasonable assumption that a safe and well-equipped work environment is conducive to increased productivity, a healthier workforce, and improved patient management. For the purposes of this paper, the 'work environment' is dealt with in terms of the 'physical' environment or the actual structure of the workplace (such as space and ventilation), and the 'functional' environment that includes the tools required for efficient service delivery (personal protective equipment and medical consumables) (WHO, 2006b & WHO, 2006a).

The physical environment or infrastructure with regard to the health care facilities refers to the state of maintenance of the buildings, the availability of basic services (such as water and electricity), the availability of and access to the necessary technology (for example communication systems and laboratory data information systems), and the availability of functional medical and non-medical equipment. Infrastructure, such as viable surrounding roads and a transport system, is also important in facilitating patients' access to the health care facility. A fully functional, well-equipped, and adequately staffed health care facility is of little use if it is inaccessible to those in need of health care (Lutge & Mbatha, 2006).

Lutge and Mbatha (2006) further report that a major concern with regard to the physical environment is the lack of space in many ARV clinics. Often, consulting rooms are shared by a variety of disciplines of HCWs consulting with different patients. This is a serious issue because, in addition to the health risks associated with limited space, it violates the patient's constitutional right to privacy (Lutge & Mbatha, 2006).

According to Curtis (2008), a further problem with the lack of space is the overcrowding of waiting rooms, which can result in patients with communicable diseases infecting other immune-compromised patients. Related to this, is the lack of adequate ventilation and / or air-conditioning and ultraviolet light in many of the ARV facilities, which further contributes to the spread of air-borne pathogens.

A common concern among respondents in a study done in Cape Town was that current space and staff would become inadequate if the number of people accessing ARV services were to grow. The lack of clinic space for patient waiting areas and consulting rooms for clinical and counselling consultations was already a major problem at most facilities. Pharmacists cite the additional problems of lack of adequate storage space for large quantities of paediatric medicines and no space for confidential counselling on ARV administration (Michaels *et al*., 2006).

Furthermore, infrastructure deficits, such as non-functioning telephone lines, are reported to have had significant effects on patients already on ART and make it very difficult for nurses to initiate new patients onto treatment. These deficits are the obstacles cited by the two STRETCH intervention sites that have not progressed to phase three, two years into the trial (Daniella, 2012). In addition, the fear of running out of drugs may lead to stockpiling, which can cause expired drugs to end up on the shelves. At the same time, because each child patient requires large amounts of antiretroviral drugs (mostly in syrup form), this can result in storage problems at pharmacies, as mentioned above, and limits the amount of drugs that can be ordered (Michaels *et al*., 2006).

2.6 TREATMENT CHALLENGES

The most significant challenge with regard to treatment comprises the limited, and often inadequate, supply of antiretroviral drugs at several ARV facilities. This is also referred to as drug 'stock-outs' and has a detrimental effect on the ARV rollout programme (Treatment Action Campaign (TAC), 2008).

The 2010 UN General Assembly Special Session (UNGASS) Country Progress Report confirms the drug shortages during the period January 2008 to December 2009, and the four-month provincial moratorium barring new patients from obtaining life-saving ARV medication. The report estimates that over 3 000 lives have been lost

because of this moratorium, and that approximately 15 000 people have on a waiting list for ARV treatment. Another serious consequence of ARV stock-outs is that of drug resistance that results in the need for more expensive second-line medication (Ndlovu, 2009).

2.6.1 DRUG STOCK-OUT

Doctors without borders (MSF) and TAC survey done in January 2013, in Limpopo, Eastern Cape and Gauteng provinces found that 53% of the responding facilities had experienced ARV and / or TB drug stock-outs, with 24% having to send patients home without any ARVs. A wide variety of other essential medicines were also affected (MSF, the TAC, & the RHAP, 2013).

According to a report launched at the 6th South African AIDS Conference by a coalition consisting of the Rural Health Advocacy project (RHAP), Doctors without Boardes (MSF), the Treatment Action Campaign TAC, and Section 27, 40% of the 70 facilities surveyed by MSF and TAC during May 2013 in the Mthatha catchment area in the Eastern Cape Province had experienced HIV and / or TB drug stock-outs, 24% of the affected facilities were forced to send patients home without treatment because they experience stock-outs of essential HIV and TB drugs. Lamivudine (3TC), Tenofovir, Nevirapine, Efavirenz, paediatric ARV formulations, and Rifafour (a fixed-dose combination of four TB drugs) were the main medications affected, according to Doctors without borders (MSF), the Treatment Action Campaign (TAC), & Rural Health Advocacy project (RHAP) (2013).

On 10 October 2012, members of staff at the Mthatha Depot in the Eastern Cape had staged a strike, coupled with chronic supply chain issues, which precipitated widespread drug stock-outs in the region. The main causes for the drug supply problems were the lack of an early warning system for facilities to be able to report potential shortages, drug suppliers failing to meet tender quotas, government failing to pay suppliers, and poor ordering practices at health facilities and medicine depots. Rural Health Advocacy project (RHAP) received reports from the Mooiplaas Clinic, health centre in Mantlaneni, Jabavu Clinic (not served by Mthatha) Philani, Buntingville, Ndonga, Lujizweni, Libode and Canzibe Clinics and St Elizabeth Gateway Clinics of stock-outs of Fixed Dose Combination (FDC) ARVs during the

second week of May where patients were turned away from the clinic without ARVs and TB treatment (MSF, the TAC, & the RHAP, 2013).

In Gauteng, the Southern African HIV Clinicians Society reports that during 2013 there have been frequent reports of stock-outs from clinics in Johannesburg and the whole of Ekurhuleni. In most cases, stock-outs relate to Nevirapine, Efavirenz, and D4T supplies (individually and, in some cases, all at once). Many long-term, stable patients are reported to have been given dual or mono therapy instead of the prescribed triple therapy. TAC received reports that patients at the Phenduka Clinic, Thokoza and Ekurhuleni, Tsakane, Edenvale, and Vosloorus clinics were given prescriptions to purchase their ARVs at Springbok Pharmacy in Alberton, since there were no stocks available. RHAP further received a report from a district hospital in the OR Tambo District, two clinics in the Ekurhuleni District with no Lamivudine, while a third clinic in the same region had no ARVs (MSF, the TAC, & the RHAP, 2013).

In KwaZulu-Natal, MSF in Eshowe reported low supplies of Tenofovir in the hospital pharmacy, shortages of FDC ARVs and stock-outs of paediatric ARVs as well as indications of stock mismanagement from the hospital to surrounding clinics, therefore patients were provided with limited ARV supplies and were requested to return for treatment refills at a later date which necessitated more frequent travel to clinics for refills. Those who were eligible for FDC were put on triple therapy (MSF, the TAC, & the RHAP, 2013).

In Limpopo Musina reported shortage of Tenofovir (TDF) at the Messina Hospital, resulting in patients only receiving an adequate supply of ARVs for a short time. The SA HIV Clinicians Society received reports that TDF stock was being distributed to facilities in small quantities on a week-by-week basis leading to widespread shortages at clinics that were relying on that facility and that Lamivudine was out of stock in the main pharmaceutical depot in Limpopo. Consequently, there was also a stock-out at most institutions and clinics in the province. During May 2013, TAC received reports from Limpopo of shortages of Lamivudine and Stavudine from several health facilities (MSF, the TAC, & the RHAP, 2013).

In November 2008, ARV shortages in the Free State led to an estimated 30 HIV patients dying daily, as reported by the Southern African HIV Clinicians Society. At

that time, the Department of Health of that province placed a moratorium on the enrolment of new patients in the ARV programme. In June 2009, the KwaZulu-Natal MEC for Health, Dr Sibongiseni Dhlomo, denied that there was a shortage of ARV drugs at certain health facilities in the province (Ndlovu, 2009).

2.7 MAJOR CHALLENGES TO PAEDIATRIC ARV ROLLOUT

Nurses were asked what they thought were the major challenges to paediatric ARV rollout at their facilities in a study done by Michaels *et al*., (2006) in South Africa. Lack of staff, poor infrastructure, policy and procedures, socioeconomic conditions, and, to a lesser extent, funding dominated their responses.

2.7.1 TREATING CHILDREN WITH HIV / AIDS

Treatment of children with HIV / AIDS presents additional challenges. The physiology of a paediatric patient is not simply that of a diminutive version of an adult. HCWs need to be specifically trained in the skill of communication with children, using language that the child can identify with. A thorough knowledge of the spectrum of opportunistic infections that children are vulnerable to is essential in their management (Health Systems Trust, 2005).

At present, most ARV drug formulations are available as either tablets or capsules. These formulations are not suitable for young children. The currently available paediatric formulations, including syrups, are not conducive to use in rural areas due to the lack of proper storage facilities, such as refrigeration. Until more appropriate formulations are available, the contents of capsules are dissolved and the required dose titrated and administered (Health Systems Trust, 2005).

In addition to the challenges already described, many health care workers may be apprehensive about treating children because of their 'lack of training and experience' in this field. Adequate training in performing common procedures, such as drawing blood samples or performing lumbar punctures, is vitally important. At present, this training is lacking at several centres. Dealing with paediatric HIV patients is undoubtedly physically demanding. However, the emotional demands on HCWs who are attending to sick children are equally significant (Health Systems Trust, 2005).

In a study conducted at South African clinics, professional nurses reported a fear of treating children because they lacked training and experience in managing HIV infection in children, and the rollout training included very little information or reference to paediatric issues. A common concern among respondents was that current space and members of staff would become inadequate if the number of people accessing ART services were to grow. The lack of clinic space for patient waiting areas and consulting rooms for clinical and counselling consultations was already a major problem at most facilities. Inadequate storage for large quantities of paediatric medicines and lack of space for confidential counselling on ART administration were also reported as a major problem (Michaels *et al*., 2006).

2.7.2 HEALTH CARE WORKER PERCEPTIONS ON PAEDIATRIC ARV ROLLOUT

A study by Michaels *et al*., (2006) completed in South Africa, indicates that major challenges to the paediatric rollout as perceived by nurses include clinic space constraints, lack of adequately trained staff, lack of clinical capacity, and a “fear of treating children.” In particular, the need for nurses to be skilled in taking blood from children has been cited. Nurses also reported gaps in the health system, particularly between the PMTCT programme and well-baby clinics. Other concerns include fewer drug options for children, lack of services for adolescents, widespread poverty and unemployment, the impact of these factors on health care, transport and distance barriers to accessing paediatric HIV care, the lack of community awareness about ARV services for children, and the benefits of such services for infected children. At the time, nurses also reported the emotional challenges of working in a constrained system.

2.7.3 STAFF FEARS OF TREATING CHILDREN

In South African study, nurses further reported a fear of treating children because they lacked training and experience in managing HIV infection in children, and that the rollout training included very little information or reference to paediatric issues (Michaels *et al*., 2006).

2.7.4 NURSES' RELUCTANCE TO DRAW BLOOD FROM CHILDREN

Survey participants viewed the lack of blood-taking skills among nurses as a major barrier to the rollout of ARV treatment of infants and children. It is time-consuming and hazardous to health care workers to take blood from often unwilling children who have to be coaxed into allowing the procedure and may thrash about, needing to be held down. A fieldworker from a tertiary hospital site reiterated this observed barrier: "Currently nurses are refusing to take bloods on all children < 6 years which impacts negatively on the screening process for ARV readiness. The children now have to be screened by the doctors in the ARV clinic, sent back to the fully booked drug readiness program [sic], and then back to the ARV clinic for their ARV treatment to be initiated" (Michaels *et al*., 2006).

2.7.5 HEALTH WORKERS' TRAINING, ROLES, AND EXPERIENCE

According to a study conducted in South Africa, neither a standardised nor a coordinated training programme on the management of paediatric HIV and AIDS is currently available to medical personnel in South Africa. Nurses also reported varying levels of HIV management training, the majority of which were confirmed from doctors at facilities. Their roles varied across study sites, with some more involved in patient administration and ARV-related activities than other professionals (Michaels *et al*., 2006).

2.8 DRUG POLICY, PROCUREMENT, AND SUPPLY

There are fewer drug options for the treatment of children than for adults, according to a study completed in South Africa. In addition, procuring adequate drug supplies is problematic because it is difficult to predict the number of children requiring medication. In addition, the fear of running out of drugs may lead to stockpiling, which might cause expired drugs to end up on the shelves. At the same time, because each child patient requires large amounts of antiretrovirals (mostly in syrup form), this could result in storage problems at pharmacies, as mentioned above, and limits the amount of drugs that can be ordered at any particular time at particular sites. Existing weaknesses in health system management seriously affect the potential for ARV rollout, as illustrated by the following:

ARVs are classified as Schedule 7 drugs; some professionals consider this classification as a barrier to rapid rollout because it requires the drugs to be ordered on a patient name basis. ARVs are rapidly becoming one of the common chronic drugs issued at health services. Respondents in the study noted that this requirement is slowing down the pace of procurement (Michaels *et al*., 2006).

2.9 RECORD KEEPING

There is no standardised data collection system for HIV management and treatment of paediatric patients. Each facility has its own system of record keeping and monitoring. Interviewers noted that most sites visited were using an adapted version of the MSF monitoring form developed for adult patients attending HIV clinics. There is a sense among clinicians that there are child-specific elements that need to be captured and used for monitoring care and treatment among children, which are not factored into the current data collection systems (Michaels *et al*., 2006).

2.10 SOCIOECONOMIC CHALLENGES

2.10.1 POVERTY AND WELFARE GRANTS

The Social Assistance Act 2004b of Republic of South Africa provides the following types of grants for vulnerable children: A child support grant, a care dependency grant, and a foster child grant. Adults may receive a disability grant, an older person's grant, a war veteran's grant, and a grant-in-aid. As of April 2005, children 13 years and younger have been eligible for a poverty-relief grant designed to help the caregivers with meeting the child's basic needs. In 2006, these grants ranged from R190 per month (child support grant) to R820 per month (Manuel, 2006).

People infected with HIV are disproportionately poor and marginalised members of society. This is a challenge to paediatric HIV care and adherence to treatment. Health care workers in general report that they must ensure that caregivers can access social grants, which is often hampered by a lack of identity documents / birth certificates and the fact that children do not have legal guardians. Health care workers cite that they are often frustrated by the expectations patients have with regard to social welfare grant applications, because patients often believe that their

HIV-positive status automatically means that they are eligible for a social grant (Michaels *et al*., 2006).

2.11 LACK OF COMMUNITY AWARENESS AND SUPPORT

According to a study conducted in South Africa, nurses reported that community members were not aware that an ARV service was available and that children could be treated. In addition, doctors perceived scepticism around ARV treatment of children in terms of the effects of the drugs on children (Michaels *et al*., 2006).

2.12 LACK OF CAPACITY TO MANAGE CHRONIC AND ADOLESCENT CARE

According to a South African study, adolescents who are accessing services present a challenge to health care providers. It is recognised that the approach toward them should emphasise their adherence to lifelong therapy. The most common strategy adopted for providing services to adolescents is changing the adolescent-specific clinic times to the afternoons to allow them to attend school in the morning. Other activities include support groups, awareness programmes, and youth camps held during school holidays in collaboration with community based organisations (Michaels *et al*., 2006).

The study further reports that HIV-infected adolescents often experience behavioural problems and intellectual and emotional delays that require specific interventions. Another challenge that nurses face is the need to address issues of sexuality and contraception with children in their care (Michaels *et al*., 2006).

2.13 THE EMOTIONAL AND PSYCHOLOGICAL IMPACT ON HEALTH CARE WORKERS (HCWs)

According to the WHO (2011), burnout is 'characterised by emotional exhaustion, depersonalisation, and a sense of reduced personal accomplishment, accompanied by a decrease in motivation' and occurs as a result of chronic occupational stress in 'normal' individuals. Given the current conditions of employment at the ARV rollout at government facilities, it is not unusual for employees to manifest these psychological symptoms.

Furthermore, there is an added burden of having, in some instances, to forcibly restrain and incarcerate patients. A case in point is the isolation, for example, of patients who are suffering from the highly infectious extensively drug-resistant tuberculosis (XDR-TB), which has been determined by a court to be legal and justifiable. HCWs in such instances have to contend with complicity in the potential violation of the human rights of their patients, as well as the emotional trauma of being party to the use of extreme and often inhumane measures in dealing with their patients (Peltzer, Friend-du Preez, Ramlagan & Anderson, 2010).

2.14 OTHER CHALLENGING FACTORS

According to Georgeul, Colvin, Lewin, Fairall, Banchmann, Eubell, Zwarenstein, Drapper & Batemam (2012), nurses in all Free State facilities reported that paperwork demanded in the health system as a whole had been onerous, and was increased by NIMART. It is likely that the increase in administration work for NIMART is more a result of the increased numbers of ART patients rather than of unusually intense record keeping for ART patients. This burden is compounded by weak and fragmented information systems that are insufficiently staffed and resourced. The study further reports that unreliable delivery of ART drugs by hospitals and the central dispensing unit, as well as infrastructure deficits, such as non-functioning telephone lines, have significant effects on patients already on ART while making it very difficult for nurses to initiate new patients onto treatment.

Nurses also reported that ART patients required more complex and comprehensive clinical input thereby increasing the time and effort required per consultation. In contrast with increased nurse workloads, there were clear decreases in physicians' routine workloads, suggesting that the underlying objective of NIMART was attained. For example, one physician was able to start seeing patients at other clinics because his work had been reduced significantly at the intervention site (Georgeul *et al*., 2012).

2.15 POLICY, GUIDELINES, AND RELATED STUDIES ON HIV / AIDS

The new ART Guideline clearly states that children younger than one year, MDR / XDR /T B (stage 3 & 4), and pregnant woman are eligible for ARVs irrespective of CD4 count. It further indicates that all pregnant woman should be started on ARTs on

the first consultation day irrespective of CD4, but when the results indicate a CD4 count of less than 350, the patient has to take drugs for life, however, when the results indicate a CD4 count above 350, then the patient needs to take ARVs either up to one year after delivery when breast feeding, or stop taking ARVs immediately after delivery when formula feeding (National Department of Health, 2013). Nevirapine is a non-nucleoside reverse transcriptase inhibitor used to treat HIV-1 infection and AIDS. According to the revised ARV treatment guideline update for frontline clinical health professional that took effect on 02 February 2013, indicates clearly Nevirapine should not be given together with Rifampicin-based TB treatment because it might cause liver disease. Rifampicin decreases serum concentrations of nevirapine by 20-55%. The common toxicities of Nevirapine are skin rash and hepatitis, which overlap with common toxicities of some first-line anti-tuberculosis drugs. Furthermore, Nevirapine-based regimens are not recommended for patients with higher CD4 cell counts (> 350 cells / mm^3 for men, > 250 cells / mm^3 for women) because of increased risk of severe hypersensitivity reactions. Therefore, there are concerns about the efficacy and safety of using Nevirapine-based antiretroviral therapy during rifampin-based tuberculosis treatment. At the time of the study, there have been no studies comparing efavirenz vs. Nevirapine-based antiretroviral therapy among patients who are being treated for tuberculosis. Serum concentrations of Nevirapine among patients on concomitant rifampin often exceed the concentration necessary to suppress HIV in vitro. Several cohort studies have shown high rates of viral suppression among patients receiving Nevirapine-based antiretroviral therapy. The risk of hepatitis among such patients is also comparable to patients who are receiving first-line tuberculosis treatment without antiretroviral therapy. Despite the interaction with rifampin, Nevirapine-based antiretroviral therapy appears to be reasonably effective and well-tolerated among patients being treated for tuberculosis (Ribera, Pou & Lopez, 2001).

Some investigators have suggested using an increased dose of Nevirapine among patients on rifampin. However, a recent randomised trial comparing standard dose Nevirapine (200 mg twice daily) to a higher dose (300 mg twice daily) among patients on rifampin demonstrates an increased risk of Nevirapine hypersensitivity among patients randomised to the higher dose of Nevirapine. Therefore, the standard dose

of Nevirapine should be used among patients on rifampin (200 mg daily for 2 weeks, followed by 200 mg twice-daily (Avahingsanon, Manosuthi & Kantipong, 2007).

People with HIV may develop a condition called HIV-associated nephropathy (HIVAN), a syndrome causing loss of protein through the urine and decreasing renal (kidney) function. HIVAN is common in people with advanced HIV disease, but usually its effects are reduced after starting effective antiretroviral therapy. Some antiretrovirals, on their own, cause kidney problems and are described as nephrotoxic. Definitions and criteria for a diagnosis of acute renal failure vary, making it difficult to gauge either incidence in general, or in conjunction with the added complications of HIV disease and antiretroviral drug use (Lucas, 2004).

However, a recent study that followed over 600 patients for several years has concluded that although ART can slow down kidney function decline (defined as glomerular filtration rate estimated from serum creatinine [eGFR]), loss of kidney function continues slowly, even with durable viral suppression. This can be attributed to traditional kidney disease risk factors (e.g. high blood pressure), intermittent viraemia, and nephrotoxicity associated with some antiretrovirals. CD4 cell count is not predictive of declining kidney function (Choi, 2009).

Similarly, kidney function remained almost constant over seven years in a French cohort of over 1 000 HIV patients. The average GFR and the percentage of patients with impaired GFR (below 60 ml / min / 1.73m^2) remained essentially unchanged over the study period; neither tenofovir nor any other antiretroviral drug was significantly associated with the poorer evolution of GFR after 16 months of HIV therapy (Leport, 2009).

In a London-based retrospective analysis of HIV patients, nearly 6% of patients developed acute renal failure (ARF). CD4 nadir and AIDS diagnosis were associated with ARF in the first three months of antiretroviral therapy and there were over 19 episodes per 100 person-years. After three months of therapy, just one episode of ARF was found per 100 person-years and this was associated with CD4 nadir, injection drug use, and hepatitis C co-infection. In this population, ARF was associated with advanced immunodeficiency and incidence decreased remarkably after receiving antiretroviral therapy (Roe, 2008).

Africa has a high burden of both renal disease and HIV. In Zambia, nearly 33% of the 26 000 persons initiated on antiretroviral therapy between 2004 and 2007 in Zambia had renal disease at baseline. The adjusted hazard ratio for mortality (adjusted by baseline CD4 count, WHO HIV stage, haemoglobin, and adherence) in those patients with mild and moderate disease was twice that of those individuals without renal disease at baseline. Patients with severe renal disease at baseline had a fivefold increased risk of mortality as compared to those patients without renal disease. This emphasises the need to include simple screening and treatment algorithms for renal disease in antiretroviral treatment programmes, particularly in settings where Tenofovir use is widespread (Mulenga, 2008).

Suppression of viral load was associated with improved renal function in those patients who began antiretroviral therapy with low CD4 cell counts and grade 2 or higher kidney disease in a subset of participants enrolled in US AIDS Clinical Trial Group studies. This finding indicates, as have other studies, that viral replication contributes to chronic renal dysfunction in advanced HIV (Kalayjian, 2008).

According to revised the ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, HIV positive patients should be screened for STI, TB, and whether a female pregnancy test has to be done, including cervical cancer screening. The results of this study clearly indicate that most of the patients have knowledge about screenings that need to be done for HIV-positive patients (NATIONAL Department of Health, 2013).

According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, blood for CR should be taken to check for renal failure, more especially if starting on TDF

Serum creatinine (a blood measurement) is an important indicator of renal health because it is an easily measured by-product of muscle metabolism that is excreted unchanged by the kidneys. Creatinine itself is produced via a biological system involving creatine, phosphocreatine (also known as creatine phosphate), and adenosine triphosphate (ATP, the immediate energy supply of the body (Harita, Hayashi & Sato, 2009).

Creatinine is synthesised primarily in the liver from the methylation of glycocyamine (guanidino acetate, synthesized in the kidney from the amino acids arginine and glycine) by S-adenosyl methionine. It is then transported through blood to the other organs, muscle, and brain where, through phosphorylation, it becomes the high-energy compound phosphocreatine. During the reaction, creatine and phosphocreatine are catalysed by creatine kinase, and a spontaneous conversion to creatinine may occur (Harita *et al*., 2009).

Creatinine is removed from the blood chiefly by the kidneys, primarily by glomerular filtration but also via proximal tubular secretion. There is little or no tubular reabsorption of creatinine. If the filtration in the kidney is deficient, creatinine blood levels rise. Therefore, creatinine levels in blood and urine may be used to calculate the creatinine clearance (CrCl), which correlates with the glomerular filtration rate (GFR). Blood creatinine levels, on its own, may also be used to calculate the estimated GFR (eGFR) (Harita *et al*., 2009).

The GFR is clinically important because it is a measurement of renal function. However, in cases of severe renal dysfunction, the creatinine clearance rate will overestimate the GFR because hypersecretion of creatinine by the proximal tubules will account for a larger fraction of the total creatinine cleared. Ketoacids, cimetidine, and trimethoprim reduce creatinine tubular secretion and, therefore, increase the accuracy of the GFR estimate, in particular in severe renal dysfunction. (In the absence of secretion, creatinine behaves like inulin) (Harita *et al*., 2009).

According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, alanine transaminase (ALT) is a transaminase enzyme that is used to assess for liver dysfunction. It is also called serum glutamic-pyruvic transaminase or alanine aminotransferase. ALT is found in plasma and in various bodily tissues, but is most commonly associated with the liver. An alanine aminotransferase (ALT) test measures the amount of this enzyme in the blood. ALT is found mainly in the liver, but also in smaller amounts in the kidneys, heart, muscles, and pancreas. ALT was formerly called serum glutamic pyruvic transaminase (SGPT). ALT is measured to see whether the liver is damaged or diseased. Low levels of ALT are normally found in the blood. However, when the liver is damaged or diseased, it releases ALT into the bloodstream that causes ALT levels

to rise. Most increases in ALT levels are caused by liver damage. The ALT test is often done in conjunction with other tests that check for liver damage, including aspartate aminotransferase (AST), alkaline phosphatase, lactate dehydrogenase (LDH), and bilirubin. Both ALT and AST levels are reliable tests for liver damage (National Department of Health, 2013).

According to that revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, blood for haemoglobin (HB) should be taken when starting on AZT to detect anaemia or neutropenia. Zidovudine has caused severe blood problems, including a decrease in red blood cells (anaemia) and white blood cells (neutropenia). They occur more frequently in people with advanced HIV disease (AIDS). Blood problems may require either blood transfusions or stopping your medication (National Department of Health, 2013).

According to the old ARV guideline, blood for CD4 and viral load was collected at six months and annually thereafter, but according to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, only blood for viral load is taken at six months and annually thereafter. The reason behind this is that CD4 does not detect any resistance to ARV but viral load shows whether it is responding to treatment or not. According to ARV guideline, viral load has to be lower than detectable after 6 months to indicate good response to treatment (National Department of Health, 2013).

2.16 CONCLUSION

This chapter presented the literature review about adherence to ARV therapy, the risk of infection, environmental challenges, treatment challenges, drug stock-outs, major challenges to paediatric ARV roll out, socio-economic challenges, lack of community awareness and support, lack of capacity to manage chronic and adolescent care, the emotional and psychological impact on health care workers, other challenging factors, as well as policy and guidelines related to studies on HIV / AIDS.

The next chapter describes the methodology used for the research, study site, research method, research design, population, sampling, inclusion criteria, data collection, data collection tool, data analysis, and ethical considerations.

CHAPTER 3
RESEARCH DESIGN AND METHODOLOGY

3.1 INTRODUCTION

This chapter describes the research design and methodology including the study site, research method, research design, population, sampling, inclusion criteria, data collection, data collection tool, data analysis, and ethical considerations.

3.2 STUDY SITE

The study site was the Ehlanzeni District in the Mpumalanga Province of South Africa which is one of the three districts; the other two being the Nkangala and Gert Sibande District. The Ehlanzeni District is located in the north eastern part of the Mpumalanga Province. It borders Mozambique and Swaziland in the east, the Gert Sibande District in the south, the Mopani and Sekhukhune Districts of the Limpopo Province in the north, and the Nkangala Municipality in the west. The Ehlanzeni District has five local municipalities: Thabachweu, Mbombela, Umjindi, Inkomazi, and Bushbuckridge. The population in the Ehlanzeni District is estimated at 1 624 100, while the district has 26 non-fixed clinics (mobile clinics), 68 fixed clinics (8-hour clinics), 11 health care centres and seven district hospitals (Ehlanzeni District Municipality GIS Unit, 2005). The researcher used 13 Mbombela and five Bushbuckridge clinics in the Mpumalanga Province of South Africa as study site.

3.3 RESEARCH METHOD

Polit and Hungler (1999) describes a research method as the research overall plan for obtaining answers to the research questions and for testing the research hypothesis. The research design directs the strategies that the researcher adopts to develop information that is accurate, objective, and interpretable.

The research used a quantitative research method to study professional nurses in relation to NIMART in the Ehlanzeni District, Mpumalanga Province, South Africa.

- **QUANTITATIVE RESEARCH METHOD**

Quantitative research is the investigation of the phenomenon that lends itself to precise measurement and quantification, often involving a rigorous and controlled design (Claire, Graig & Smith, 2006).

A quantitative research approach is one of the scientific methods for obtaining information (Brink, 2006). It involves the systematic collection of numerical information under conditions of considerable control, and the analysis of that information using statistical procedures (Claire, Graig & Smith, 2006).

3.4 STUDY DESIGN

The researcher considered quantitative research approach, that included a structural approach, as a formal instrument to collect data. Forthwith, the ideal procedures for analysing data during this study are described. Descriptive studies assist with discovering new meaning, determining what exists and how often a phenomenon occurs, and categorising information (Claire, Graig & Smith, 2006). A descriptive study provides detailed information about the variable under study.

A descriptive cross-sectional research design was used to describe the demographic information of the professional nurses, to describe the challenges encountered by professional nurses with regard to NIMART in the Ehlanzeni District, as well as the difficulties as a result of the simultaneous collection of data from two different areas, namely the Mbombela Sub-district and the Bushbuckridge Sub-district at the same time (Burns & Grove, 2009).

3.5 POPULATION

According to Burns and Grove (2009), population is a complete set of participants who possess some common characteristics that are of interest.

According to Stender (2011), Ehlanzeni has 234 NIMART trained nurses and 207 are already initiating patients on ARTs. In this study, the population consisted of 207 professional nurses who were NIMART trained and who were managing and initiating patients on ARVs at primary health care clinics of the Ehlanzeni District, Mpumalanga Province.

3.6 SAMPLING

Sampling, according to Burns and Grove (2009), refers to a process of selecting a sample from the population in order to obtain information about a phenomenon in a way that represents the population of interest. A systematic sampling method was used that involved selecting elements at equal intervals; such as every fifth, eighth, or twentieth element (Burns & Grove, 2009).

3.6.1 Sample frame

The sample frame was prepared by using the list of all professional nurses who were NIMART trained and who were managing patients on ARTs at the time of the study, then the sample was randomly selected, i.e. participants were neither listed in alphabetical order, nor in hierarchical order or according to gender with the purpose of preventing bias. Also, the sample selection was truly representative of the population (Brink, 2006).

3.6.2 Sample size

The sample frame was prepared by using the list of all professional nurses who were NIMART trained and who were managing patients on ARTs at the time of the study, then the sample was randomly selected. (Morgan & Krejcie, 1970).

$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P (1 - P)$.

s = required sample size

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

N = the population size = 207

P = the population proportion (assumed to be 0.50, since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

$s = X^2 NP (1 - P) \div d^2 (N - 1) + X^2 P (1 - P)$.

= (3.841) (207) (0.50) (1-0.50) ÷ $(0.05)^2$(207-1) + (3.481) (0.50) (1-0.50)

= 198.77175 ÷ 0.515 +0.96025

=198.77175 ÷ 1.47525

= 134.7

= 135

3.6.3 Sample interval

Sample interval was determined in the following manner using Brink (2006) formula for determining sample interval.

Sample interval (K) = size of population (N)

size of the sample (n)

=207 = 1.53 which is equivalent to 2

135

Inclusion criteria

To be included in the study, the respondents had to be:

- NIMART trained professional nurses.
- Managing patients on ARVs at primary health care clinics of the Ehlanzeni District.
- Willing to take part in the research voluntarily, irrespective of gender and age.

- **Exclusion criteria**

Professional nurses who were not NIMART trained or those nurses who were trained but not yet managing or initiating patients on ARTs were excluded from this study.

3.7 DATA COLLECTION

Data collection is the gathering of information needed to address a research problem (Burns & Grove, 2009). A questionnaire with closed-ended questions was considered as a suitable tool for this study.

A questionnaire has the following advantages according to Brink (2006):

- The tool is easy to administer and analyse.
- Yields a high degree of consistency for comparative purposes.
- The same information is collected from all respondents.

Disadvantages of a questionnaire according to Brink (2006):

- Respondents may fail to answer some of the questions.
- Respondents may provide socially acceptable answers.

Data was collected through a self-designed questionnaire (Appendix D) with consideration of the literature review, as well as consultation with the supervisor, co-supervisor, and statistician. Questions regarded as not clear by them were then corrected. The questionnaire was also pretested by conducting a pilot study with five professional nurses who were not taking part in the main study. Typing errors were found on the tool and other questions which were not applicable to other respondents were identified not to be having option for “not applicable” and were rectified. The questionnaire consisted of three sections; namely Section A: demographic data, Section B: challenges faced by professional nurses with regard to NIMART, and Section C: policies and Strategies. The questionnaire consisted of 51 closed-ended questions.

Questionnaires were delivered at clinics and handed to operational managers as contact people, and the targeted population was provided with information during a briefing session on what to expect from the questionnaire. Questionnaires were completed during working hours and operational managers released participants one-by-one in a room provided by them in order to not interrupt nursing services at the clinics, and to avoid discussion while questionnaires were being completed. A box with thin slot at the top was designed for nurses to put the completed

questionnaires on exit and the assigned person (operational manager) made sure that nurses were not leaving without putting their questionnaires in the box. The box was later collected from the assigned person at the clinic.

3.7.1 PILOT STUDY REPORT

Five NIMART trained professional nurses from the Ehlanzeni District participated in the pilot study and were excluded from the main study.

It has been found that question 39 of the questionnaire on “how often to visit the clinic” did not have an option for not applicable, especially when the answer to question 38 “do you have a visiting doctor?” was no. A typing error was also identified in question 50 where D4T appeared instead of AZT in answer 4. All those identified errors were corrected.

3.7.2 RELIABILITY AND VALIDITY

Reliability of a research instrument

Reliability is the degree of consistency with which the instrument measures an attribute. An instrument can be said to be reliable if it accurately reflects true measures of the attribute under investigation. It is, therefore, concerned with stability and repeatability of the informants accounts, as well as the investigator’s ability to collect and record information accurately (Burns & Grove. 2009).

Reliability in this study was ensured through the following:

- A self-designed questionnaire in consultation with the supervisor, co-supervisor, and statistician from the University of Limpopo and with the guide that was developed in the basis of a literature review. All questions regarded as not clear by them were corrected accordingly.
- The researcher pre-tested the tool by conducting a pilot study to test for reliability.

Validity of the research instrument

Validity is the degree to which an instrument measures what it is intended to measure (Brink, 2006).

The questionnaire was considered valid for the following reasons:

- Undertaking an extensive literature review when the researcher looked at what had been done in the area of study.
- Providing operational definitions of concepts, which are the specifications of the operation that the researcher performed to collect the required information.
- Content validity and face validity were ensured because the questionnaire was given to the supervisor, co-supervisor, and statistician for review, corrections, and recommendations that were implemented.
- The questions were constructed according to the objectives of the study and organised according to the literature review.
- Finally, congruence was ensured between research questions, objectives, investigations, findings, and recommendations.

3.8 DATA ANALYSIS

Raw data from questionnaires had been captured using the Microsoft Excel program after being taught by the statistician and was later emailed to him for analysis.

The statistician used the following:

- **IBM SPSS statistics 21.0** program for data analysis (statistical analysis software that delivers the core capabilities needed for the analytical process from start to finish) was used to analyse data.
- **Descriptive statistics** including counting, percentages, and frequency distributions were used to determine the demographic information of the variables and also to describe the challenges encountered by NIMART professional nurses in the Ehlanzeni District. Descriptive statistics were used to describe basic features of data by pointing out what the data indicated.

3.9 ETHICAL CONSIDERATIONS

Ethics is a system of moral values that is concerned with the degree to the research subjects (Burns & Grove, 2009). The researcher obtained permission to conduct the study from authorities concerned and informed consent from the respondents.

Furthermore, the researcher observed the rights of the patients to confidentiality and anonymity.

3.9.1 Ethical clearance and permission to conduct the study

Permission and ethical clearance were obtained from the Medunsa Research Ethics Committee (MREC), the Mpumalanga Province Research Ethics Committee of the Department of Health (DoH), and the operational managers at the Mbombela and Bushbuckridge clinics.

3.9.2 Informed consent

The researcher ensured the right to self-determination by means of a written informed consent. The objectives and purpose of the study were explained to professional nurses before agreeing to respond in the study. All respondents were asked to sign a consent form (Annexure E) to validate their agreement to participate in the study. The respondents were also reminded of their right to withdraw from the study at any time that they wished to do so. The researcher used a standard consent form designed by MREC.

3.9.3 Anonymity and confidentiality

Anonymity is the right ensured to the respondents in a research study and vow that under no circumstances will the identity of the respondents be made public (Brink, 2006). Respondents were assured that they would be treated confidentially, because no names were written on the questionnaires and that the researcher would not divulge any information or names to anyone.

3.10 CONCLUSION

This chapter dealt with research design and methodology; including the population, sample and sampling, research instrument used, data collection, and ethical considerations. Respondents were NIMART trained professional nurses who were initiating and managing patients on ARTs at the Mbombela South and Bushbuckridge clinics. Chapter 4 will deal with data analysis and interpretation of the results.

CHAPTER 4
DATA ANALYSIS AND INTERPRETATION OF THE RESULTS

4.1 INTRODUCTION

This chapter discusses the data analysis and interpretation of the results.

The study sought to develop a protocol for professional nurses regarding NIMART management that is aiming on the following:

- To develop a protocol for professional nurses regarding NIMART management that is based on the demographic data and specific challenges that are faced by professional nurses in the Ehlanzeni District

The objectives were as follows:

- Determine the demographic information of the professional nurses with regard to NIMART management.
- Describe the challenges encountered by professional nurses in relation to the management of NIMART in the Ehlanzeni District.
- Develop a protocol that could assist with the challenges experienced by the professional nurses in terms of the management of NIMART.

The questionnaire was arranged in to the following sections and data was analysed in the same order:

- Section A: Demographic data.
- Section B: Challenges faced by professional nurses in relation to NIMART.
- Section C: Policy and strategy.

4.2 SECTION A: RESPONDENTS DEMOGRAPHIC DATA

4.2.1 Gender

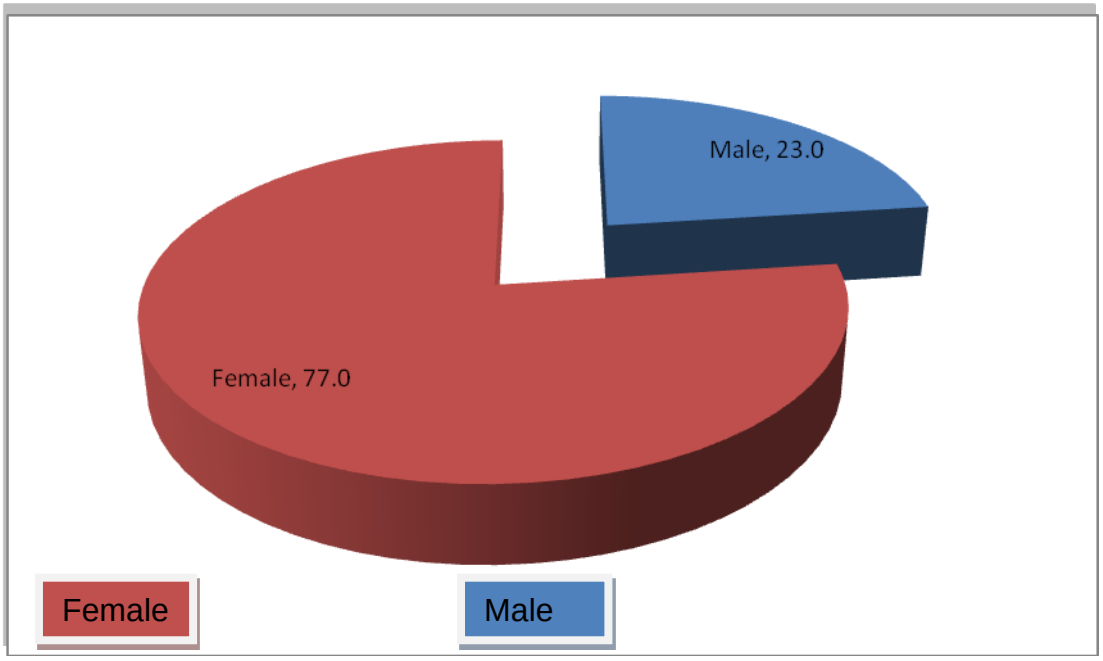

Figure 4.1: Respondents' gender

According to the findings, 23% of the respondents were male and 71% were female as shown on Figure 4.1.

Research shows that men in predominantly female careers face gender discrimination, job discrimination, and high rates of job-related stress. Much of the discrimination that men face in the nursing profession could actually be attributed to a larger societal gender bias. They are entering a profession traditionally dominated by women and face many of the same constraints that women have historically faced in entering workplaces dominated by men (Armour, 2003).

Men face the challenge of unequal treatment at the workplace in female dominated professions. Williams (2006) indicates that many male nurses are denied the opportunity to work in certain areas in hospitals, such as labour and delivery units or nursery units; whilst Armour (2003) asserts that quite a number of men are denied the opportunity to work in certain areas of their responsibilities. In addition, male nurses find that their female colleagues automatically expect them to handle unruly or heavy patients (Williams, 2006).

4.2.2 Age of respondents

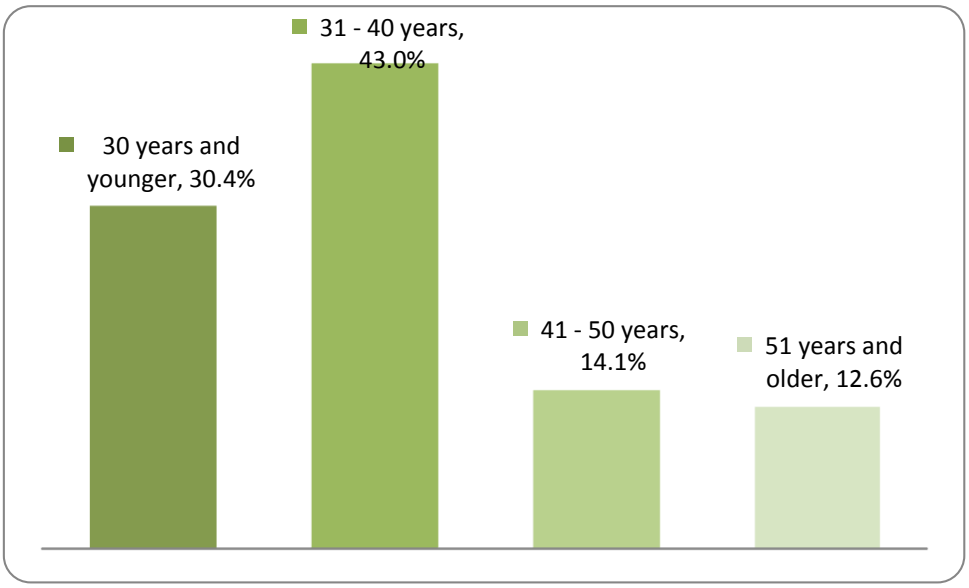

Figure 4.2: Respondents' age

The respondents age ranged from 30 years and younger to 51 and older. Figure 4.2 shows that 30.4% (41) of respondents were 30 years old or younger, 43% (58) were 31 - 40 years old, 14.1% (19) were 41 - 50 years old, and 12.6% (17) were 51years old or older.

According to statistics from the South African Nursing Council (2013), the majority of professional nurses in the Mpumalanga Province are between 40 years and 49 years old.

Table 4.1: Respondents' ethnic group

Ethnic group	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Blacks	128	94.8	94.8	94.8
White	3	2.2		97.0
Coloured	3	2.2	2.2	99.3
India / Asian	1	.7	.7	100.0
Total	135	100.0	100.0	

According to the findings, 94.8% (n = 128) of the respondents were black, 2.2% (n = 3) were white, 2.2% (n = 3) were coloured, and 0.7% (n = 1) were Indian / Asian.

According to William (2006), public institutions are more dominated by blacks Africans while private hospitals and clinics are dominated by white Africans.

Table 4.2: Educational qualification

Educational qualification	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Diploma	112	83.0	83.0	83.0
Degree	23	17.0	17.0	100.0
Honours	0	0	0	
Masters	0	0	0	
Total	135	100.0	100.0	

(83%) (n = 112) of the respondents had a diploma and 17.0% (n = 23) had a bachelor's degree as their educational qualification, while no one had either an Honours degree or Master's degree (Table 4.2).

Due to lack of universities in Mpumalanga Province, most nurses fail to further their studies because it has become too expensive for them to register in other provinces. According to Occupation Specific Dispensation (OSD) policy; Honours, Master's, and other postgraduate degrees are not paid for unless a professional nurse is hired for a higher administrative position (Ditlopo et al, 2007).

4.2.3 **Respondents' marital status**

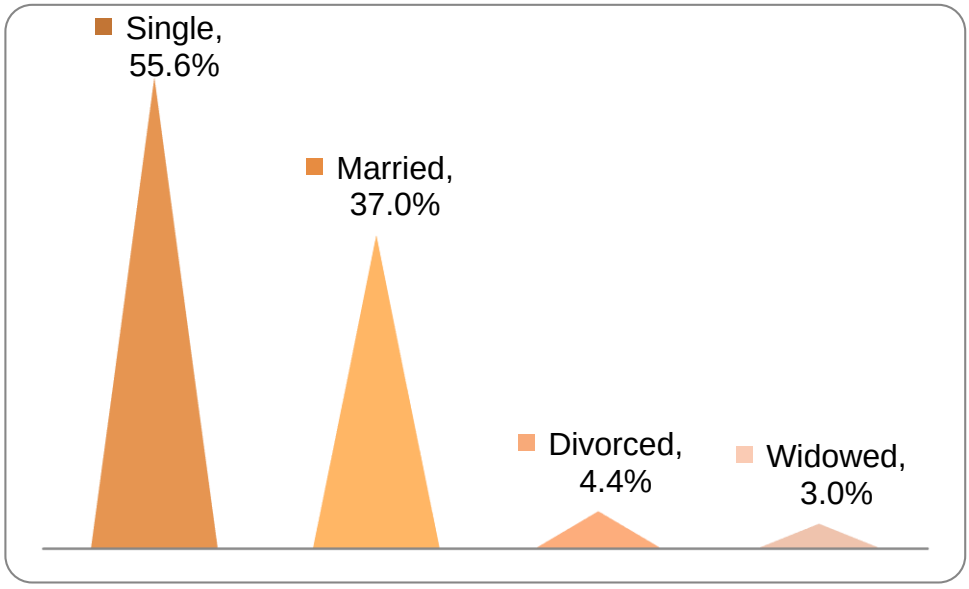

Figure 4.3: Respondents' marital status

Figure 4.3 shows that 55.6% (n = 75) of the respondents were single, 37% (n = 50) were married, 4.4% (n = 6) were divorced and 3.0% (n = 4) were widowed. Unlike in the ancient days when nursing was regarded as a calling, nurses nowadays are getting married. According to statistics, nurses' demographic data for Ehlanzeni indicates that 57.9% of the nurses are married.

4.2.3 Experience (number of years working) as professional nurses

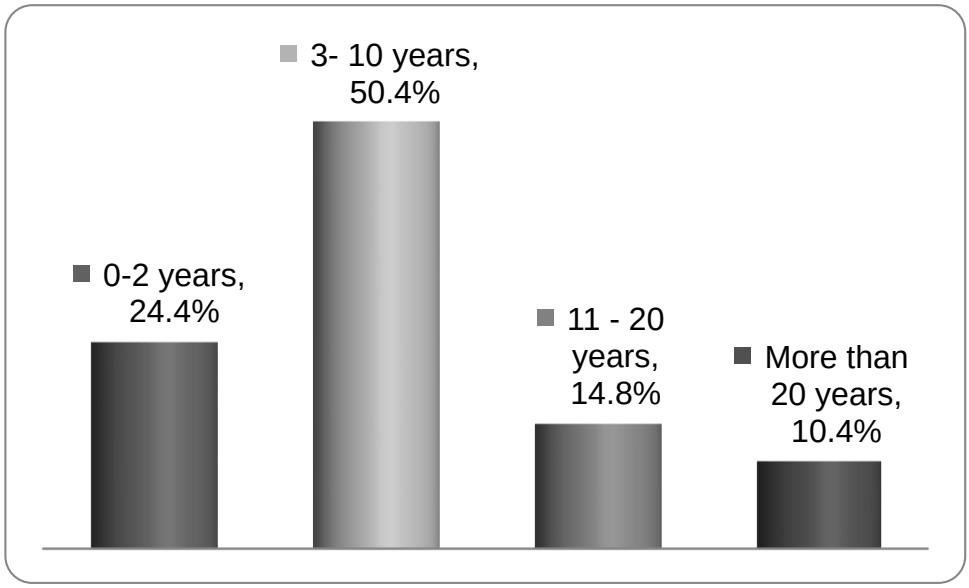

Figure 4.4: Respondents' experience as professional nurses

The results in this study indicate that 24.4% (n = 33) of the respondents had 0-2 years' experience, 50.4% (n = 68) had 3-10 years' experience, 14.8% (n = 20) had 11-20 years of experience, and 10.4% (n = 14) had more than 20 years of experience as shown in Figure 4.4. Most of the respondents for this study had less than 5 years of post-community service experience.

Table 4.3: Location of the clinic

Clinic location	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Rural	106	78.5	78.5	78.5
Urban	29	21.5	21.5	100.0
Total	135	100.0	100.0	

Table 4.3 shows that 78.5% (n = 106) of the respondents' clinics were in rural area and 21.5% (n = 29) were in urban area. According to Stender (2011), Mpumalanga consists mainly of rural areas and is one of the more disadvantaged provinces.

4.2.4 Clinic type

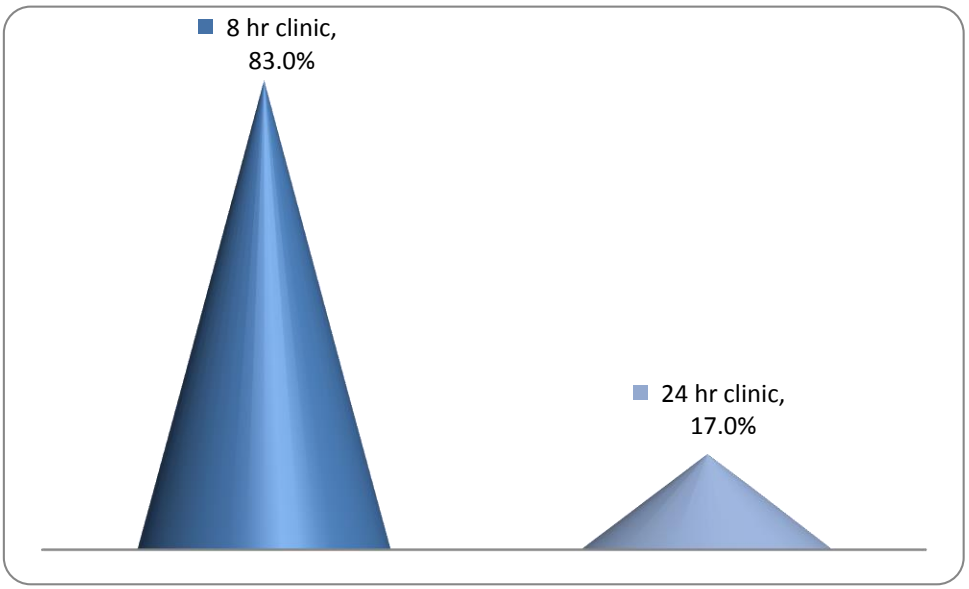

Figure 4.5: Type of clinic

Figure 4.5 indicates that 83.0% (n = 112) of the respondents worked at 8-hour clinics and 17.0% (n = 23) worked at 24-hour clinics.

Mpumalanga Province has 26 non-fixed clinics (mobile clinics), 68 fixed clinics (8-hour clinics), 11 health care centres, and seven district hospitals (Ehlanzeni District Municipality GIS Unit, 2005).

4.3 SECTION B: CHALLENGES FACED BY PROFESSIONAL NURSES WITH REGARD TO NIMART

Table 4.4: Short courses about HIV attended

Short courses attended about HIV (n=135)		Yes	No
9.1	Voluntary Counselling and Testing.	83.70%	16.30%
9.2	Prevention of mother to child transmission.	86.70%	13.30%
9.3	HIV / AIDS, STIs, TB collaboration.	49.60%	50.40%
9.4	NIMART.	100%	0%

The results Table 4.4 show that 83.7% of the respondents were trained in voluntary counselling and testing while 16.3% were not trained. Almost Eighty seven per cent (86.7%) were trained in prevention of mother-to-child transmission, while 13.3% were not trained, 49.6% were trained in HIV / AIDS, STIs, TB collaboration while50.4% were not trained and 100% were NIMART trained. The latter is due to the inclusion criteria. Jumbo et al. (2004) emphasise that primary health care facilities must have knowledgeable personnel with adequate training in ARTs to be able to operate and manage the programme.

Michaels *et al*. (2006) and the Health System Trust (2005) report that lack of training of professional nurses in management of HIV infection and lack of experience present a major challenge, more specifically when treating children.

Their study further indicate that there is no standardised or coordinated training programme in the management of paediatric HIV and AIDS that is currently available to medical personnel in South Africa. Nurses also report varying levels of HIV management training, the majority of which was received from doctors at facilities. Their roles vary across study sites, with some more involved in patient administration and ARV-related activities than others (Michaels *et al*., 2006).

Table 4.5: Barriers to ARV therapy

Barriers to ARV therapy (n = 135)		Yes	No
10.1	Lack of professional nurses.	84.20%	14.80%
10.2	Lack of infrastructure (consulting rooms, communication, electricity).	77.80%	22.20%
10.3	Weak support system (laboratory services, transport and medicine supply).	26.70%	73.30%
10.4	Lack of strong monitoring and evaluation (Ability to track and treat patients regardless of where they live).	48.10%	51.90%

According to this study as shown in Table 4.5, 84.2% of the respondents agreed that lack of professional nurses was the barrier to ARV therapy but 14.8% answered no,

77.8% of the respondents answered yes to the issue of infrastructure as a barrier to ARV therapy and 22.2% answered no, and on the issue of a weak support system as a barrier to ARV therapy, 26.7% of the respondents answered yes and 73.3% answered no. on issue of lack of strong monitoring and evaluation (Ability to track and treat patients regardless of where they live) as a barrier to ARV therapy48.1% answered yes and 51.9% answered no.

A study done in Cape Town indicates that lack of staff; including nurses, pharmacists, and auxiliary staff, such as social workers and counsellors; and staff capacity are most commonly cited as the major obstacles to increasing access to treatment for HIV infected children. Unfortunately, even when resources were allocated to augment the staff complement, certain provinces had difficulties with getting suitable applicants and posts were often re-advertised and remained vacant due to a lack of applicants (Michaels *et al*., 2006).

The Health Systems Trust, a non-governmental organisation that has been monitoring the AIDS treatment programme in South Africa since 2003, acknowledges that the single most significant obstacle to attaining public health goals is the lack of adequate human resources. It concludes that the strategies outlined in the Strategic Plan of the Department of Health have not been effective in addressing the issue (DoH, 2004).

A study by Lutge and Mbatha (2006) explains the physical environment or infrastructure with regard to the health care facilities as the state of maintenance of the buildings, the availability of basic services (such as water and electricity), the availability of and access to the necessary technology (for example, communication systems and laboratory data information systems), and the availability of functional medical and non-medical equipment. Infrastructure, such as viable surrounding roads and a transport system, is also important in facilitating patients' access to the health care facilities.

The Occupational Health and Safety Act (Act 85 of 1993) entitles all workers, including health care workers (HCWs), to a safe working environment without risk to their health. The Act also charges employers with the provision of the necessary health and safety measures for their employees. In the case of public HCWs, the

government is responsible for the provision of adequate measures to protect them against health hazards, particularly biological hazards.

The lack of clinic space for patient waiting areas and consulting rooms for clinical and counselling consultations is already a major problem for most facilities as reported by Michaels *et al*. (2006). Furthermore, Daniella (2012) reports infrastructure deficits, such as non-functioning telephone lines, to have had significant effects on patients already on ART and make it very difficult for nurses to initiate new patients onto treatment. These were the obstacles cited by the two STRETCH intervention sites that had not progressed to phase three two years into the trial.

A study by Daniella (2012) indicates that infrastructure deficits, such as non-functioning telephone lines, were reported to have had significant effects on patients already on ART and made it very difficult for nurses to initiate new patients onto treatment.

Table 4.6: Fear of being infected (n = 135)

Fear of being infected	Yes	No
11. Do you have any fear of infecting yourself while treating an HIV-positive patient? (n = 135).	68.10 %	31.90 %
12. Are there enough enforced precautions by government; such as gloves, gowns, masks, and others? (n = 135).	79.30 %	20.70 %
13. Is a lack of enough enforced precautions fuelling fear of infection amongst health workers? (n=135).	28.90 %	71.10 %
14. Is the fact that HIV is incurable increasing nurses fear of being infected? (n = 135).	67.40 %	32.60 %
15. Are you afraid that you might infect your partner due to HIV exposure at work? (n = 135).	32.60 %	67.40 %
16. Is your partner or family concerned about you being in close contact with patients who suffer from incurable disease? (n = 135).	25.90 %	74.10 %
17. Have you ever considered a career change due to fear of treating HIV-positive patients? (n = 135).	8.10%	91.90 %

Table 4.6 indicates that the majority (68.10%) of the respondents feared infecting themselves while treating HIV-positive patients but 31.90% answered no. More than three quarters (79.3%) of the respondents reported that they did have enough enforced precautions by government; such as masks, gowns, gloves, and others but 20.70% reported no. More than a quarter (28,9%) of respondents indicated that a lack of enough enforced precautions was fuelling fear of infection amongst health workers but 71.1% reported that it is not fuelling fear of infection . About two thirds (67.4%) of the respondents reported that the incurable nature of HIV increased their fear of being infected. Nearly a third (32.6%) of the respondents reported that they were afraid that they might infect their partners while the majority (67.4%) reported that they were not afraid. Just more than a quarter (25.9%) of the respondents

reported that their families or partners were concerned about them being in close contact with patients who suffered from incurable diseases, but 74.1% reported the opposite. Lastly, 91.1% of the respondents reported that they never considered a career change due to fear of treating HIV-positive patients but 8.1% reported that they did consider career change due to fear of treating HIV-positive patients.

HCWs (health care workers) at HIV / AIDS treatment facilities are at an increased risk of contracting communicable diseases, either by direct contact (for example, gastroenteritis and scabies) or by droplet spread (for example; tuberculosis, pneumonia, and meningitis). By virtue of the nature of their patient base, they are also at risk of contracting blood-borne infections, such as Hepatitis B or HIV via accidental exposure to blood or other body fluids, such as cerebrospinal fluid (WHO / ILO, 2010).

A study conducted in Sub-Saharan Africa recognises that the health care workforce in South Africa is adversely affected by HIV and TB. This results in an increase in the frequency of disability and of sick leave taken by HCWs, further burdening the remaining personnel (Ncayiyana, 2004).

The WHO and International Labour Organisation (ILO) have noted that, 'although health workers are at the frontline of national HIV programmes, they often do not have adequate access to HIV services themselves' (WHO, 2006).

For HCWs employed at the ARV clinics, there is a risk of infection by blood-borne pathogens, such as Hepatitis B and, to a lesser extent, HIV. This risk is increased by the inadequate supply and incorrect use of PPE, also referred to as “universal precautions and negligent 'sharps' and waste disposal methods” (Vawda & Variawa, 2012).

Respondents in the study completed by Hall (2009) in South African hospitals indicated that protective clothing was not always available: Most (90.4%) nurses indicated that gloves were always available when they needed them, but not gowns (58.3%), goggles (20.2%), and masks 64.6% (Hall, 2009).

Table 4.7: Patient's attitude (n = 135)

Patient's attitude		Strongly agree	Agree	Disagree	Strongly disagree
18.1	Always polite to nurses (n = 135).	4.40%	20.00%	51.90%	23.70%
18.2	Always come on their follow up dates (n = 135).	0.70%	12.60%	43%	43.70%
18.3	Phone or send massage when the patients failed to go to clinic (n = 135).	3%	14.80%	25.20%	57%
18.4	Always not patient while waiting to collect their treatment (n = 135).	43%	37%	13.30%	6.70%
18.5	Accuses nurses for drugs that are out of stock (n = 135).	25.20%	46.70%	21.50%	5.90%
18.6	Sometimes shouts at or calls nurses names (n =135).	19.30%	21.50%	48.10%	10.40%

The findings based on Table 4.7 on issue of patients being polite to nurses always 4.4% strongly agree, 20% agree, 51.9% disagree and 23% strongly disagree. On the issue of patients always coming on their follow up dates, 0.7% strongly agree, 12.6% agree, 43% disagree and 43.7% strongly disagree. On the issue of patients Phoning or sending massage when the patients failed to go to clinic 3% strongly agree, 14.8% agree, 25.2% disagree and 57% strongly disagree. On the issue if patients being not patient always while waiting to collect their treatment, 43% strongly agree, 37% agree, 13.3% disagree and 6.7% strongly disagree. On the issue of patients who accuse nurses for drugs that are out of stock,19.3% strongly agree, 21.5% agree, 48.1% disagree and 10.4% strongly disagree.

Table 4.8: Adherence to treatment

Adherence to treatment		Yes	No
19.	Any defaulters in the clinic amongst ARV patients (n = 135).	88.90%	11.10%
20.	Home-based carers are used to trace those patients (n = 135).	80%	20%
21.	Nurses trace defaulters (n = 135).	81.50%	18.50%
22.	Any problem encountered by nurses while tracing those defaulters (n = 135).	86.70%	13.30%

Table 4.8 indicates that 88.9% of the respondents reported defaulters in their facilities but 11.1% reported to be having no defaulters, 80% reported that they did use home-based carers to trace patients but 20% reported not to be using home base carers, 81.5% reported that they used nurses to trace defaulters but only 18.5 reported not to be using nurses to trace defaulters, and lastly, 86.7% of the respondents reported that they did encounter problems while tracing defaulters and 13.3% reported to be encountering problems.

The Free State Provincial Department of Health (DoH) (2004) stopped initiating ARTs because drugs were out of stock and due to a lack of funding. Home-based care groups who were utilised to trace and support patients in surrounding areas also stopped doing their job because they were no longer getting money from the non-governmental organisations (NGOs). Nurses tried to trace patients but encountered problems; such as wrong telephone numbers, wrong addresses, and immigration. This also impacted negatively on adherence of existing patients on the ART programme, and could have led to life threatening effects with emerging drug resistant strains of HIV.

4.2.5 Drug stock-outs during the previous 3 months

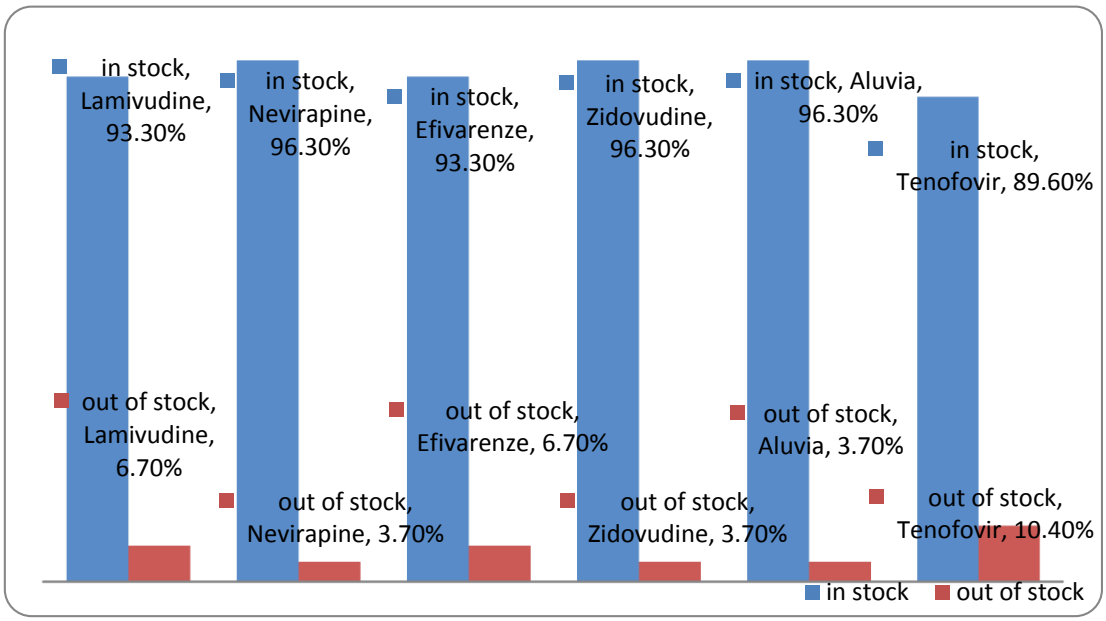

Figure 4.6: Drug stock-outs

Figure 4.6 indicates that 6.7% of the respondents experienced stock-out of Lamivudine, but 93.3% did not experience any stock out. 3.7% reported a Nevirapine stock-out while 96.3% did not experience any stock outs. 6.7% reported a stock-out of Efivarenze but 93.3% did not experience any stock outs. 3.7% reported a Zidovudine stock-out but 96.3% did not experience any stock outs. 3.7% reported a stock-out Aluvia but 96.3% did not experience any stockouts, and lastly 10.4% reported a Tenofovir stock-out while 89.6% reported not to be experiencing any stock out.

In the Eastern Cape, medical staff members working at 24% of the affected facilities were forced to send patients home without treatment because they experienced stock-outs of essential HIV and TB drugs. These stock-outs were reported to last, on average, 45 days at a time and had been ongoing since October 2012. The organisations estimated that at least 5 494 adults were not able to take some of their ARVs and 561 children were sent home without treatment since September 2012 when the drug supply issues had begun. Lamivudine (3TC), tenofovir, nevirapine, efavirenz, paediatric ARV formulations, and Rifafour (a fixed-dose combination of four TB drugs) were the main medications affected (MSF, the TAC & the RHAP. 2013).

An update on drug supply in the Eastern Cape and other provinces by the RHAP, MSF, the TAC, and Section 27 shows that many thousands of patients on ARV and TB drugs continue to experience stock-outs at health facilities (MSF, the TAC & the RHAP, 2013).

An MSF and TAC survey in January 2013 found that 53% of facilities responding had experienced ARV and / or TB drug stock-outs, with 24% having to send patients home with no ARVs. A wide variety of other essential medicines were also affected (MSF, the TAC & the RHAP, 2013).

In May 2013, the RHAP received reports from the Mooiplaas Clinic of stock-outs of FDC ARVs, during the second week of that month. All the surrounding clinics were reported to be experiencing the same problem. The TAC received reports from a health centre in Mantlaneni where patients were turned away without ARVs and advised to go elsewhere for medication. The TAC also received reports from the Libode and Canzibe Clinics, both of which had been without supplies of Tenofovir for one month (MSF, the TAC & the RHAP, 2013).

On 22 June 2013, the TAC received a report from the Jabavu Clinic (not served by Mthatha) where patients were turned away from the clinic without ARVs. The TAC also received reports from the Philani, Buntingville, Ndonga, Lujizweni, and St Elizabeth Gateway Clinics that had experienced ARV stock-outs, with St Elizabeth Gateway also experiencing stock-outs of TB treatment (MSF, TAC & the RHAP, 2013).

In Gauteng, the Southern African HIV Clinicians Society reports that during 2013 there had been frequent reports of stock-outs from clinics in Johannesburg and the whole of Ekurhuleni. In most cases, stock-outs affected Nevirapine, Efavirenz and D4T supplies (individually and in some cases, all at once). Many long-term, stable patients were reported to have been given dual or mono therapy instead of the prescribed triple therapy (MSF, the TAC & the RHAP, 2013).

In March 2013, TAC received reports that patients at the Phenduka clinic in Thokoza, Ekurhuleni were given prescriptions to purchase their ARVs at the Springbok Pharmacy in Alberton, since there were stocks available at that pharmacy. In April 2013, the RHAP received a report from a district hospital in the OR Tambo District of

stock-outs of Efavirenz, as well as multiple other essential medicines. In May 2013, the TAC received reports of two clinics in the Ekurhuleni District with no Lamivudine, while a third clinic in the same region had no ARVs. The TAC further received reports of wide spread treatment shortages at all clinics in the Thokoza District, as well as reports of Lamivudine stock-outs at clinics in Tsakane, Edenvale, and Vosloorus (MSF, the TAC & the RHAP, 2013).

During March 2013 in KwaZulu-Natal, MSF reported low supplies of Tenofovir in the hospital pharmacy in Eshowe, as well as indications of stock mismanagement from that hospital to surrounding clinics. Patients at affected facilities reported being provided with limited ARV supplies and were requested to return for treatment refills at a later date (MSF, TAC & the RHAP, 2013).

During May 2013, clinics in Eshowe that were supported by MSF reported shortages of FDC ARVs. As a result, patients who were eligible for FDC were put on triple therapy. Many patients were sent home with shortened ARV supplies that necessitated more frequent travel to clinics for refills. Stock-outs of paediatric ARVs were also reported (MSF, the TAC & the RHAP, 2013).

During June 2012 to June 2013 in Limpopo, the MSF project in Musina reported a shortage of Tenofovir at the Messina Hospital, resulting in patients only receiving adequate supplies of ARVs for a short time. The SA HIV Clinicians Society received reports that TDF stock was being distributed to facilities in small quantities on a week-by-week basis leading to widespread shortages at clinics that were relying on that facility and that Lamivudine was out of stock in the main pharmaceutical depot in Limpopo; consequently, also at most institutions and clinics in the province. During May 2013, the TAC received reports from Limpopo of shortages of Lamivudine and Stavudine from several health facilities (MSF, the TAC & the RHAP, 2013).

Table 4.9: Dealing with stock-outs

	Dealing with stock-outs	Strongly agree	Agree	Disagree	Strongly disagree
24	Borrow from nearest clinics or hospital (n = 135).	68.10%	20%	7.40%	4.40%
25	Give alternate drug with similar effect or of the same line (n = 135).	15.60%	22.20%	51.10%	11.10%
26	Refer patients to nearest hospital for treatment (n = 135).	31.90%	40%	17%	11.10%

Table 4.9 on dealing with stock outs, by borrowing from the nearest clinics or hospital 68.1% stongly agree, 20% agree, 7.4% disagree and 4.4% strongly disagree. On the issue that they gave alternate drugs with similar effects or of same line, 15.6% strongly agree, 22.2% agree, 51.1% disagree and 11.1% strongly disagree and finally on the issue that they referred patients to the nearest hospital for treatment, 31.9%strongly agree, 40% agree, 17% disagree and 11.1% strongly disagree.

In the case of treatment stock-outs of HIV / AIDS drugs, according to Ndlovu (2009), it is sometimes necessary to transfer patients to a regional or provincial hospital for specialised (step-up) care, or to ARV clinics for continuation of treatment in uncomplicated cases (step-down). In either case, the availability of ARV medication at the referral centre is not guaranteed or otherwise ascertained. For example, the Inkosi Albert Luthuli Hospital in KwaZulu-Natal, which is the referral centre for that province and some Eastern Cape hospitals, does not stock ARV medication for their in-patients.

Medical staff members at 24% of the affected facilities were forced to send patients home without treatment because they were experiencing stock-outs of essential HIV and TB drugs, according to a national report on stock-outs. These stock-outs were reported to last, on average, 45 days at a time and have been ongoing since October

2012. The organisations estimated that at least 5 494 adults were not able to take some of their ARVs and 561 children were sent home without treatment since September 2012 when the drug supply issues began. Lamivudine (3TC), tenofovir, nevirapine, efavirenz, paediatric ARV formulations, and Rifafour (a fixed-dose combination of four TB drugs) were the main medication affected (MSF, the TAC & the RHAP, 2013).

Table 4.10: Causes of stock-outs

Causes of stock-outs	Strongly agree	Agree	Disagree	Strongly disagree
27.1 Poor supply chain management (n = 135).	17%	31.10%	38.50%	13.30%
27.2 Poor financial management (n = 135).	14.80%	24.40%	44.40%	16.30%
27.3 Inability of government to pay supplier on time (n = 135).	28.90%	17.80%	43%	10.40%

Based on results provided in Table 4.10, 17% of the respondents strongly agreed, 31.1% agreed, 38.5% disagreed, and 13.3% strongly disagreed that poor supply chain management was a cause of stock-outs. On the issue of poor financial management, 14.8% of the respondents strongly agreed, 24.4% agreed. 44.4% disagreed, and 16.3% strongly disagreed. In relation to the issue of the inability of government to pay suppliers on time, 28.9% of the respondents strongly agreed, 17.8% agreed, 43% disagreed, and 10.4% strongly disagreed.

On 10 October 2012, staff members at the Mthatha Depot in the Eastern Cape staged a strike, following which 29 individuals were suspended, leaving the depot with only 10 working employees. Coupled with chronic supply chain issues, this precipitated widespread drug stock-outs in the region (MSF, the TAC & the RHAP, 2013).

4.2.6 Problem of sharing treatment

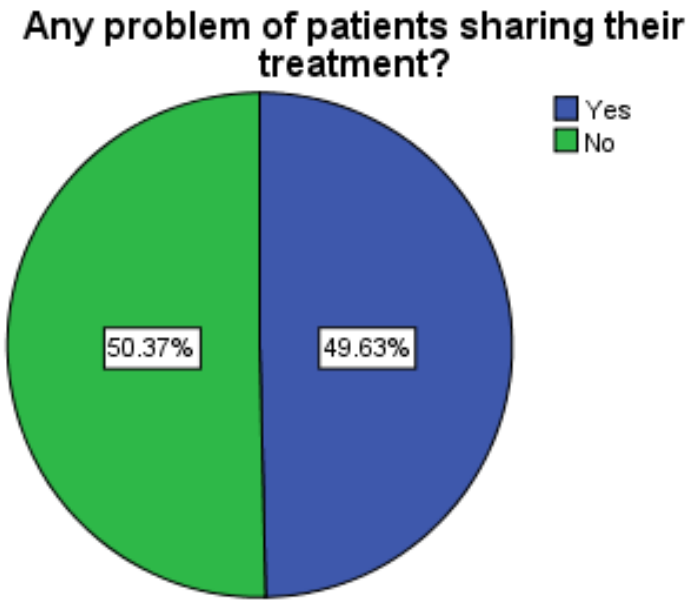

Figure 4.7: Problem of sharing treatment (n = 135)

According to the results shown in Figure 4.7, 50.37% of the respondents reported a problem of patients who were sharing their treatment and 49.63% of the respondents reported not experiencing a problem of patients who were sharing their treatment.

Table 4.11: Infrastructure (n = 135)

Infrastructure	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Good	75	55.6	56.0	56.0
Bad	59	43.7	44.0	100.0
Total	134	99.3	100.0	
Missing System	1	.7		
Total	135	100.0		

Table 4.11 shows that 55.6% (75) of the respondents reported that their infrastructure was good, 43.7% (59) reported that their infrastructure was bad, and 0.7 (1) did not answer the question.

According to the WHO (2006b), it is a reasonable assumption that a safe and well-equipped work environment is conducive to increased productivity, a healthier workforce, and improved patient management. For the purposes of this study, the 'work environment' is dealt with in terms of the 'physical' environment or the actual structure of the workplace (such as space and ventilation), and the 'functional' environment that includes the tools required for efficient service delivery (personal protective equipment and medical consumables).

The physical environment or infrastructure with regard to the health care facilities refers to the state of maintenance of the buildings; the availability of basic services (such as water and electricity), the availability of and access to the necessary technology (for example, communication systems and laboratory data information systems), and the availability of functional medical and non-medical equipment. Infrastructure, such as viable surrounding roads and a transport system, is also important in facilitating patients' access to the health care facility. A fully functional, well-equipped, and adequately staffed health care facility is of little use if it is inaccessible to those members of society who are in need of health care (Lutge & Mbatha, 2006).

Furthermore, Lutge and Mbatha (2006) report that a major concern with regard to the physical environment is the lack of space at many ARV clinics. Often, consulting rooms are shared by a variety of disciplines of HCWs consulting with different patients. This is a serious issue because, in addition to the health risks associated with limited space, it violates the patient's constitutional right to privacy

According to Curtis (2008), a further problem with the lack of space is the overcrowding of waiting rooms, which can result in patients with communicable diseases infecting other immune-compromised patients. Related to this, is the lack of adequate ventilation and / or air-conditioning and ultraviolet light in many of the ARV facilities, which further contributes to the spread of air-borne pathogens.

Table 4.12: Special room for HIV-positive patients (n = 135)

Special room for HIV-positive patients	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	89	65.9	65.9	65.9
No	46	34.1	34.1	100.0
Total	135	100.0	100.0	

According to results shown in Table 4.12, 65.9% (n = 135) of the respondents reported that they had a special room for HIV patients where they were treated confidentially on a daily basis while 34.1% (n = 135) reported the opposite.

Nearly half (49.2%) of the nurses in a study completed in the Gauteng Province believed that there was a stigma attached to HIV / AIDS in their work environment. They justified their perceptions by saying that AIDS patients were treated differently from other patients in their private special room. The secrecy surrounding the disease contributed to the stigma. People feared isolation and rejection if they made their status known and only went for treatment when they could no longer take care of themselves. Family members also “dumped” their ill relatives at hospitals for fear of stigmatisation, as well as a lack of resources (due to poverty) and the absence of alternative types of care (Hall, 2009).

Table 4.13: Storage room for medication (n = 135)

Storage room for medication	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	74	54.8	54.8	54.8
No	61	45.2	45.2	100.0
Total	135	100.0	100.0	

According to the results from this study as shown in Table 4.13, 54.8% (n = 135) of the respondents reported to be having enough storage room for medication while 45.2% (n = 135) reported not having enough storage room for medicine at their facilities.

Lutge and Mbatha (2006) report that a major concern with regard to the physical environment is the lack of space at many ARV clinics, including a storage room for medication. Curtis (2008) further reports a problem with the lack of space, overcrowding of waiting rooms, and lack of air-conditioning at many of the ARV facilities.

Table 4.14: Problem with waiting area

Problem with waiting area	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	62	45.9	45.9	45.9
No	73	54.1	54.1	100.0
Total	135	100.0	100.0	

Table 4.14 indicates that 45.9% (62) of the respondents had a suitable waiting area for the patients at their facilities and 54.1% (73) of the respondents indicated that they did not have a proper waiting area for the patients at their facilities.

According to Curtis (2008), a further problem with the lack of space is the overcrowding of waiting rooms, which can result in patients with communicable diseases infecting other immune-compromised patients. Related to this is the lack of adequate ventilation and / or air-conditioning and ultraviolet light in many of the ARV facilities, which further contributes to the spread of air-borne pathogens.

Table 4.15: Laboratory services (n = 135)

Laboratory services	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	135	100	100	100
No	0	0	0	100.0
Total	135	100.0	100.0	

All (n = 135, 100%) of the respondents reported that they did have laboratory services at their clinics (Table 4.15).

According to the National Laboratory Health Services goal, each and every clinic must have a courier who visits clinics twice a day. Results should be received within and not later than 72 hours, depending on the type of specimen.

Table 4.16: Frequency of courier visiting the clinics (n = 135)

Frequency of courier visiting the clinics	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Once a day	51	37.8	37.8	37.8
Twice a day	74	54.8	54.8	92.6
Weekly	10	7.4	7.4	100.0
Total	135	100.0	100.0	

According to the results of this study, 54.8% (74) of the respondents reported that the courier visited their clinics twice a day, 37.8% (51) reported that the courier visited their clinic once a day, and 7.4% (10) reported that the courier visited their clinics weekly (Table 4.16).

Table 4.17: Medicine supply at clinics

Medicine supply at clinics	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Good	102	75.6	75.6	75.6
Bad	33	24.4	24.4	100.0
Total	135	100.0	100.0	

Three quarters 75.6% (102) of the respondents reported that medicine supply to their facilities was good while a minority of the respondents 24.4% (33), reported bad service of medicine supply to their facilities (Table 4.17).

Table 4.18: Frequency of ordering and receiving of treatment (n = 135)

Frequency of ordering and receiving of treatment	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Weekly	19	14.1	14.1	14.1
Twice a month	111	82.2	82.2	96.3
Monthly	5	3.7	3.7	100.0
Total	135	100.0	100.0	

Table 4.18 indicates that 82.2% (111) of the respondents reported that they ordered and received treatment supplies twice a month, 14.1% (19) reported that they ordered and received treatment supplies weekly and 3.7% (5) reported that they ordered and received treatment supplies monthly (Table 4.18).

According to the agreement between Amalgamated Logistics and the DoH, medicine must be ordered and received after two weeks, meaning that twice a month.

Table 4.19: Frequency of receiving ordered treatment (n = 135)

Frequency of receiving ordered treatment	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	81	60.0	60.0	60.0
No	54	40.0	40.0	100.0
Total	135	100.0	100.0	

Results displayed in Table 4.19 indicates that 60% of the respondents ordered and received treatment on scheduled dates while 40% did not. According to the delivery schedule provided to clinics and hospitals by Amalgamated Logistics (depot), treatment is ordered and delivered twice a month to each and every facility.

Table 4.20: Availability of visiting doctor (n = 135)

Availability of visiting doctor	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	42	31.1	31.1	31.1
No	93	68.9	68.9	100.0
Total	135	100.0	100.0	

In this study, 68.9% of the respondents reported that they did not have a visiting doctor at their facilities, meaning that they managed patients on ARVs on their own while 31.1% reported to be having a visiting doctor as shown in Table 4.20.

Table 4.21: Frequency of doctors' visits to clinics (n = 135)

Frequency of visiting doctor	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Daily	12	8.9	8.9	8.9
Twice a week	24	17.8	17.8	26.7
Weekly	10	7.4	7.4	34.1
Not applicable	89	65.9	65.9	100.0
Total	135	100.0	100.0	

According to results with regard to a visiting doctor, 8.9% (12) reported that they did have a visiting doctor daily and those were respondents from health centres (CHCs), 17.8% (24) reported twice a week, 7.4% (10) reported weekly, and 65.9% (89) answered not applicable because they did not have a visiting doctor at all at their facilities (Table 4.21).

Table 4.22: Confidence to initiate less than 5 years

Confidence to initiate less than 5 years	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	80	59.3	59.3	59.3
No	55	40.7	40.7	100.0
Total	135	100.0	100.0	

In this study, 59.3% (80) of the respondents reported that they did have confidence to initiate under five years old children and 40.7% (55) of the respondents reported that they did not have the confidence to initiate under five years old children (Table 4.22).

Table 4.23: Knowledge on blood and procedures to be followed

Knowledge on blood and procedures to be followed	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Yes	112	83.0	83.0	83.0
No	23	17.0	17.0	100.0
Total	135	100.0	100.0	

The results shown in Table 4.23 indicate that 83% (112) of the respondents reported that they knew blood and related procedures to be followed when initiating patients on ARTs, but 17% (23) of the respondents reported that they did not know blood and related procedures to be followed before initiating on ARTs.

Table 4.24: Ability to draw blood from less than five year olds

Ability to draw blood from less than five years olds	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Valid: Yes	111	82.2	82.2	82.2
No	24	17.8	17.8	100.0
Total	135	100.0	100.0	

According to this study, 82.2% (111) of the respondents reported that they were able to draw blood from the under five years children and 17.8% (24) indicated ‘no’ to the question Table 4.24.

4.4 SECTION C: POLICY AND STRATEGY

This section discusses issues related to policy and guidelines.

4.4.1 Eligibility for ARVs

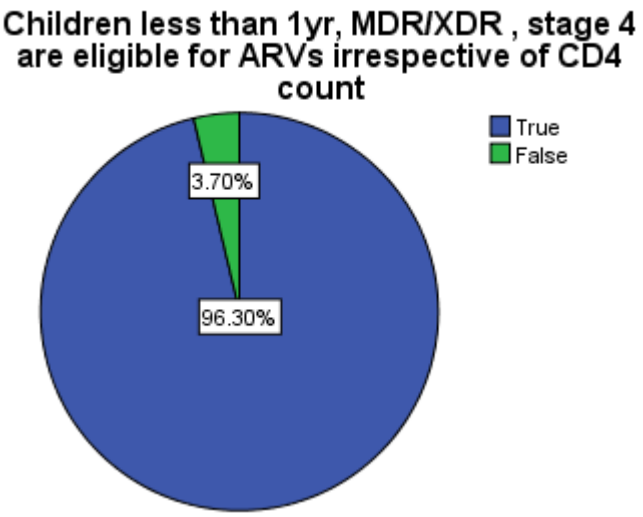

Figure 4.8: Eligibility for ARVs

The results displayed in Figure 4.8 indicate that respondents knew who was eligible for ARTs. The vast majority (96.3%) of the respondents agreed that children younger than one year old, MDR / XDR (Stage 4) were eligible for ARVs irrespective of their CD4 count. According to the new ART guideline, children younger than one year, MDR/XDR/TB (Stage 3 & 4) and pregnant women are eligible for ARVs irrespective of their CD4 count.

4.4.2 Eligibility for ARVs to be initiated within two weeks

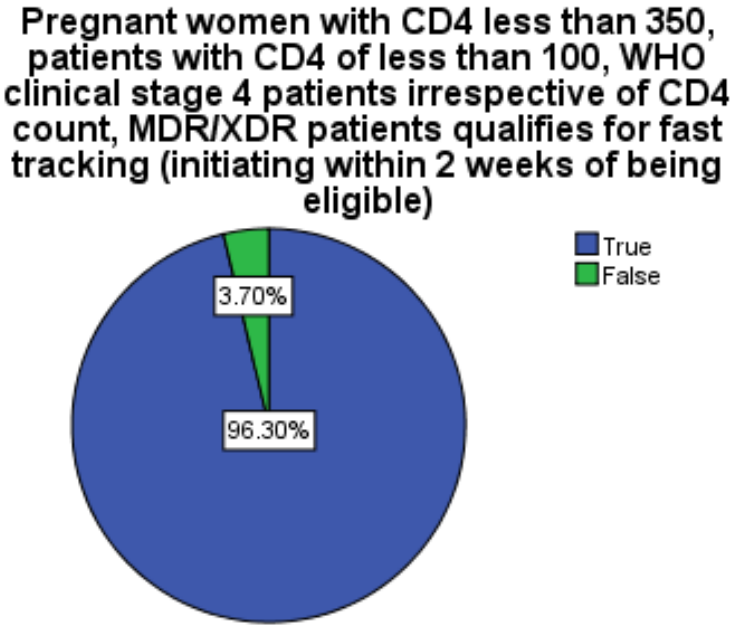

Figure 4.9: Eligibility for ARVs to be initiated within two weeks

According to this study findings, 96.3% of the respondents agreed that pregnant women with a CD4 count of less than 350, patients with a CD4 count of less than 100, WHO clinical stage 4 patients irrespective of count, MDR / XDR patients qualified for fast tracking. Their responses were based on the old ART guideline (Figure 4.9).

According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, clearly all pregnant woman should be started on ARTs on the first day of bookings irrespective of their CD4 count. When the CD4 results indicate a count less than 350, the patient has to take drugs for life but when the results show a CD4 count above 350, then the patient will take ARVs up to one year postnatal when breast feeding, or will stop taking ARVs immediately after delivery when formula feeding.

4.4.3 Which drug is contra-indicated for TB patients? (n = 135)

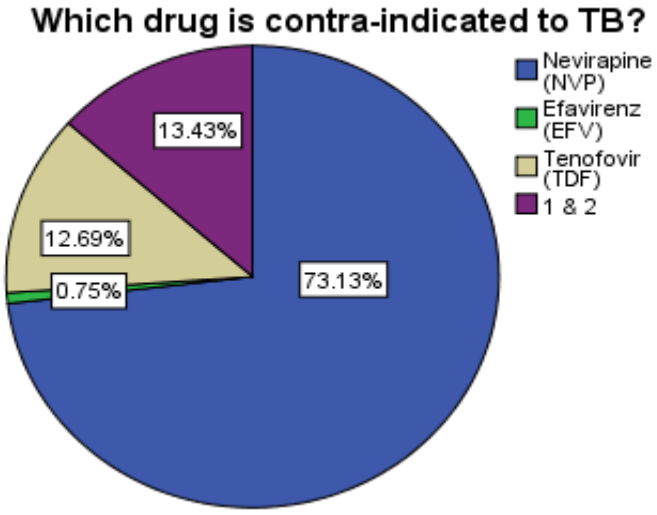

Figure 4.10: Drugs contra-indicated for TB patients

In this study, 73.13% (98) of respondents reported that Nevirapine was contra-indicated for TB treatment, 0.75% (1) reported that Efivarenze was contra-indicated for TB treatment, 12.69% (17) reported TDF, and 13.43% (18) reported NVP and Efivarenze (Figure 4.10).

Nevirapine is a non-nucleoside reverse transcriptase inhibitor used to treat HIV1-infected and AIDS patients. According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, Nevirapine is clearly indicated not be given together with Rifampicin-based TB treatment because it might cause liver disease. Rifampicin decreases serum concentrations of nevirapine by 20-55%. The common toxicities of Nevirapine – skin rash and hepatitis – overlap with common toxicities of some first-line anti-tuberculosis drugs. Furthermore, Nevirapine-based regimens are not recommended for patients with higher CD4 cell counts (> 350 cells / mm^3 for men, > 250 cells / mm^3 for women) because of increased risk of severe hypersensitivity reactions. Therefore, there are concerns about the efficacy and safety of using Nevirapine-based antiretroviral therapy during rifampin-based tuberculosis treatment. At present, there have been no studies comparing efavirenz- vs. Nevirapine-based antiretroviral therapy among patients being treated for tuberculosis. Trough serum concentrations of Nevirapine among patients on concomitant rifampicin often exceed the concentration necessary

to suppress HIV in vitro. Several cohort studies have shown high rates of viral suppression among patients receiving Nevirapine-based antiretroviral therapy. The risk of hepatitis among such patients is also comparable to patients who are receiving first-line tuberculosis treatment without antiretroviral therapy. Despite the interaction with rifampin, Nevirapine-based antiretroviral therapy appears to be reasonably effective and well-tolerated among patients being treated for tuberculosis (Ribera, Pou & Lopez, 2001).

However, a recent randomised trial comparing standard dose Nevirapine (200 mg twice daily) to a higher dose (300 mg twice daily) among patients on rifampin demonstrates an increased risk of Nevirapine hypersensitivity among patients randomised to the higher dose of Nevirapine. Therefore, the standard dose of Nevirapine should be used among patients on rifampin (200 mg daily for 2 weeks, followed by 200 mg twice daily) (Avihingsanon, Manosuthu & kantipong, 2007).

4.4.4 Which drugs are contra-indicated when suffering from renal failure? (n = 135)

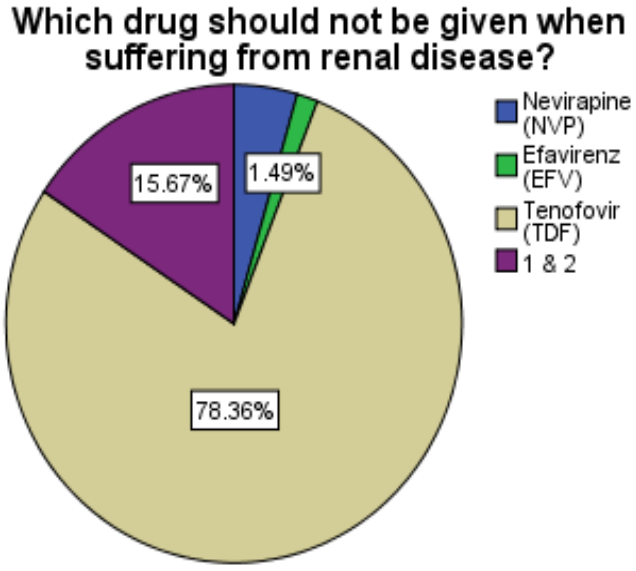

Figure 4.11: Drugs not to be given when suffering from renal failure

According to this study on a question “Which drug/s is not given when suffering from renal failure?’’, 4.4% (6) of the respondents reported NVP, 1.5% (2) reported EFV,

77.8% (n = 105) reported TDF and, lastly, 15.6% (21) reported 1&2 which is NVP & EFV as shown on figure 4.11.

People with HIV may develop a condition called HIV-associated nephropathy (HIVAN), a syndrome causing loss of protein through the urine and decreasing renal (kidney) function. HIVAN is common in people with advanced HIV disease, but usually improves after starting effective antiretroviral therapy. Some antiretrovirals on their own cause kidney problems and are described as nephrotoxic. Definitions and criteria for a diagnosis of acute renal failure vary, making it difficult to gauge incidence in general due to the added complications of HIV disease and antiretroviral drug use (Lucas, 2004).

However, a recent study that followed over 600 patients for several years has concluded that although ART can slow down kidney function decline (defined as glomerular filtration rate estimated from serum creatinine [eGFR]), loss of kidney function continues slowly, even with durable viral suppression. This can be attributed to traditional kidney disease risk factors (e.g. high blood pressure), intermittent viraemia, and nephrotoxicity associated with some antiretrovirals. CD4 cell count is not predictive of declining kidney function (Choi, 2009).

Similarly, kidney function remained almost constant over seven years in a French cohort study of over 1 000 HIV patients. The average GFR and the percentage of patients with impaired GFR (below 60 ml / min / 1.73m^2) remained essentially unchanged over the study period. Neither tenofovir nor any other antiretroviral drug was significantly associated with the poorer evolution of GFR after 16 months of HIV therapy (Leport, 2009).

In a London-based retrospective analysis of HIV patients, nearly 6% of patients developed acute renal failure (ARF). CD4 nadir and AIDS diagnosis were associated with ARF in the first three months of antiretroviral therapy and there were over 19 episodes per 100 person-years. After three months of therapy, just one episode of ARF was found per 100 person-years and this was associated with CD4 nadir, injection drug use, and hepatitis C co-infection. In this population, ARF was associated with advanced immunodeficiency and the incidence decreased remarkably after receiving antiretroviral therapy (Roe, 2008).

Africa has a high burden of both renal disease and HIV. In Zambia, nearly 33% of the 26 000 persons initiated on antiretroviral therapy between 2004 and 2007 had renal disease at baseline. The adjusted hazard ratio for mortality (adjusted by baseline CD4 count, WHO HIV stage, haemoglobin, and adherence) in those people with mild and moderate disease was twice that of those individuals without renal disease at baseline. Patients with severe renal disease at baseline had a fivefold increased risk of mortality as compared to those patients without renal disease. These occurrences point to the need for including simple screening and treatment algorithms for renal disease in antiretroviral treatment programmes, particularly in settings where tenofovir use is widespread-(Mulenga, 2008).

Suppression of viral load was associated with improved renal function in those who began antiretroviral therapy with low CD4 cell counts and grade 2 or higher kidney disease in a subset of participants enrolled in US AIDS Clinical Trial Group studies. This finding indicates, as have other studies, that viral replication contributes to chronic renal dysfunction in advanced HIV (Kalayjian, 2008).

Table 4.25: Screenings to be done to HIV-positive patients

Screenings to be done to HIV-positive patients.	Frequency	Per cent	Valid Per cent	Cumulative Per cent
Tuberculosis (TB)	14	10.4	10.4	10.4
Sexually transmitted infections (STIs)	2	1.5	1.5	11.9
If female, test for pregnancy	1	.7	.7	12.6
All of the above	118	87.4	87.4	100.0
Total	135	100.0	100.0	

According to respondents in this study (Table 4.25), 87.4% (118) reported that HIV-positive patients should be screened for TB, STI and, if female, a pregnancy test has

to be conducted. A tenth 10.4%, (14) reported TB only, 1.5% (2) reported only STIs, and 0.7% (n = 1) indicated if female, test for pregnancy test only.

According to the revised ARV treatment guideline update for frontline clinical health professional that took effect on 02 February 2013, HIV-positive patients should be screened for STIs, TB and, if female, a pregnancy test has to be conducted, including cervical cancer screening. According to results from this study, it is clearly indicated that most of the respondents had knowledge about the screenings to be conducted for HIV-positive patients (revised ARV guideline for frontline clinical health professionals, 2013).

Table 4.26: Blood for creatinine

Blood for creatinine	Frequency	Per cent	Valid Per cent	Cumulative Per cent
TDF	121	89.6	89.6	89.6
NVP	10	7.4	7.4	97.0
EFV	3	2.2	2.2	99.3
D4T	1	.7	.7	100.0
Total	135	100.0	100.0	

In this study, responses to Item 48 (Table 4. 26) show that 89.6% (121) of the respondents reported that blood for CR was collected when starting on TDF, 7.4% (10) reported NVP, 2.2% (3) reported EFV and, lastly, 0.7% (1) reported D4T.

According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, blood for CR should be taken to check for renal failure, more especially when starting on TDF (NDoH, 2013). Serum creatinine (a blood measurement) is an important indicator of renal health because it is an easily-measured by-product of muscle metabolism that is excreted unchanged by the kidneys. Creatinine itself is produced via a biological system involving

creatine, phosphocreatine (also known as creatine phosphate), and adenosine triphosphate (ATP, the body's immediate energy supply) (Harita *et al*., 2009).

Creatinine is synthesized primarily in the liver from the methylation of glycocyamine (guanidino acetate, synthesized in the kidney from the amino acids arginine and glycine) by S-adenosyl methionine. It is then transported through blood to the other organs, muscle, and brain where, through phosphorylation, it becomes the high-energy compound phosphocreatine. During the reaction, creatine and phosphocreatine are catalysed by creatine kinase, and a spontaneous conversion to creatinine may occur (Harita *et al*., 2009).

Creatinine is removed from the blood chiefly by the kidneys, primarily by glomerular filtration but also via proximal tubular secretion. There is little or no tubular reabsorption of creatinine. If the filtration in the kidney is deficient, creatinine blood levels rise. Therefore, creatinine levels in blood and urine may be used to calculate the creatinine clearance (CrCl), which correlates with the glomerular filtration rate (GFR). Blood creatinine levels may also be used alone to calculate the estimated GFR (eGFR) (Harita *et al*., 2009). The GFR is clinically important because it is a measurement of renal function. However, in cases of severe renal dysfunction, the creatinine clearance rate will overestimate the GFR because hyper-secretion of creatinine by the proximal tubules will account for a larger fraction of the total creatinine cleared. Ketoacids, cimetidine, and trimethoprim reduce creatinine tubular secretion and, therefore, increase the accuracy of the GFR estimate, in particular in severe renal dysfunction. (In the absence of secretion, creatinine behaves like inulin) (Harita *et al*., 2009).

Table 4.27: Blood for alanine aminotransferase (ALT) test

Blood for ALT	Frequency	Per cent	Valid Per cent	Cumulative Per cent
TDF	17	12.6	12.6	12.6
NVP	97	71.9	71.9	84.4
EFV	13	9.6	9.6	94.1
D4T	8	5.9	5.9	100.0
Total	135	100.0	100.0	

This study (Table 4.27) shows that 12.6% of the respondents reported that ALT blood was collected when starting on TDF, 71.9% (n = 97) answered that blood for ALT was collected when starting on NVP, which indicated that they had knowledge, 9.6% reported EFV, and 5.9% reported D4T.

According to the revised ARV treatment guideline update for frontline clinical health professional which took effect on 02 February 2013, Alanine transaminase or ALT is a transaminase enzyme which is used to assess for liver dysfunction. It is also called serum glutamic-pyruvic transaminase or alanine aminotransferase. ALT is found in plasma and in various bodily tissues, but is most commonly associated with the liver. An alanine aminotransferase (ALT) test measures the amount of this enzyme in the blood. ALT is found mainly in the liver, but also in smaller amounts in the kidneys, heart, muscles, and pancreas. ALT was formerly called serum glutamic pyruvic transaminase (SGPT). ALT is measured to see whether the liver is damaged or diseased. Low levels of ALT are normally found in the blood. However, when the liver is damaged or diseased, it releases ALT into the bloodstream that causes ALT levels to rise. Most increases in ALT levels are caused by liver damage. The ALT test is often done along with other tests that check for liver damage, including aspartate aminotransferase (AST), alkaline phosphatase, lactate dehydrogenase (LDH), and bilirubin. Both ALT and AST levels are reliable tests for liver damage.

Table 4.28: Blood for haemoglobin (Hb)

Blood for haemoglobin (Hb)	Frequency	Per cent	Valid Per cent	Cumulative Per cent
TDF	2	1.5	1.5	1.5
NVP	18	13.3	13.3	14.8
EFV	3	2.2	2.2	17.0
AZT	112	83.0	83.0	100.0
Total	135	100.0	100.0	

In this study (Table 4.28), 83% (112) of the respondents reported that HB was taken when starting on AZT and that clearly showed that respondents had knowledge about blood to be taken when starting on AZT, but 1.5% (2) reported TDF,13.3% (18) reported NVP, and 2.2% (3) reported EFV.

According to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, blood for HB should be taken when starting on AZT to detect anaemia or neutropenia. Zidovudine has caused severe blood problems, including a decrease in red blood cells (anaemia) and white blood cells (neutropenia). They occur more frequently in people with advanced HIV disease (AIDS). Blood problems may require blood transfusions or stopping your medication.

Table 4.29: Blood/s collected at six months then followed by every year

Blood/s collected at six months then followed by every year	Frequency	Per cent	Valid Per cent	Cumulative Per cent
CD4 Count	8	5.9	5.9	5.9
VL (Viral load)	43	31.9	31.9	37.8
Hb (Haemoglobin)	2	1.5	1.5	39.3
1 & 2	82	60.7	60.7	100.0
Total	135	100.0	100.0	

In this study (Table 4.29), 5.9% of the respondents reported CD4, 31.9% reported viral load, 1.5% reported Hb, while 60.7% reported CD4 and VL. This shows that majority of the respondents had knowledge about blood to be collected at six months and every year thereafter.

According to the old 2007 ARV guideline, blood for CD4 and viral load was collected at six months and annually thereafter, but according to the revised ARV treatment guideline update for frontline clinical health professionals that took effect on 02 February 2013, only blood for viral load is taken at six months and annually thereafter. The reason behind this is that CD4 does not detect any resistance to ARV but viral load shows whether it is responding to treatment or not and has to be lower than detectable after six months to indicate good response to treatment.

4.5 CONCLUSION

This chapter presented research findings and interpretation of the results and supporting literature. The results show that the majority of the respondents were females and that most of the respondents experienced similar problems; such as infrastructural problems and shortage of human resources. A protocol was developed with regard to NIMART. Chapter 5 discusses findings, limitations, and recommendations and protocol of the study.

CHAPTER 5
FINDINGS, LIMITATIONS, AND RECOMMENDATIONS OF THE STUDY AND THE PROTOCOL

5.1 INTRODUCTION

This chapter summarises the study, presents the findings, discusses the limitation of the study, and makes recommendations for the practice and further research and the protocol.

5.2 SUMMARY OF THE STUDY

- Develop a protocol for professional nurses regarding NIMART management that is based on the demographic data and specific challenges that are faced by professional nurses in the Ehlanzeni District.

The researcher conducted an extensive literature review to gain insight into the challenges faced by professional nurses with regard to NIMART nationally and internationally.

5.3 OBJECTIVES OF THE STUDY

The objectives of the study were to:

- Determine the demographic information of the professional nurses with regard to NIMART management.
- Describe the challenges encountered by professional nurses in relation to the management of NIMART IN the Ehlanzeni District.
- Develop a protocol that could assist with the challenges experienced by the Professional nurses in terms of the management of NIMART.

Data was electronically captured in a dedicated Excel for Windows spreadsheet and analysed by using the IBM SPSS Statistical 21.0 program for data analysis.

5.4 FINDINGS

The findings are discussed according to the objectives of the study.

5.4.1 Determine the demographic information of the professional nurses with regard to NIMART management.

According to the findings, 23% of the respondents were males and 71% were females. The respondents ages ranged from 30 years and younger to 51 and older; 30.4% of respondents were 30 years and younger, 43% were 31-40 years old, 14.1% were 41-50 years old, and 12.6% were 51 years and older. The majority (94.8%) of the respondents were black, 2.2% were white, 2.2% were coloured, and 0.7% were Indian / Asian. In terms of education, 83% of the respondents had a diploma and 17.0% had a degree. No one had an Honours or a Master's degree. Slightly more than half (55.6%) of the respondents were single, 37% were married, 44% were divorced, and 3.0% were widowed. Nearly a quarter (24.4%) of the respondents had 0-2 years of working experience, 50.4% had 3-10 years of working experience, 14.8% had 11-20 years of experience, and 10.4% of the respondents had more than 20 years of experience. More than two thirds (78.5%) of the respondents' clinics where in rural areas while 21.5% of respondents' clinics were in urban areas. A majority (83.0%) of the respondents worked at eight hour clinics and 17.0% worked at 24 hour clinics.

5.4.2 Describe the challenges encountered by professional nurses in relation to the management of NIMART IN the Ehlanzeni District.

- The respondents almost unanimously (84.2%) agreed that lack of professional nurses was a barrier to ARV therapy, 77% of the respondents answered yes to the issue of infrastructure as a barrier to ARV therapy, on the issue of a weak support system as a barrier to ARV therapy, 26.7% of the respondents answered yes while 73.3% answered no.
- Slightly more than two thirds (68%) of the respondents feared being infected themselves while treating HIV-positive patients. More than three quarters (79.3%) of the respondents reported that they did have enough enforced

precautions by government; such as masks, gowns, gloves. More than a half (28.9%) of respondents indicated that lack of enough enforced precautions fuelled fear of infection amongst health workers. Two thirds (67.4%) of the professional respondents reported that the fact that HIV was incurable increased their fear of being infected. Almost a third (32.6%) of respondents reported that they were afraid that they might infect their partners, while a majority (67.4%) reported that they were not afraid. A quarter (25.9%) of the respondents reported that their families or partners were concerned about them being in close contact with patients who suffered from an incurable disease, but 74.1% reported the opposite. Lastly, 91.1% of the respondents reported that they never considered a career change due to fear of treating HIV-positive patients.

- The findings based on professional nurses' responses to patients' attitude indicated that 23.7% of the respondents strongly disagreed and 51.9% agreed that patients were not polite to nurses, while 43.7% strongly disagreed and 43% disagreed that patients did not return to the clinic on their return dates. More than half (57%) of the respondents strongly disagreed and 25.2% disagreed that patients sent a message or phoned when they would fail to go the the clinic for a follow-up visit. Less than half (43%) of the respondents strongly agreed and 37% agreed that patients were always not patient while waiting to collect their treatment. A quarter (25.2%) of the respondents strongly agreed and 46.7% agreed that patients accused nurses for drugs that were out of stock. More than a fifth (21.5%) of the respondents agreed, 19.3% strongly agreed, 48.1% disagreed, and 10.4% strongly disagreed that patients sometimes shouted at or called nurses names.
- The majority (88.9%) of the respondents reported defaulters at their facilities, 80% reported that they did use home base carers to trace patients, 81.5% reported that they use nurses to trace defaulters and, lastly, 86.7% of the respondents reported that they did encounter problems while tracing defaulters.
- The majority (88.1%) of the respondents dealt with their stock-outs by borrowing from the nearest clinics or hospital. More than a third (37.8%) agreed that they gave alternate drugs with a similar effect or of the same line and, finally, 71.9% agreed that they referred patients to the nearest hospital for treatment.

- Half (50.37%) of the respondents reported a problem of patients who were sharing their treatment and (49.63%) of the respondents reported that they did not experience the problem.
- More than half (54.1%) of the respondents indicated that they did not have a suitablewaiting area for the patients in their facilities.
- In this study, 68.9% of the respondents reported that they did not have a visiting doctor at their facilities, meaning that they managed patients on ARVs on their own.
- According to results with regard to a visiting doctor, 8.9% reported that they did have a visiting doctor daily, 17.8% reported twice a week, 7.4% reported weekly, and 65.9% answered not applicable because they did not have a visiting doctor at all at their facilities.

5.4.3 Develop a protocol that could assist with the challenges experienced by the Professional nurses in terms of the management of NIMART.

- Respondents knew the eligibility for ARTs. The majority (96.3%) agreed that children younger than one year and MDR / XDR (Stage 4) were eligible for ARVs irrespective of CD4 count. The new ART guideline clearly states that children younger than one year, MDR / XDR / TB (Stage 3 & 4), and pregnant women are eligible for ARVs irrespective of their CD4 count.
- Almost all the respondents (96,3%) agreed that pregnant women with a CD4 count less than 350, patients with a CD4 count of less than 100, WHO clinical Stage 4 patients irrespective of count, MDR / XDR patients qualified for fast tracking. These responses were based on the old ART guideline.
- Almost three quarters (72.6%) of respondents reported that Nevirapine was contra-indicated to TB treatment, 0.7% (n = 1) reported that Efivarenze was contra-indicated to TB treatment, 12.6% reported TDF, while 13.3% reported NVP and Efivarenz.
- According to this study, on a question “Which drug/s is not given when suffering from renal failure?’’, 4.4% reported NVP, 1.5% reported EFV, 77.8% reported TDF.

- The majority (87.4%) of the respondents reported that HIV-positive patients should be screened for TB, STIs and, if female, pregnancy test had to be done. In this study, responses to Item 48 (Table 4.25) shows that 89.6% of the respondents reported that blood for CR was collected when starting on TDF, 7.4% (n = 10) reported NVP, 2.2% reported EFV and, lastly, 0.7% reported D4T.
- Almost three quarters (71.9%) answered that blood for ALT was collected when starting on NVP which indicated that they had knowledge and 18.1% answered incorrectly, showing that they did not have an idea about blood collected when initiating on NVP.
- The majority (83%) reported that a blood sample for Hb was taken when starting on AZT and that clearly indicated that respondents had knowledge about blood to be taken when starting on AZT, but 17% of the respondents answered incorrectly, which showed that they had no idea about blood to be taken when starting on AZT.
- In this study about blood to be collected at six months and thereafter once a year, 5.9% of the respondents reported CD4, 31.9% reported viral load, 1.5% reported Hb, and 60.7% reported CD4 and VL.

Figure 5.1 shows a protocol with regard to NIMART.

5.4.1.1 Steps to be followed with regard to the NIMART protocol

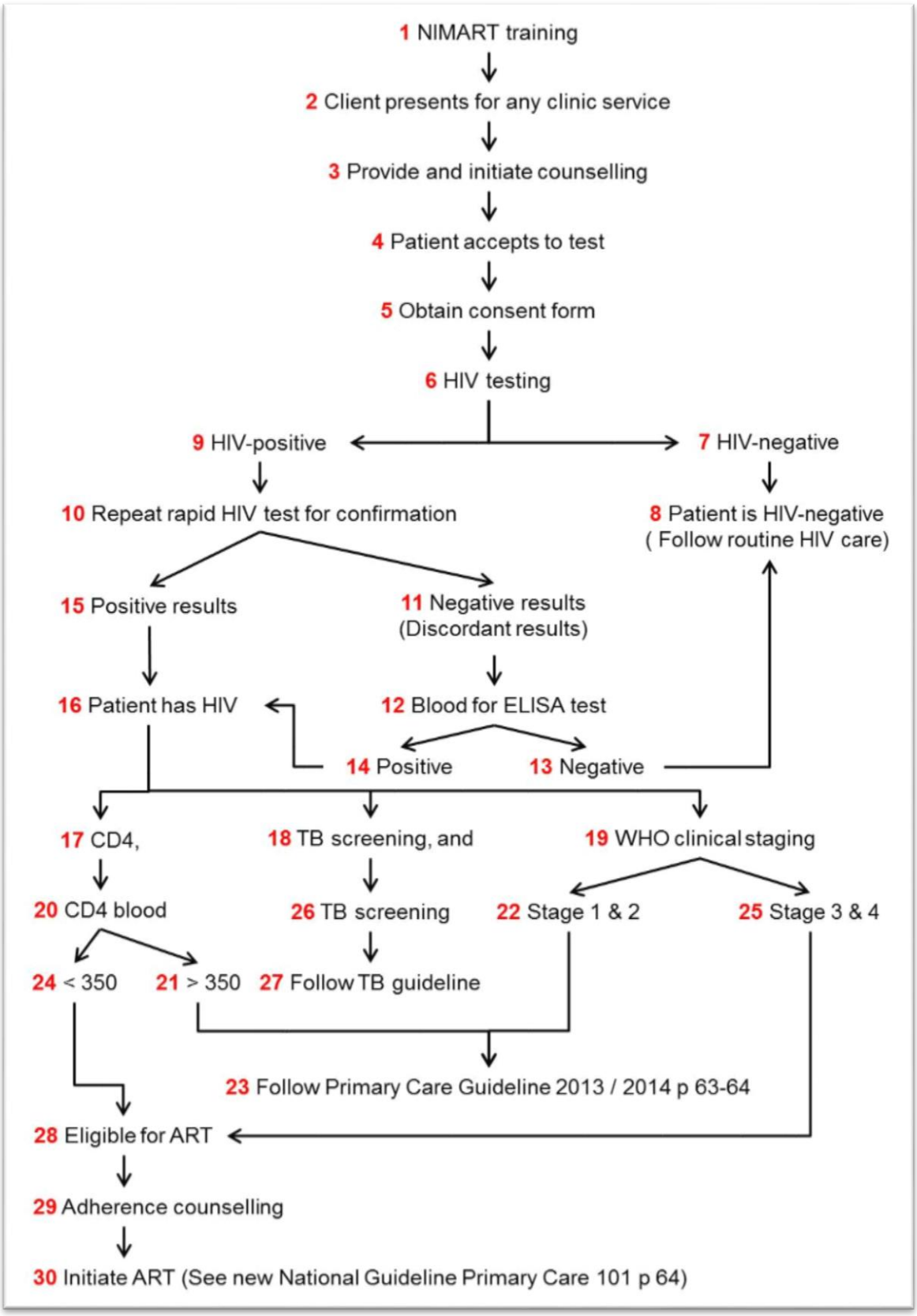

Figure 5.1: Algorithm for a protocol with regard to NIMART

The algorithm for a protocol with regard to NIMART was constructed with the guide from TB/HIV screening algorithm and the discussion written below is supported by the strategies developed based on challenges faced by the participants. It has been constructed in order to avoid similar challenges. Below is full details of figure 5.1.

1. The process of effective management of patients in relation to HIV starts by training professional nurses in NIMART (Nurse initiated management of antiretroviral therapy) to enable them to diagnose and manage patients accordingly. This type of training is organised by HAS (HIV / AIDS & STI) coordinators; it normally lasts 5 working days and it continues afterwards at facilities where nurses are expected to complete their working books and submit them within 3 months. Then assessment is done afterward to see if nurses are competent enough to initiate patients on ARVs without any help.

2&3. HIV diagnosis starts by consulting all clients present at a clinic for any clinic service by proving and initiating counselling. Educate patient about HIV and AIDS, methods of HIV transmission, risk factors and benefits of knowing one's HIV status. Explain test procedures and that it is completely voluntary. Children < 12 years need parental or guardian consent.

4&5. Immediately when a patient accepts to test, provide the patient with consent form to validate the agreement.

6. After signing consent form, prick patient's finger for rapid HIV testing which have to be interpreted within 15 minutes; not afterwards.

7&8. If the HIV test is negative, then counsel on strategies to remain negative including regular condom use, one partner. Explain issues pertaining to window period that rapid test detect HIV antibodies which may take three months to be formed. Check whether the patient has been at risk of HIV infection during the past three months. If not, then the patient is negative and should be encouraged to remain negative; if at risk, then advise to repeat HIV testing after three months. When the client is male, encourage him to go for circumcision if it has not yet been done to reduce the risk of infection. Ensure that the patient understands results and the issue of the window period, and when and where to access further care. Follow primary care (PC1O1) guideline 2013 / 14 p 61.

9&10. If results are positive, then do a confirmatory rapid test simply to confirm the first test.

11&12. If results are negative, then it shows discordant results and a blood specimen for ELISA should be collected and send to the laboratory for testing and results should be received within 24 hours to 72 hours. The courier collects the specimen in the afternoons and drops off the results the following day, either in the morning or afternoon.

13. If the results are negative, follow step **7 & 8** above.

14. If the results are positive, then it means the patients is positive. Proceed to step 16.

15&16. Positive results simply means that the patient has HIV, not that the patient is sick or dying. Follow routine HIV care on Primary Care 101 p 61.

17,18&19. Collect blood for CD4 count, screen for TB, and stage patient according to WHO clinical staging.

20, 21, 22&23. If CD4 is more than 350 then and on WHO clinical stage 1 & 2, not eligible then follow routine HIV care on PC101 guideline 2013 / 2014 p 6.

24,25,28&29. If the CD4 count is less than 350 and / or WHO clinical stage 3 and 4 then it means that the patient is eligible for ART. Do adherence counselling extensively, collect blood specimen based on regimen to be initiated on (follow PC101 guideline 2013 / 14 p 61-64). Educate the patient about different ARVs, including how to take them, side effects, dangers of poor adherence, and benefits of good compliance. Encourage patients in relation to issues of disclosure so that they can be able to take their treatment freely and to be supported with taking treatment. This can help to reduce poor adherence by patients

30. Initiate ART (see new national guideline primary care 101 p 64). This is where the NIMART trained nurse has to make sure that there is enough stock of ARVs for patients and to avoid stock-outs by making sure that treatment is ordered and delivered twice a month according to the depot schedule.

In the case of treatment stock-outs of HIV / AIDS drugs, according to Ndlovu (2009), it is sometimes necessary to transfer patients to a regional or provincial hospital for specialised (step-up) care, or to ARV clinics for continuation of treatment in uncomplicated cases (step-down). In either case, the availability of ARV medication at the referral centre is not guaranteed or otherwise ascertained. For example, the Inkosi Albert Luthuli Hospital in KwaZulu-Natal, which is the referral centre for that province and some Eastern Cape hospitals, does not stock ARV medication for their in-patients.

5.5 LIMITATIONS OF THE STUDY

The study was conducted at Mbombela and Bushbuckridge clinics in the Mpumalanga Province and small samples were used, therefore, findings cannot be generalised to other areas of the Mpumalanga District. The presence of the researcher during the briefing session might have influenced the responses of the professional nurses. The fact that this study included only NIMART trained nurses, excluded responses from other non-NIMART trained professional nurses who also serve HIV-positive patients.

5.6 RECOMMENDATIONS

- Staff shortages should be addressed and unfilled or available posts for all categories in nursing should be filled by suitable appointment and rural allowances should be higher in remote areas to encourage nurses to remain in their posts.
- Renovations / building of clinic structures should be taken into consideration to accommodate large numbers of patients; especially in waiting areas, storage rooms, pharmacy, and consulting rooms.
- Patients should be health educated in service standards at clinics; including rights and responsibilities by emphasising the issue of respect, the issue of compliance or adherence to treatment, and the dangers of sharing their treatment.
- Dedicated outreach teams should be appointed to assist with tracing non-adhering and lost patients who miss their follow-up visits to the clinic.

- All patients with chronic conditions should be seen in one consulting room to avoid stigma, rather than seeing ART patients in separate room.
- Medicine supply should be monitored closely, especially when treatment is not delivered and reported, a name of a person contacted should be recorded and filed for future references, including returned order forms and invoices as a proof of ordering.
- A competent HIV trained doctor should be appointed to attend to complicated cases and to conduct follow-up six-monthly examinations of children younger than five years.

The following trainings should be planned by HAS (HIV/AIDS and STI) coordinators:

- Collection of blood samples of children younger than five years old.
- ARV drug interactions, contradictions, and blood samples to be collected for specific drugs.
- In-service training of nurses in management of ART patients by using the newly revised guidelines.
- The HAS coordinator has to supervise and provide training to focal NIMART trained nurses.
- Land line telephones should be installed in clinics to help with tracing of patients and results.
- Amalgamated Logistics (medicine depot) needs to inform clinic facilities, especially when they are about to do stock takes so that more stock can be ordered to avoid stock-outs.

5.7 CONCLUSION

The study found that nurses from all facilities experienced similar problems in the Ehlanzeni District of the Mpumalanga Province. This requires intervention from Government, health professional care workers, patients, and programme coordinators to tackle the challenges.

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APPENDIX 1: PERMISSION LETTER FROM THE MREC

UNIVERSITY OF LIMPOPO
Medunsa Campus

MEDUNSA RESEARCH & ETHICS COMMITTEE

CLEARANCE CERTIFICATE

MEETING:	05/2013
PROJECT NUMBER:	MREC/HS/96/2013: PG
PROJECT:	
Title:	A protcol for professional nurses regarding the management of nurse initiated management of Antiretroviral Therapy (NIMART) at Ehlanzeni district, Mpumalanga province, South Africa
Researcher:	Ms. P Sekatane
Supervisor:	Dr JC Kgole
Co-supervisor:	Prof ME Lekhuleni
Department:	Nursing & Human Nutrition
School:	Health Sciences
Degree:	MCur

DECISION OF THE COMMITTEE:

MREC approved the project

DATE: 06 June 2013

UNIVERSITY OF LIMPOPO
Medunsa Campus
2013 -06- 05
MEDUNSA RESEARCH ETHICS COMMITTEE
MREC CHAIRPERSON

PROF GA OGUNBANJO
CHAIRPERSON MREC

The Medunsa Research Ethics Committee (MREC) for Health Research is registered with the US Department of Health and Human Services as an international Organisation (IORG0004319), as an Institutional Review Board (IRB0005122), and functions under a Federal Wide Assurance (FWA00009419)
Expiry date: 11 October 2016

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

Finding Solutions for Africa

APPENDIX 2: APPLICATION LETTER TO DEPARTMENT OF HEALTH

Villa de Sutene
47 St Vincent
Heron street
Nelspruit
1200
09 July 2013

Department of Health
Planning and information
Private Bag X11285
Nelspruit
1200

Dear Mr T Mulungo

REQUISITION FOR PERMISSION TO CONDUCT RESEARCH ON THE FOLLOWING TOPIC: **A PROTOCOL FOR PROFESSIONAL NURSES REGARDING THE MANAGEMENT OF NURSE INITIATED MANAGEMENT OF ANTIRETROVIRAL THERAPY (NIMART) AT EHLANZENI DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA.**

I, Ms Patricia Thato Sekatane, currently studying Masters Curationis at University of Limpopo and working at Valencia Clinic in Nelspruit, hereby request permission to collect data at Ehlanzeni clinics for study purpose.
Kindly receive attached research proposal and clearance Certificate from Medunsa Research & Ethics Committee (MREC).
Hope my request will be considered and respond from you will be highly appreciated.

Regards
Patricia Sekatane
Ms P. T. Sekatane
Cell: 072 718 4021
Email: patricia.sekatane@gmail.com

APPENDIX 3: PERMISSION LETTER FROM DEPARTMENT OF HEALTH

MPUMALANGA PROVINCIAL GOVERNMENT

Building No.3
No. 7 Government Boulevard
Riverside Park Extension 2
Nelspruit
1200
Republic of South Africa

Private Bag X 11285
Nelspruit, 1200
Tel: 013 766 3429
Int: +27 13 766 3429
Fax: 013 766 3458
Int: +27 13 766 3458

Department of Health

Litiko Letemphilo | Umnyango WezaMaphilo | Departement van Gesondheid

Enquiries: Themba Mulungo (013) 766 3511

19 July 2013

Ms. Patricia Sekatane
Villa de Sutene
47 St Vincent
Heron street
NELSPRUIT
1200

Dear Ms. Patricia Sekatane

APPLICATION FOR RESEARCH & ETHICS APPROVAL: A PROTOCOL FOR PROFESSIONAL NURSES REGARDING THE MANAGEMENT OF NURSE INITIATED MANAGEMENT OF ANTIRETROVIRAL THERAPY (NIMART) AT EHLANZENI DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA.

The Provincial Research and Ethics Committee has approved your research proposal in the latest format that you sent.

Kindly ensure that you provide us with the soft and hard copies of the report once your research project has been completed.

Kind regards

Dr. William R.M Maphanga
Chairperson PHREC

19/07/2013
Date

Mr. Molefe Machaba
Research and Epidemiology

19/07/2013
Date

Siyanakekela

MPUMALANGA
A Province to Grow

APPENDIX 4: QUESTIONNAIRE

21 August 2013

Dear respondent

I **Sekatane P.T** currently am studying Masters Degree at University of Limpopo. The research is about a protocol for Professional nurses regarding management of NIMART in Ehlanzeni District, and it is for Degree purposes. Your respond will help in developing strategies that could assist Professional nurses with challenges regarding NIMART. You are kindly requested to complete this questionnaire and it will take 20 minutes of your time to complete.

Please remember that no names or contact details are needed on the questionnaire. It is strictly anonymous and confidential.

Kindly return this questionnaire to assigned person at facility after completion. Should you have any questions contact me at **072 718 4021** or **patricia.sekatane@gmail.com?**

Yours sincerely

Sekatane P.T

PLEASE ANSWER THE FOLLOWING QUESTIONS BY CROSSING (*x*) THE RELEVANT BLOCK

SECTION A- Demographic data

You are reassured that your response will be kept confidential and your respond is highly appreciated

1. Gender

Male	1
Female	2

2. Age

30yrs and younger	1
31yrs - 40yrs	2
41yrs-50yrs	3
51yrs and older	4

3. Ethnic group

Black	1
White	2
Coloured	3
Indian/Asian	4

4. Educational qualification

Diploma	1
Degree	2
Honours	3
Master’s	4

5. Marital status

Single	1
Married	2
Divorced	3
Widowed	4

6. Experience as professional nurse

0yr - 2yrs	1
3yrs - 10yrs	2
11yrs - 20yrs	3
More than 20 yrs	4

7. Location of clinic

Rural	1
Urban	2

8. Type of clinic

8hr clinic	1
24hr clinic	2

SECTION B

This section identifies challenges faced by professional nurses with regard to NIMART

9. Short courses attended in relation to HIV

	Yes	No
9.1. Voluntary Counselling and Testing	1	2
9.2. Prevention of mother-to-child transmission	1	2
9.3. HIV / AIDS, STI, TB collaboration	1	2
9.4. NIMART	1	2

10. Are the following barriers to ARV therapy?

	Yes	No

10.1. Lack of professional nurses	1	2
10.2. Lack of infrastructure (consulting rooms, communication, electricity)	1	2
10.3. Weak support systems (laboratory services, transport, and medicine supply)	1	2
10.4. Lack of strong monitoring and evaluation (Ability to track and treat patients regardless of where they live)	1	2

The following questions are based on fear of being infected :

	Yes	No
11. Do you have any fear of infecting yourself while treating HIV-positive patients?	1	2
12. Are there enough enforced precautions by government; such as gloves, gowns, masks, and others?	1	2
13. Is a lack of enough enforced precautions fuelling fear of infection amongst health workers?	1	2
14. Is the fact that HIV is incurable increases nurses fear of being infected?	1	2
15. Are you afraid that you might infect your partner due to HIV exposure at work?	1	2
16. Is your partner or family concern about you being in close contact with patients who suffer from an incurable disease?	1	2
17. Have you ever considered a career change due to fear of treating HIV-positive patients?	1	2

18. Patients' attitude

	Strongly agree	Agree	Disagree	Strongly disagree
18.1. Always polite to nurses	1	2	3	4
18.2. Always come on their follow-up dates	1	2	3	4
18.3. Phone or send message if they fail to go to clinic	1	2	3	4
18.4. Always not patient while waiting to collect their treatment	1	2	3	4
18.5. Accuse nurses for drugs that are out of stock	1	2	3	4
18.6. Sometimes shout at or call nurses names	1	2	3	4

The following questions are based on adherence to treatment:

	Yes	No
19. Any defaulters in the clinic amongst ARV patients	1	2
20. Home base carers are used to trace those patients	1	2
21. Nurses trace defaulters	1	2
22. Any problem encountered while tracing those defaulters	1	2

23. Drug stock-outs during the past three months

	In stock	Out of stock
23.1. Lamivudine	1	2
23.2. Nevirapine	1	2
23.3. Efivarenze	1	2
23.4. Zidovudine	1	2
23.5. Aluvia	1	2
23.6. Tenofovir	1	2

Dealing with drug stock-out

	Strongly agree	Agree	Disagree	Strongly disagree
24. Borrow from nearest clinics or hospital	1	2	3	4
25. Give alternate drug with similar effect or of the same line	1	2	3	4
26. Refer patients to nearest hospital for treatment	1	2	3	4

27. To what extent do you agree with the below as a cause for stock-outs

	Strongly agree	Agree	Disagree	Strongly disagree
27.1. Poor supply chain management	1	2	3	4
27.2. Poor financial management	1	2	3	4
27.3. Inability of Government to pay supplier on time	1	2	3	4

28. Any problem of patients sharing their treatment?

Yes	1
No	2

29. How is the infrastructure in your clinic?

Good	1
Bad	2

30. Are HIV-positive patients having a special room where they are attended to confidentially on a daily basis?

Yes	1
No	2

31. 31. Is there enough storage room for medicine in the facility?

Yes	1
No	2

32. Is there enough waiting area for the patients?

Yes	1
No	2

Support systems (laboratory and medicine supply)

33. Are there any laboratory services at your clinic?

Yes	1
No	2

34. How often does the courier visit the clinic?

Once a day	1
Twice a day	2
Weekly	3

35. How is medicine supply in your clinic?

Good	1
Bad	2

36. How often do you order and receive treatment supplies?

Weekly	1
Twice a month	2
Monthly	3

37. Do you receive ordered treatment in scheduled delivery dates?

Yes	1
No	2

Visiting doctor

38. Do you have a visiting doctor at your clinic who assists with ARV initiation?

Yes	1

No	2

39. How often does the doctor visit the clinic?

Daily	1
Twice a week	2
Weekly	3
Not applicable	4

The following questions are based on paediatric NIMART (children younger than five years)

40. Do you think you have confidence to initiate under five years without any assistance

Yes	1
No	2

41. Do you know blood and related procedures to be followed before initiating younger than five years olds on ARTs

Yes	1
No	2

42. Are you able to draw blood of the under five years old children?

Yes	1
No	2

SECTION C: Policy and strategy

This section determines the guideline and strategy that could assist with the challenges

43. Children less than one year old, MDR/XDR (Stage 4) are eligible for ARVs irrespective of CD

True	1
False	2

44. Pregnant women with a CD4 count of less than 350, patients with a CD4 count of less than 100, WHO clinical (Stage 4) patients irrespective of CD4 count, MDR / XDR patients qualifies for fast tracking
(initiating within 2 weeks of being eligible)

True	1
False	2

45. Which drug is contra-indicated for TB?

Nevirapine (NVP)	1
Efavirenz (EFV)	2
Tenofovir (TDF)	3
1 & 2	4

46. Which drug should not be given when suffering from renal disease?

Nevirapine (NVP)	1
Efavirenz (EFV)	2
Tenofovir (TDF)	3
1 & 2	4

47. Select the appropriate tests and screenings to be done to HIV-positive patients

Tuberculosis (TB)	1
Sexually transmitted infections (STIs)	2
If female, test for pregnancy	3
All of the above	4

48. Blood for creatinine(CR) is collected when starting on:

TDF	1
NVP	2
EFV	3
D4T	4

49. Blood for ALT is collected when starting on :

TDF	1
NVP	2
EFV	3
D4T	4

50. Blood for Hb is collected when starting on :

TDF	1
NVP	2
EFV	3
AZT	4

51. Which blood/s is/are collected at six months, then once a year thereafter

CD4 count	1
VL (Viral load)	2
Hb (Haemoglobin)	3
1 & 2	4

APPENDIX 5: CONSENT FORM

UNIVERSITY OF LIMPOPO (Medunsa Campus)

A PROTOCOL FOR NURSES WITH REGARD TO NIMART IN THE EHLANZENI DISTRICT, MPUMALANGA PROVINCE

I have read the information on */heard the aims and objectives of* the proposed study and was provided the opportunity to ask questions and given adequate time to rethink the issue. The aim and objectives of the study are sufficiently clear to me. I have not been pressurized to participate in any way.

I know that the questionnaire will be taken of me. I am aware that this material may be used in scientific publications which will be electronically available throughout the world. I consent to this provided that my name is not revealed.

I understand that participation in this Clinical Project is completely voluntary and that I may withdraw from it at any time and without supplying reasons. This will have no influence on the regular treatment that holds for my condition neither will it influence the care that I receive from my regular doctor.

I know that this Project has been approved by the Medunsa Research Ethics Committee (MREC), University of Limpopo (Medunsa Campus). I am fully aware that the results of this Project will be used for scientific purposes and may be published. I agree to this, provided my privacy is guaranteed.

I hereby give consent to participate in this Study / Project .....

Name of patient/volunteer.....

Signature of patient or guardian..... .

Place……. Date…… Witness……..

_____

Statement by the Researcher

I provided verbal and/or written* information regarding this Project*

I agree to answer any future questions concerning the Project* as best as I am able.

I will adhere to the approved protocol.

Sekatane P.T ....…… ……

Name of Researcher Signature Date Place

APPENDIX F: EDITING CONFIRMATION LETTER

*** The stars that tell the spade when to dig and the seeds when to grow ***
*** Isilimela – iinkwenkwezi ezixelela umhlakulo ukuba mawembe nembewu ukuba mayikhule***

P O Box 65251
Erasmusrand
0165

19 March 2013

Dear Ms Patricia Sekatane

CONFIRMATION OF EDITING THE MINI-DISSERTATION WITH THE TITLE A PROTOCOL FOR PROFESSIONAL NURSES REGARDING THE MANAGEMENT OF NURSE INITIATED MANAGEMENT OF ANTIRETROVIRAL THERAPY (NIMART) IN THE EHLANZENI DISTRICT, MPUMALANGA PROVINCE, SOUTH AFRICA

I hereby confirm that I have edited the abovementioned dissertation as requested.

Please pay particular attention to the editing notes AH01 to AH29 for your revision.

The tracks copy of the document contains all the changes I have effected while the edited copy is a clean copy with the changes removed. Kindly make any further changes to the edited copy since I have effected minor editing changes after removing the changes from the tracks copy. The tracks copy should only be used for reference purposes.

Please note that it remains your responsibility to supply references according to the convention that is used at your institution of learning.

You are more than welcome to send me the document again to perform final editing should it be necessary.

Kind regards

André Wills
083 501 4124