

**FACTORS INFLUENCING THE CONFIDENCE AND KNOWLEDGE OF
PROFESSIONAL NURSES PRESCRIBING ANTIRETROVIRAL THERAPY IN A
RURAL AND URBAN DISTRICT IN THE WESTERN CAPE**

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Science in the Faculty of Medicine and Health Science Stellenbosch University*

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DECLARATION

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ABSTRACT

Introduction: Since the introduction of nurse-initiated and -managed antiretroviral therapy (NIMART) in South Africa in 2010, there has been an increased demand for the training of professional nurses in Human Immunodeficiency Virus (HIV) management in primary healthcare settings. Task shifting from doctors to nurses to prescribe antiretroviral therapy (ART) became essential to ensure that more patients living with HIV are initiated on life-saving ART. Although the shifting of tasks is a timely solution for human resource constraints, the continued success of the approach is dependent on factors such as adequate training and effective support systems. However, there is limited evidence on how these factors influence the confidence and knowledge of nurses who prescribe ART in primary health care settings.

Aim: The study aimed to investigate factors influencing the knowledge and confidence of professional nurses in managing patients living with HIV in rural and urban primary health care settings in the Western Cape.

Methods: A quantitative research approach was used with an analytical, cross-sectional study design. The researcher, based on the literature and previous instruments, designed a self-completion questionnaire. The questionnaire measured demographic details, influencing factors, HIV management confidence and HIV management knowledge. Approval for the study was obtained from the Health Research Ethics Committee (HREC) of Stellenbosch University, the Department of Health and the City of Cape Town.

Seventy-seven participants from 29 healthcare facilities completed the questionnaire. Data was entered into Microsoft Excel by the researcher, imported and analysed with a statistical analysing programme, IBM SPSS (version 23). Descriptive statistics were used to describe the data and appropriate statistical tests were used to test for relationships between variables.

Results: The majority of participants had adequate HIV management knowledge and reported to be very confident or experts in the HIV management skills / competencies. With regard to the

Factors influencing HIV management knowledge and confidence, the research results revealed that participants trained recently in PULSA PLUS / PACK (3years ago or less) had significantly higher knowledge scores. Regular feedback about clinic and personal performance was associated with higher HIV management knowledge. Participants who received mentoring over a period of two weeks had a higher mean confidence score compared to other periods of mentoring. A higher caseload of HIV-positive patients was also associated with higher knowledge and confidence.

Conclusion: The results show that training, mentorship and clinical practice experience are associated with knowledge and confidence. Recommendations include the strengthening of current training and mentoring and ensuring that NIMART-trained nurses are provided with sufficient opportunities for clinical practice.

Keywords: HIV, NIMART, confidence, knowledge, nurses

OPSOMMING

Inleiding: Sedert die bekendstelling van verpleegkundige-geïnisieerde en bestuurde antiretrovirale terapie (NIMART) in Suid-Afrika in 2010 was daar 'n toenemende vraag na die opleiding van professionele verpleegkundiges in Menslike Immuniteits gebreksvirus (MIV) bestuur in die primêre gesondheidsorg instellings. Taak verskuiwing van dokters na verpleegsters om antiretrovirale terapie voor te skryf (ART) het noodsaaklik geword om te verseker dat meer pasiënte wat met MIV leef, op lewens reddende ART begin. Alhoewel die verskuiwing van take 'n tydige oplossing vir menslike hulpbron beperkings is, is die volgehoue sukses van die benadering is afhanklik van faktore soos voldoende opleiding en effektiewe ondersteuning sisteme. Daar is egter beperkte bewyse oor hoe hierdie faktore die vertrouwe en kennis van verpleegkundiges beïnvloed wat ART voorskryf in primêre gesondheidsorg instellings.

Doelwit: Die studie het ten doel om faktore wat die kennis en vertrouwe van professionele verpleegkundiges beïnvloed, te ondersoek in die bestuur van pasiënte wat met MIV leef in landelike en stedelike primêre gesondheidsorg instellings in die Wes-Kaap.

Metodes: 'n Kwantitatiewe navorsings benadering is gebruik met 'n analitiese, deursnee-studie ontwerp. 'n Self evaluerings vraelys is ontwerp deur die navorser gebaseer op die literatuur en vorige instrumente. Die vraelys het demografiese besonderhede, beïnvloedende faktore, MIV-bestuursvertroue en MIV-bestuurskennis gemeet. Goedkeuring vir die studie is verkry vanaf die Gesondheidsorg navorsings etiek komitee (MHO) van die Universiteit Stellenbosch, die Department van Gesondheidsorg en die Stad Kaapstad.

Sewe en sewentig deelnemers uit 29 gesondheidsorg fasiliteite het die vraelys voltooi. Data is in Microsoft Excel deur die navorser ingevoer en geanaliseer met 'n statistiese ontledingsprogram, IBMSPSS (weergawe 23). Beskrywende statistiek is gebruik om die data te beskryf en toepaslike statistiese toetse is gebruik om te toets vir verhoudings tussen veranderlikes.

Resultate: Die meerderheid van die deelnemers het voldoende MIV-bestuurskennis en was baie selfversekerd of kundiges in die MIV-bestuursvaardighede. Met betrekking tot die faktore wat MIV-bestuurskennis en -vertroue beïnvloed, het die navorsings resultate aan die lig gebring dat deelnemers wat onlangs in PULSA PLUS / PACK (3 jaar gelede of minder) opgelei is, aansienlik hoër kennis tellings gehad het. Gereelde terugvoering oor kliniek en persoonlike prestasie is geassosieer met hoër MIV-bestuurskennis. Deelnemers wat mentorskap ontvang het oor 'n tydperk van twee weke, het 'n hoër gemiddelde vertroue telling in vergelyking met ander tydperke van mentorskap. 'n Hoër gevalle van MIV-positiewe pasiënte is ook geassosieer met hoër kennis en vertroue.

Slot: Die resultate toon dat opleiding, mentorskap en kliniese praktykervaring geassosieer word met kennis en vertroue. Aanbevelings sluit in die bevordering van huidige opleiding en mentorskap en om te verseker dat NIMART-opgeleide verpleegkundiges genoegsame geleenthede vir die kliniese praktyk bied.

Sluitwoorde: HIV, NIMART, selfvertroue, kennis, verpleegkundiges

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My husband, Daniel thank to you for your encouragement and willingness to support me in this endeavour of my life. Thank you for your support, dedication and inspiration that helped me to finish this part of life. My children, Wesley and Fred, may this inspire you even more to persevere even though the odds are sometimes against you. Life is wonderful and full of surprises; use the opportunities to fulfil your purpose in life. God preserve us through this part of our lives and may he even bless us more to be a blessing to others.

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ABBREVIATIONS AND ACRONYMS

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Treatment / Antiretrovirale terapie
CDC	Community Day Centre
CHC	Community Health Centre
DOH	Department of Health
DHIS	Department of Health Information Systems
HCW	Health Care Worker
HIV	Human Immunodeficiency Virus
IMCI	Integrated Management of Childhood Illnesses
MIV	Menslike Immuniteitsgebrek Sindroom
NDOH	National Department of Health
NIMART	Nurse-Initiated and -Managed Antiretroviral Therapy
NSP	National Strategic Plan
PACK	Practical Approach to Care Kit
PALSA PLUS	Practical Approach to Lung Health in South Africa and Management of HIV / AIDS
PGS	Primêre Gesondheidsorg
PHC	Primary Healthcare Clinics
PMTCT	Prevention Mother-to-Child Transmission of HIV
SAHO	South African History Online
SANAC	South African National Aids Council
STRETCH	Streamline Tasks and Roles to Expand Treatment and Care for HIV
TB	Tuberculosis
UNAIDS	Joint United Nations Programme on HIV / AIDS
WHO	World Health Organization

CHAPTER 1: FOUNDATION OF THE STUDY

1.1 INTRODUCTION

Since the introduction of nurse-initiated and -managed antiretroviral therapy (NIMART) in South Africa in 2010, there has been an increased demand for the training of professional nurses in Human Immunodeficiency Virus (HIV) management in the primary health care settings (Nyasulu, Muchiri, Mazwi & Ratshefola, 2013:232-234). Due to persistent human resource constraints in South Africa, task shifting from doctors to nurses to prescribe antiretroviral therapy (ART) became essential to ensure that more patients living with HIV are initiated on life-saving ART (Nyasulu *et al.*, 2013:232-234).

Although the shifting of tasks is a timely solution for human resource constraints, the continued success of the approach is dependent on factors such as adequate training and effective support systems (George, Colvin, Lewin, Fairall & Bachmann, 2012:66). However there is limited evidence on how these factors influence the confidence and knowledge of nurses who prescribe ART in primary health care settings (Cameron, Gerber, Mbatha, Mutyabule & Swart, 2012:98-100). The proposed study aims to investigate factors influencing the knowledge and confidence of professional nurses in managing patients living with HIV in rural and urban primary health care settings in the Western Cape.

1.2 BACKGROUND AND RATIONALE

The World Health Organization (WHO) recommends that countries adopt a methodical approach to coordinated, consistent and competency-based education that is needs driven and approved. This will ensure that all health care workers are equipped with the appropriate competencies to undertake the tasks that they perform (WHO, 2008:2). Competency has been described as “the knowledge, perceptives, skills, attitudes and standards that an individual develops or acquires through education, training and work experience, which can be used to depict particular occupational roles or functions against which personal performance may be assessed” (International Council of Nurses, 2008:6).

Although it is ideal that all health professionals should be competent to undertake the tasks they perform, competency may be difficult to assess. The assessment of competency in the

form of subjective, multiple-choice and standardised patient assessments may underemphasise significant domains of professional capability such as the integration of knowledge and skills, the framework of care, cooperation and patient-nurse associations (Epstein & Hundert, 2002:226). It is even more challenging to assess the competency of clinicians in practice.

For the purpose of this study, self-assessment was used to measure how confident nurses are in performing HIV management skills. In addition, knowledge questions were used to provide an objective assessment. Self-assessment is often used to help practicing clinicians to identify their own strengths and weaknesses for continuous professional development. However, the process of assessing oneself is complex and never completely objective. Self-assessment can therefore not be used as an accurate measure of competency but it can be used to help individuals identify gaps in their clinical performance (Steward, O'Halloran, Barton, Singleton, Harrigan & Spencer, 2000:903). In addition, there is a trend towards worse patient outcomes for patients who received care from clinicians who do not consider themselves 'experts' in HIV/AIDS care (Rackal, Tynan, Handford, Rzeznikewiz, Agha & Glazier, 2012:68).

Factors such as training, mentoring and clinical experience have been found to influence the competency of health care providers. A systematic review by Rackal *et al.* (2012:68) revealed better clinical outcomes for patients treated by a provider with more training in HIV/AIDS care. In 2010, many stakeholders began to train nurses in HIV / AIDS management 2012. The reported numbers of nurses trained in NIMART exceeded 23 000 (Department of Health (DOH), 2012a:3). There is very little research available on the evaluation of the different NIMART training courses and training outcomes. One study found that 62% of nurses who had been trained in NIMART were initiating patients on antiretroviral therapy in the clinics where they were working, yet some of these nurses did not pass the open book exam after the training (Cameron *et al.*, 2012:98-100). A study in Khayelitsha, South Africa, showed an increase in the confidence of nurses to manage patients on ART after mentorship (Green, de Azevedo, Patten, Davies, Ibeto & Cox, 2014:1). However, key informants in a study on perspectives of task-shifting commented that the mentoring process is not working very well due to service provider constraints and the fact that both nurses and doctors are too busy for mentoring (Orner, Cooper & Palmer, 2010:16). Provider experience in HIV / AIDS care has shown to improve quality of care (Rackal *et al.*, 2012:68). Conversely, care provided by providers with low levels of self-rated expertise who treat low numbers of HIV / AIDS patients tend to lead to less favourable patient outcomes.

South Africa has the largest antiretroviral treatment programme in the world (Mayosi, Lawn, van Niekerk, Bradshaw, Abdool Karim & Coovadia, 2012:2029-43). Antiretroviral treatment guidelines are continuously revised, consequently increasing the threshold for ART treatment. Access to treatment was further improved with the decentralisation of ART to primary health care clinics and the implementation of NIMART in 2010. Many nurses have been trained and certified in NIMART (DOH, 2012b:3). However, studies have not focused on the confidence and knowledge of nurses who are currently prescribing ART. Studies show different entry criteria for NIMART training, various training methods and variable outcomes (Fairall, Max, Bachmann, Lombard, Timmerman, Uebel, Zwarenstein, Boulle, George, Colvin, Lewin, Faris, Cornick, Draper, Tsabalala, Kotze, van Vuuren, Steyn, Chapman & Bateman, 2012:889-898; Cameron *et al.*, 2012:98-100; Green *et al.*, 2014:1). Furthermore, various other health system barriers to the implementation of NIMART have been identified that could impact on the success and sustained effect of NIMART (Cameron *et al.*, 2012:98-100).

The researcher is a professional nurse who has been trained in NIMART and has been authorised to prescribe ART in the Western Cape. She identified that there are several barriers to the implementation of NIMART in practice. Evaluating the HIV management confidence and knowledge of professional nurses who prescribe ART may help to determine if additional education is needed or if there are gaps in perceptions of competency. In addition, scientific evidence about the factors that influence knowledge and confidence may help to focus and improve on-going NIMART training interventions. Evidence from this study may also assist policy makers to design appropriate interventions to ensure the long-term success of task shifting through NIMART.

1.3 RESEARCH PROBLEM

NIMART has been implemented widely in South Africa and in the Western Cape, utilising various training and mentoring methodologies. Only one study in Khayelitsha, Western Cape, has assessed nurses' confidence before and after clinical mentoring (Green *et al.*, 2014:1). This study occurred in an urban setting within the context of a non-profit organisation providing support to nurses. No published studies could be found that have investigated the factors that influence the knowledge and confidence of nurses currently prescribing ART in the Western Cape in both urban and rural settings. The need arose to investigate whether there may be factors that could influence the knowledge and confidence of nurses currently prescribing ART

in the Western Cape in both urban and rural settings.

1.4 RESEARCH QUESTION

What factors influence the HIV management confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape?

1.5 RESEARCH HYPOTHESES

The researcher wanted to test the following research hypotheses:

Professional nurses with recent training (three years or less) in HIV management have higher confidence ratings and knowledge scores compared with professional nurses who have not recently been trained. Professional nurses who receive continuous mentoring have higher confidence ratings and knowledge scores compared with professional nurses who do not receive continuous mentoring. Professional nurses with more experience in HIV management have higher confidence ratings and knowledge scores.

1.6 RESEARCH AIM

The primary aim is to determine the factors that influence the HIV management confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape.

1.7 RESEARCH OBJECTIVES

The objectives are to: Determine the HIV management confidence of nurses prescribing ART.

Determine the HIV management knowledge of nurses prescribing ART.

Evaluate whether individual and health system factors such as training, continuous mentoring and experience are associated with confidence ratings and knowledge scores.

1.8 THEORETICAL AND CONCEPTUAL FRAMEWORKS

For the purpose of this study, the researcher adopted the theoretical model of Patricia Benner, “From Novice to Expert”. Nurses trained in a new skill start as novices and advance through

the steps to reach the level of expert. The Dreyfus Model of Skill Acquisition serves as the theoretical basis for Benner’s work to identify the professional development of nurses. There are five domains identified in the Dreyfus Model of Skill Acquisition, namely: novice, advanced beginner, competent, proficient and expert (George, 2013:593). This model was selected as it provides suitable anchors to measure the self-assessment of skills (Steward *et al.*, 2000: 906).

NIMART trained nurses are knowledgeable practitioners who are essential to the promotion and health and well-being of patients (George, 2013:592). Benner’s theoretical model explains that critical thinking is an evolutionary process that becomes more insightful as experience is gained (George, 2013:598). The clinical experience of the NIMART nurse is a critical component of evidence-based practice. It is the expert nurse who has the greatest skill and ability to implement research to meet the unique values and needs of patients living with HIV (George, 2013:594). Further, expert nurses instinctively aim to avoid known hazards, are attentive to safely meet the requirements of patients and are confident in changing the plan as needed should situations change (George, 2013:594).

The Clinical Proficiency Pathway (Figure 1.1) depicted in the Clinical Mentorship Manual for Integrated Services (DOH, 2011:4), was adopted as the conceptual framework for this study. It illustrates the possible relationship between training, mentoring, clinical experience and independent decision-making or expertise. The factors that assist in developing competency and expertise are training, mentorship, clinical practice and continuous assessment. These factors help the ‘novice’ to become ‘proficient’ and eventually an ‘expert’.

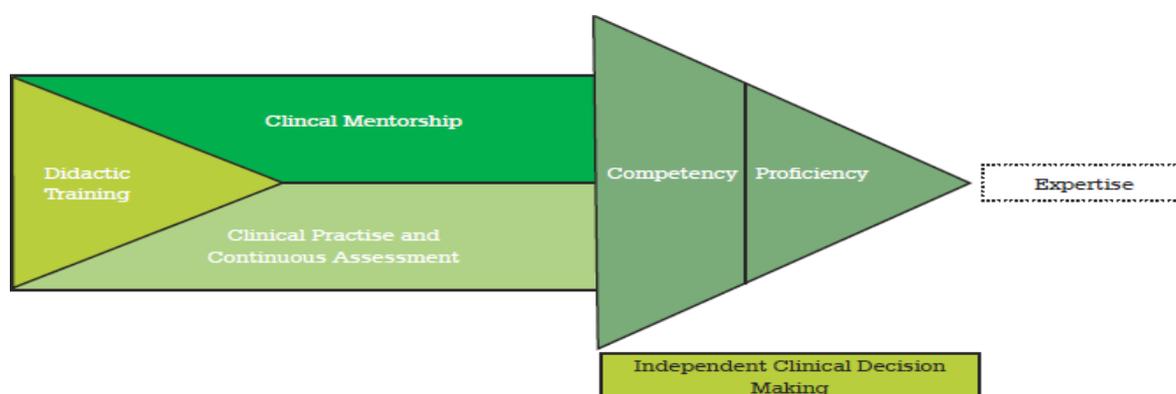


Figure 1.1: Clinical Proficiency Pathway (DOH, 2011:4)

1.9 RESEARCH METHODOLOGY

The research methodology will be discussed here briefly and in more detail in chapter 3.

1.9.1 Research design

A quantitative research design was used to identify the factors influencing the HIV management confidence and knowledge of professional nurses prescribing ART in the Western Cape. Since NIMART training has been operational for the past four years and is in its implementation phase, an analytical, cross-sectional study was used to measure these factors at one point in time (Grove, Burns & Gray, 2013:691).

1.9.2 Study setting

The study was conducted in one urban and one rural district – the City of Cape Town (City Health) and the Cape Winelands districts.

1.9.3 Population and sampling

Based on a list obtained from the Department of Health, there were 256 nurses who were authorised to prescribe NIMART in the two districts. However, when the researcher contacted the individual clinics, there were only 146 authorised nurses (67 in the City of Cape Town and 79 in the Cape Winelands). This discrepancy may have been either due to some sub-districts in the Cape Winelands declining to participate or due to staff turnover within the districts. Of the five districts in the Cape Winelands, three districts agreed to participate in the research (Drakenstein, Witzenberg and Stellenbosch) and two districts declined (Breede-Valley and Langeberg).

As advised by a statistician, all the nurses authorised to prescribe NIMART in the two selected districts (N=146) were invited to participate in order to account for the clustering effect in the sub-districts. Forty participants refused to participate and a further 21 participants could not be approached. In the Cape Winelands, 49 (69%) participants completed questionnaires, 18 (25%) refused to participate and four (6%) were absent, on leave or not available when the research was conducted. In the City of Cape Town 28 (42%) participants completed questionnaires, 22 (33%) refused to participate and 17 (25%) were absent, on leave or not available when the research was conducted.

1.9.4 Instrumentation

A self-completion questionnaire (Appendix 4) was used that was designed by the researcher based on the literature and previous instruments. The questionnaire measured demographic details, influencing factors, HIV management confidence and HIV management knowledge. The questionnaire was available in English only. All participants were able to read and understand English as this is the medium used for written communication and training in the Western Cape.

1.9.5 Pilot test

The researcher worked in Stellenbosch sub-district and these participants were easily accessed. The pilot was conducted in the rural district because the purpose was only to identify any unclear questions. The pilot test included participants with various language backgrounds and I could therefore test if the questions were understood by all. Participants in the sub-district were randomly selected to complete the questionnaire. Eight participants completed the questionnaire. After completion of the questionnaire, a few changes were made to the questionnaire. The pilot test data were not included in the main study.

1.9.6 Validity and reliability

Face and content validity was ensured by making use of a previously used instrument to measure HIV management confidence and knowledge as well as a review of the instrument by experts in the field of HIV/AIDS, research and nursing. The previously reported Cronbach's alpha for the confidence items was 0.94 (Crowley, 2014:1).

1.9.7 Data collection

Following ethical approval and provincial permission, the different districts' Medical Superintendents or sub-District Managers were contacted, telephonically or via email. The Researcher trained one fieldworker to assist with the data collection. The fieldworker was fluent in at least two languages - Afrikaans, English or isiXhosa and approached the participants individually in the clinics. The researcher or the fieldworkers explained the purpose of the study and invited participants to complete the questionnaire for the study. The researcher or a trained fieldworker supervised the completion of questionnaires at the arranged clinics. The completion of the questionnaires took approximately 25 to 60 minutes and was conducted in their own consultation rooms or secluded tearooms.

1.9.8 Data analysis

Data was entered into Microsoft Excel by the researcher, imported and analysed with a statistical analysing programme, IBM SPSS (version 23), with the assistance of the study supervisor and a statistician of the Biostatistics Unit at the Faculty of Medicine and Health Sciences. HIV management confidence and knowledge were measured as continuous variables by calculating the total scores. Descriptive statistics were used to describe the data and appropriate statistical tests such as Chi-square (categorical demographic variables) or t-tests (continuous variables) were used to test for relationships between variables.

1.10 ETHICAL CONSIDERATIONS

Ethics approval to conduct the study was obtained from the Health Research Ethics Committee (HREC) at Stellenbosch University (Appendix 2 &3) (S14/12/268). Permission was further obtained from the Department of Health, City of Cape Town (City Health), Western Cape Province and the appropriate Medical Superintendents from the chosen sub districts. This study adhered to the ethical principles of the Declaration of Helsinki 2013. The researcher has the ethical responsibility to protect the human rights of the participants, such as their rights to privacy, confidentiality, autonomy, anonymity, fair treatment and protection from discomfort and harm (Burns & Grove, 2013:110).

1.10.1 Right to self-determination

Written informed consent was obtained from participants and participants were informed that the data would be used for research purposes. Participation was voluntary and participants could withdraw at any given time, without the risk of penalty.

1.10.2 Right to confidentiality and anonymity

All data were handled in a confidential manner and only the investigators, supervisor and statistician had access to the original data that will be kept in a locked cabinet for at least five years. No participant name or contact details were recorded on the questionnaires to ensure anonymity and confidentiality throughout the study.

1.10.3 Right to protection from discomfort and harm

Minimal risks or discomfort were experienced by participants since dates, times and venues for completions of questionnaires were arranged at times convenient for the participants. The

participants' knew that they could discontinue their participation at any time before completion of the questionnaire without any risks or penalties when experiencing any discomfort or harm. Although the researcher is NIMART trained, she is not in an HIV/AIDS/STI/TB (HAST) managerial position and was therefore not personally known to the participants.

1.11 OPERATIONAL DEFINITIONS

Confidence

Confidence is in essence a subjective assessment of own competencies in a specific area. It has also been described as a judgement that determines whether an individual is willing or not to undertake an activity (Steward *et al.*, 2000:903-909). In this study, confidence relates mainly to how confident nurses rate themselves in certain HIV management related competencies.

Knowledge

According to Gray, Grove & Burns (2013:15), knowledge is the necessary information acquired in an assortment of ways, predicted to be an accurate indication of reality, and included and used to direct a person's actions. In this study, the participants' acquired level of knowledge was measured by completing the questionnaire that consisted of multiple choice questions related to the management of people living with HIV.

Task shifting

The WHO (2008:2) describes task shifting as "a process whereby specific tasks are moved, where appropriate, to health workers with shorter training and fewer qualifications".

1.12 DURATION OF THE STUDY

The research proposal was submitted on 14 December 2014 for ethical approval to the Health Research Ethics Committee at Stellenbosch University and approval was obtained on the 16th of March 2015 until 12 March 2016 (Appendix 2 & 3) (S14/12/268). A further extension was obtained until 12 May 2017 due to a delay in obtaining Provincial Research Committee approval. Approval was obtained from the Western Cape Health Research Department on 31 August 2015 for the Cape Winelands district for Ceres Hospital and Drakenstein sub-districts

(Appendix 6) (WC_2015RP53_429). Approval was obtained for Stellenbosch sub-district on the 11th of September 2015 (Appendix 7) (WC_2015RP53_429). City of Cape Town (City Health) approval was obtained on 12 October 2015 (Appendix 8) (ID No: 10519). Data were collected from September 2015 until March 2016. Data were analysed from June 2016 until August 2016. The final thesis was submitted on the 1st of March 2018.

1.13 CHAPTER OUTLINE

Chapter 1: Foundation of the study

This chapter includes the foundation of this study and an overview of the methodology on how the research was conducted.

Chapter 2: Literature review

In this chapter, the current literature related to this topic is presented.

Chapter 3: Research methodology

In this chapter, a step-by-step account is given on how the data was collected and analysed.

Chapter 4: Results

In this chapter, the research results are presented and displayed.

Chapter 5: Discussion, conclusions and recommendations

In this chapter, the results of the research are interpreted in the light of the current literature and recommendations for practice are made.

1.14 SIGNIFICANCE OF THE STUDY

Through NIMART, nurses have taken on tasks historically performed by doctors. This places them at the frontline of managing patients on ART. Rackal *et al* .(2012:68) found a trend towards worse patient outcomes for patients who receive care from clinicians who do not consider themselves‘ experts’ in HIV / AIDS care. It is therefore important that nurses have the necessary confidence and knowledge to manage patients on ART. Understanding the factors that influence the confidence and knowledge of nurses who manage patients on ART may assist in developing better support structures for these nurses.

1.15 SUMMARY

In this chapter the background to and purpose of this study were discussed and how the researcher conducted the study. In the next chapter, a review of the literature that assisted the researcher to have a better understanding of the research topic is presented.

1.16 CONCLUSION

The study identified factors that influence the confidence and knowledge of registered nurses prescribing ART in a rural and urban district. The findings from this study may be used to enhance ART training and support programmes in order to increase the clinical performance of professional nurses.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

A literature review can be defined as an evaluation of information found in the literature, which is relevant to the selected area of study. The literature review should be conducted to describe, summarise, evaluate and clarify this literature. This review should provide a theoretical base for the research and assists the researcher to determine the nature of the research (Taylor & Procter, 2017:1). This literature review focuses on the progress that has been made to improve antiretroviral treatment (ART) programmes and the challenges nurses face when initiating ART. It provides an overview of the training programmes that exist to prepare nurses for NIMART and the factors that may influence their knowledge and confidence.

2.2 LITERATURE REVIEW

A literature review commenced by searching the following databases for relevant articles: Cochrane Database of Systematic Reviews, PubMed, CINAHL and Google Scholar. Articles were sourced from journals such as PLOS Medicine, PLOS ONE, Implementation Science, South African Medical Journal, Journal of Medical Imaging and Radiation Sciences, African Health Sciences, The Cochrane Collaboration and Lancet.

The literature study findings in this chapter are presented according to the following framework:

- HIV/AIDS epidemiology globally and in South Africa History of the ART programme in South Africa
- Task shifting and the introduction in NIMART Factors influencing the success of NIMART: Training
- Certification Mentoring
- Health systems restructuring and support
- Continuous quality assurance

2.3 HIV / AIDS EPIDEMIOLOGY GLOBALLY AND IN SOUTH AFRICA

In 2017, it was reported that there was 36.7 million people infected with HIV globally (UNAIDS, 2017:1). By June 2017, 20.9 million people living with HIV were accessing antiretroviral therapy (ART). The progress made to improve access to ART has had several benefits such as the decrease in new HIV infections. New HIV infections have fallen by 11% since 2010. Globally 1.8 million people became newly infected with HIV in 2016 compared to 2.1 million in 2015. New HIV infections among children have also declined by 47% since 2010 to 160 000 in 2016 (UNAIDS, 2017:1).

South Africa has the largest HIV epidemic in the world, with an estimated 7.03 million people living with HIV in 2016. For 2015, an estimated 12.7% of the total population was HIV-positive. In 2016, there was a decline to only 150 759 South Africans dying from AIDS-related illnesses (STATSSA, 2016:6-7).

2.4 HISTORY OF THE ART PROGRAMME IN SOUTH AFRICA

The reaction of the South African leadership to the HIV/AIDS epidemic for the period 1999 – 2008 was slow. In 1999, the single ART regime of Nevirapine became the drug of choice for the prevention of mother-to-child (PMTCT) transmission. According to the South African History Online (SAHO, 2015), in 2002, the National Prevention of Mother-to-Child Transmission (PMTCT) pilot sites were implemented to assist in the improvement of the effectiveness and efficiency of PMTCT services.

A plan to provide antiretroviral drugs (ARV's), the most suitable treatment for the HIV infected, was published in November 2003 and the South African ART programme launched by National Department of Health (NDOH) occurred in April 2004. South Africa began the programme by distributing complimentary HIV/AIDS drugs after years of uncertainty and delays. The programme was implemented in Gauteng, where five major hospitals, including Chris Hani Baragwanath, the largest in Africa, were chosen to administer the drugs (SAHO, 2015). The South African government's denial of HIV / AIDS had a significant impact on the health of most citizens (Kautzky & Tollman, 2008:26).

In May 2006, the then Deputy President, Mrs. Phumzile Mlambo-Ngcuka, mandated the NDOH to develop a guide for a new five-year National Strategic Plan (NSP) on HIV/AIDS

(SANAC, 2007) and sexually transmitted infections, for the years 2007-2011. The goals of the NSP were to present comprehensive care and treatment for people living with HIV and AIDS and to assist the reinforcement of the national health system. The aim of the NSP was to decrease the number of new HIV infections by 50% by 2011 and to lessen the impact of HIV and AIDS on individuals, families, communities and society by expanding access to an appropriate package of treatment, care and support to 80% of all people diagnosed with HIV (SANAC, 2007:2011).

The provision of treatment and care provided to persons living with HIV/AIDS has been expanding since the ART programme was rolled-out in 2004. Patients on ART had increased to an estimated 3.7 million in 2015 according to the Department of Health Information Systems (DHIS: 2015). The first rollout of ART was mostly hospital-based and doctor-led. However, the capacity of the health care system would have been surpassed if only doctors were responsible for initiating ART (Nyasulu, Muchiri, Mazwi & Ratshefola, 2013:232).

Stein, Lewin, Fairall, Mayers, English Bheekie, Bateman and Zwarenstein (2008:240) therefore explain that it was more feasible to deliver ART using an integrated primary health care (PHC) approach, since PHC in South Africa is conducted primarily by nurses. The most convincing reason for an integrated PHC approach was that this level of public health care reached most South Africans and was therefore the only way for the ART programme to reach all those who needed it.

The provision of ART was initially limited to authorised, accredited health care facilities because of the availability of doctors. ART services were located at hospitals since most PHC facilities were staffed by nurses. Doctors managed ART programmes and could initiate ART, conduct medical examinations and dispense ART. Nurses were not authorised to manage ART patients (Long, Brennan, Fox, Ndibongo & Jaffray, 2011:2).

A study that was conducted by Daviaud and Chopra (2008:146), focused on the human resources in the PHC system in South Africa. They predicted that the HIV/AIDS epidemic in South Africa would increase the need for HIV counselling and testing, prevention of mother-to-child-transmission of HIV (PMTCT), treatment of opportunistic infections and ART. Consequently, PHC staff requirements would increase and human resources in rural areas would be stretched to the maximum.

The solution was therefore to train more nurses in order to assist with the ART rollout and to spread the workload. It became clear that the pool of human resources were insufficient for the upscale of a sustainable ART programme that would provide life-saving treatment to all those in need. In the face of one of the most extensive HIV / AIDS pandemics in the world, a shortage of doctors existed and it became clear that non-physician models of health care delivery would be the obvious route to take in order to ensure sustainable ART programmes would be successful (Stein, Lewin, Fairall & Meyers, 2008:241).

In 2004, the South African HIV treatment guidelines were launched for the first time and thereafter revised in 2010. ART guidelines changes have been made to the eligibility criteria, drug regimens and monitoring protocols (Long *et al.*, 2011:2). Previously the eligibility to commence ART before August 2016, was to fast-track CD4 count ≤ 500 cells / μL or WHO stage 3 or 4, irrespective of CD4 count or clinical staging: This included all types of active TB disease, pregnant, breastfeeding women AND Hepatitis B virus (HBV) co-infection (National Consolidated Guidelines, 2015:72).

From 1st September 2016 the eligibility criteria was modified to the Universal Test and Treat (UTT) strategy. The following eligibility criteria to start patients on lifelong ART relate to all HIV positive children, adolescents and adults regardless of CD4 count. Patients with a CD4 ≤ 350 would be prioritised. Patients in the pre-ART and wellness programme would be considered for UTT. Treatment readiness and willingness to start ART would be evaluated. Patients who are not prepared to start ART after assessment shall be kept in the wellness programme and continuous counselling on the importance of early ART initiation, at every visit would be emphasised. Routine monitoring of baseline CD4 counts was recommended; Opportunistic Infection prophylaxis would be evaluated if the CD4 ≤ 200 ; identifying eligibility for Cryptococcal antigen (CrAg) if the CD4 ≤ 100 ; prioritisation the patients was to occur if their CD4 ≤ 350 and fast tracking if their results were CD4 ≤ 200 (NDOH, 2016).

In order to reach the goals set by the NSP (2007-2011), the South African government was involved in several national initiatives with the goal to increase ART access. A campaign was launched from July 2010 to June 2011, namely the HIV Counselling and Testing (HCT). It targeted 15 million people according to the South African National AIDS Council (SANAC, 2010:9).

Due to the need to increase ART access, accreditation of health care facilities for the provision of ART was abandoned. A presidential mandate was issued in April 2010 that ART must be available at all 5500 PHC centres and that nurses must be trained to prescribe and manage patients on ART. Empowering nurses to initiate ART resulted in 2552 PHC centres initiating patients by April 2011 (Nyasulu *et al.*, 2013). According to the latest data, 3591 PHC centres deliver ART's since March 2015 (DHIS, 2015:1).

In 2015, the World Health Organization (WHO) launched a new Consolidated Antiretroviral Guideline that recommended that antiretroviral therapy (ART) should be provided regardless of CD4 count for HIV-positive people of ages. The new consolidated ART guideline also recommended a new alternative first – and second – line regimen HIV Treatment Bulletin (HTB, 2015:1).

Although access to treatment has improved, the absolute number of People Living with HIV (PLHIV) is increasing by approximately 100 000 annually due to ARV treatment increasing the life expectancy of individuals with HIV and the new infections exceeding AIDS – related deaths. Given the nature of the current HIV epidemic, it is therefore foreseen that large numbers of people will need to be rolled for life-long treatment and retained in care for extended periods. This led to the new National Strategic Plan (NSP) HIV / AIDS, TB and STI for the period 2012 - 2016, which identifies five goals: one is to ensure that at least 80% of people eligible for antiretroviral treatment are receiving it by 2016 and 70% of people on antiretroviral therapy should be alive and on treatment after five years (SANAC, 2013:1). It is anticipated that 15 million people living with HIV/AIDS will be receiving antiretroviral therapy by the end of 2015 (DOH, 2012b:64).

To help end the AIDS epidemic by 2020, the UNAIDS set an ambitious 90-90-90 strategy target. This includes that by 2020, 90% of HIV infected persons know their HIV status, 90% diagnosed with HIV will receive ART and 90% of patients receiving ART will have viral loads that is suppressed. The aim of the post-2015 era is to eradicate the AIDS epidemic by 2030 which will ensure an increase in the health and economic benefits (UNAIDS, 2017:1-2)

2.5 TASK SHIFTING AND THE INTRODUCTION TO NIMART

HIV / AIDS have placed the sub-Saharan region's human resources under pressure because of the enormous expansion of ART programmes. Stein *et al.* (2008:240) explained eight years ago that the launching of a national antiretroviral treatment programme would create an urgent need for nurse training in ART delivery.

The “task shifting“ strategy in South Africa aimed to reduce the number of patients on ART managed by doctors and increase the number of patients managed by PHC nurses. Task shifting is a strategy that allows tasks to be shifted from higher cadres to health care providers with fewer qualifications and less training (WHO, 2008:2). A task shifting strategy in clinical care responsibilities is encouraged by the World Health Organization (WHO), international agencies and national governments. The WHO published guidelines on task shifting in 2008 in order to address human resource constraints and to ensure that more people who needed treatment for HIV/AIDS receive assessment and care (WHO, 2008:9). The guidelines for implementing the task-shifting approach are the participation of stakeholders; availability of resources, regulatory framework; incorporation with other basic health services and the training of health workers according to their requirement (WHO, 2008:6).

A meta-analysis on task shifting found that the strategy, when combined with other interventions and financial support, is effective in increasing access to ART (Edmin & Millson, 2012:318). In a systematic review, it was found that task shifting occurs in various settings other than HIV treatment programme and it is viewed as a key approach for governing human resources for health care. It may be an appropriate time to review current task shifting recommendations to embrace a wider range of programme and incorporate initiatives to address current challenges (Crowley & Mayers, 2015:3).

In 2004, a study was done by Uebel, Joubert, Wouters, Mollentze and van Rensburg (2013:1) to investigate the integration of HIV care into primary care services in the Free State. The intervention, called Streamlining Tasks and Roles to Expand Treatment and Care for HIV (STRETCH) focused on task shifting and integration of ART services into PHC and monitored the outcomes of patients needing ART. The aim of this intervention was to expand access to ART by moving assessment and treatment closer to patient's homes by providing both services at local clinics (George *et al.*, 2012:66).

This meant that nursing staff at local clinics needed to initiate ART and to be trained in this specialised field of assessment and care. It also required practical guidelines to guide Registered nurses in prescribing ART. The Practical Approach to Lung Health in South Africa and Management of HIV / AIDS (PALSA PLUS) was the product of their efforts and was implemented in 2004. The PALSA PLUS guideline was designed by experts in the clinical fields of medicine and nursing and was evidence-based. This flowchart-type guideline was evidence based, using symptoms to guide nurses to diagnosis and provide appropriate treatment (including referral to a physician). This guideline also ensures local applicability, consistency with national TB policies and essential (state supplied) drugs lists are met. The DOH requested the integration of nurse-initiated and managed antiretroviral treatment (NIMART) in the existing PALSA PLUS guidelines in 2005 but there was no clear national guideline. The capability of nurses prescribing ART safely was also a concern (George *et al.*, 2012:2).

PALSA PLUS helps to strengthen the overall health service. Updates for the programme occurred continuously. PALSA PLUS have clear guidelines and easy to follow algorithms and training programme. Studies suggest that PALSA PLUS training “felt less intimidating, more appropriate and better attuned to the realities of primary care level treatment and care” (Stein *et al.*, 2008:240).

Qualitative findings from the STRETCH trial revealed that patients and nurses appreciated the convenience of being able to access HIV care and ART at their local clinic, instead of travelling to a specific ART clinic (Uebel *et al.*, 2013:1). The manner in which various intervention sites approached the STRETCH programme and its implementation were different. A lack of direct clinical experience from STRETCH trainers was challenging. Nurses that had a strong support system developed good clinical confidence (George *et al.*, 2012:10).

There were variations in the pace in which sites were implementing the STRETCH-training. The STRETCH-training was implemented in three phases including: re-prescribing, decentralisation, and nurse-initiation. Certain sites struggled to meet the basic requirements; it took them more than 10 months to progress through the phases, instead of 4-6 months. Health systems were already challenged by infrastructural and logistical limitations. Limitations included resources constraints, pharmacy re-structuring, and information and transport system problems. Furthermore, NIMART increased the administration workload of nurses (George *et al.*, 2012:10).

Nurse-monitored ART was found to be non-inferior to doctor-monitored therapy in a randomised controlled study undertaken by the Comprehensive International Programme for Research in AIDS in South Africa (CIPRA-SA) from February 2005 to January 2009 (Sanne, Orrell, Fox, Conradie, Ive, Zeinecker, Cornell & Heiberg, 2010: 33). Findings from this study lend support to task shifting to appropriately trained nurses for monitoring of ART. A systematic review on task shifting by Callaghan, Ford and Schneider (2010:1), concluded that task shifting could offer high quality, cost-effective care to more clients than a physician-centred model.

However, due to the lack of a clear directive for task shifting to support the strategies outlined in the National Strategic Plan (2007-2011), access to ART remained problematic. This led to an announcement by the President, Jacob Zuma, on the 1st December 2009, that new key interventions to improve antiretroviral treatment access to special groups in order to decrease the disease burden, to address maternal and child mortality and to improve life expectancy should be implemented (DOH, 2010:4; SANAC, 2007). One of these interventions included the implementation of nurse-initiated and managed antiretroviral therapy (NIMART) and the decentralisation of HIV services to primary health care (PHC) facilities.

Soon after this announcement, acting Director-General, Dr Yogan Pillay, issued a directive on the first of April 2010 that professional nurses in the public sector may place their clients (children, adults and pregnant women) on antiretroviral drugs using the predetermined national regimens, re-prescribe using those regimens and manage stable clients (DOH, 2010:4). Technical partners with training expertise were identified and asked to contribute to the effort to prepare nurses for the expansion of ART services. By April 2012, over 10 000 nurses were trained to initiate and manage clients on antiretroviral therapy (DOH, 2012b:15). NIMART was implemented in 2010. There was an increase in the initiation of ART by nurses after completion of the NIMART rollout. The retention of patients on ART was strengthened by the decentralisation of ART services. NIMART has proved to be economical, improving access and not inferior to doctor-managed ART (Nyasulu *et al.*, 2013:232-234).

Nurse-initiated and management of antiretroviral therapy (NIMART) requires nurses to assess, diagnose and manage clients with HIV, whether it involves initiating antiretroviral therapy, re-prescription of stable clients on ART, or appropriate referral to physicians. Nurses therefore need to be equipped with skills such as history taking, physical assessment, interpretation of

laboratory results and knowledge about the pharmacological and interaction of antiretroviral drugs (Morris, Chapula, Chi, Mwangi, Chi, Mwanza, Manda, Bolton, Pantratz, Stringer & Reid, 2009:3).

In South Africa, the criteria for the NIMART programme are:

- Registration with the South African Nursing Council as a registered nurse;
- Completion of the prescribed national training programme for nurses initiating antiretroviral treatment and managing HIV and AIDS clients according to the national guidelines;
- Access to and experienced clinician who can provide support in initiating antiretroviral treatment and managing HIV and AIDS clients according to the national guidelines;
- Adequate and timely mechanisms are in place to allow for referrals by a nurse to facilities that can offer an appropriate level of care that is beyond the competences and related scope of practice;
- On-going clinical mentoring and support of nurses beyond the initial training event (DOH, 2010:4).

It is important that the abovementioned criteria be in place to ensure the success of NIMART.

2.6 FACTORS INFLUENCING THE SUCCESS OF NIMART

In the STRETCH trial, nurses accepted NIMART well. However, some health care facilities resisted implementation. In these facilities, health care workers felt they had not had ample capacity to manage logistical tasks of nurse-initiation. There was a greater apprehension about health system constraints than about clinical practice. Challenges were not specific to NIMART but also to other programme. Nurses' clinical confidence to implement NIMART was influenced by different factors. Guidelines needed to flow in an orderly algorithm, the nurse needs to be familiar with the guidelines, the pace of each site to phase in the intervention, the clinical support, effective training and the supervision from doctors on-and- off-site (George *et al.*, 2012).

2.6.1 Training

Task shifting should result in an equivalent standard of care that is provided by the higher cadres of health workers. The WHO (2008:2) recommends that: "countries should adopt a

systematic approach to harmonised, standardised and competency-based training that is needs-driven and accredited so that all health workers are equipped with the appropriate competencies to undertake the tasks they are to perform”.

The International Council of Nurses (ICN, 2008) have recognised the need for competency-based orientation of clinicians, continuing competency validation as part of licensure renewal, and the critical need to have evidently identified competencies to sustain the efficient and effective utilization of resources, including human resources, in the delivery of nursing care. As defined by WHO professional competence “is the ability to effectively and efficiently deliver a specified professional service” (WHO, 2008:79). Competence is comprised of three elements knowledge, skills, and attitudes (ICN, 2008; WHO, 2008:79).

In a discussion between the DOH and key stakeholders in 2010, it was decided that the “prescribed training” should consist of a basic HIV/AIDS course, PULSA PLUS training (Practical Approach to Lung health in South Africa: guidelines for managing common primary health care problems including HIV), IMCI (Integrated Management of Childhood Illnesses, including ART), and a period of mentoring (Personal communication: Thabile Msila, NDOH: Human Resource Strategic Programmes, November 2012). The Knowledge Translation Unit (KTU) is a Clinical Research Unit of the University of Cape Town Lung Institute whose work originated in 2000 to provide primary care guidelines and training on respiratory disease. The KTU was formally established in 2005. They provide a guideline that was initially implemented as the Primary Care 101, in the Eden district of Western Cape of South Africa. The guideline was rebranded in 2012 as the PACK (Practical Approach to Care Kit) Adult which is a broad clinical practice guideline that aims to prepare nurses and other clinicians to diagnose and manage common adult conditions at primary level (Folb, Lund, Fairall, Timmerman, Levitt, Steyn & Bachmann, 2015, 15:1194). PULSA PLUS was replaced by the PACK guidelines since 2013 that also consists of the HAST module aimed at providing NIMART training.

In 2010, numerous patrons began to train nurses and by 2012, reported numbers of nurses trained in NIMART exceeded 10 000 (DOH, 2012b:3). One of the studies that contributed significantly to the adoption of NIMART was a study that compared nurse versus doctor management of HIV-infected patients receiving antiretroviral therapy (Sanne *et al.*, 2010:33-40). Concerns acknowledged in this study were that in both the doctor and nurse groups, antiretroviral failure rates were in excess of 40%, which was unacceptable and did not reflect

quality of care. All the nurses that participated in this study were clinical nurse practitioners that had a diploma in Health Assessment, Treatment and Care and they received additional training in HIV and ART. This course provided nurses with the necessary training to be authorised to assess, diagnose and prescribe treatment according to the Nursing Act (33 of 2005) (SANC, 2005). However, a randomised controlled trial reported that nurses could provide comprehensive ART care, including ART initiation, after just four additional short training sessions (Fairall *et al.*, 2012:898). The authors did not comment whether the nurses in training had any previous qualifications. Cameron *et al.* (2012:98-100) conducted a survey on a sample of nurses trained in NIMART and found that 55% had formal training in Health Assessment, Treatment and Care and 70% had previously attended formal training courses in PMTCT and in the management of HIV and TB.

Even though different types of training have been offered for nurses to initiate and manage antiretroviral treatment, there is very little research available on the evaluation of the different training courses and the training outcomes. A study found that 62% of nurses that have been trained for NIMART were initiating patients on antiretroviral therapy in the clinics where they were working (Cameron *et al.*, 2012:98-100). Sixty percent (60%) of the nurses that trained passed the open book exam and data from telephonic interviews indicated that 62% of the nurses who failed were also initiating patients on ART, which questions their competency to be able to initiate and manage patients on antiretroviral therapy.

Therefore, it is clear that courses and programmes have not yet been standardised in terms of content, methodology and assessment approaches. There are currently no single course / curriculum / assessment criteria for NIMART that is implemented nationally, since the South African Nursing Council does not yet register any short courses for continuous professional development (CPD). There is also a lack of evidence of the effectiveness of these courses to improve clinical practice, health indicators and patient outcomes on a larger scale.

2.6.2 Certification

WHO recommends that: “training programmes and continuing educational support for health workers should be tied to certification, registration and career progression mechanisms that are standardised and nationally endorsed” (WHO, 2008). One of the barriers to task shifting is professional and regulatory policy change to expand the scope of practice for Registered nurses to be able to prescribe antiretroviral therapy and perform tasks that are not traditionally part of

their scope of practice (WHO, 2008:2).

Nurses trained through NIMART are not currently certified through the South African Nursing Council, as the council does not make provision for the registration of short courses. This lack of acknowledgement and authorisation by the official nursing governing body was found to be very demoralising (Orner *et al.*, 2010:18).

A NIMART model with specific requirements was implemented in the Western Cape Department of Health that will lead to certification and authorisation to prescribe ART. Requirements are that they should complete any basic HIV / AIDS management course, receive PALS PLUS training and have an additional 40 hours of clinical mentoring with an experienced ART clinician. Nurses then receive authorisation to prescribe under section 56 (1-6) of the Nursing Act (33 of 2005) (SANC, 2005; Green *et al.*, 2014:2)

2.6.3 Mentoring

Although special didactic training is essential, it is too brief and not sufficient in itself to result in sustained changes in clinical practice and therefore on-going mentoring is needed to build problem-solving capacity and leadership (Morris, 2009:3; Orner *et al.*, 2010:46-47).

In 2011, the DOH published a Clinical Mentorship Guideline for integrated services that aimed to explain the process of the certification of nurses that complete NIMART and to provide guidelines for continuous mentoring. The guideline advocates a model where competency can only be acquired through clinical mentorship and continuous assessment (DOH, 2011:4). The expected outcomes of the clinical mentoring model are improved technical skills, knowledge and clinical decision-making by mentees, but also patient clinical outcomes. The guideline advises that clinical practice should be assessed through record review, interviews and client chart reviews. The mentor should continuously evaluate the performance of the mentee. Mentees should maintain a logbook of patients examined and treated under the guidance of the clinical mentor. A list of competencies required by NIMART nurses are available with which nurses are required to assess themselves and it includes a list of the minimum required number of patients in each category. However, no clear guidelines are given as to how long the mentoring process should be or who decides if a nurse is competent or not and it appears as if it is left to the discretion of the mentor.

A research study in Lusaka, Zambia describes that the goal of mentoring should be to acquire skills to competently initiate and manage patients according to established clinical protocols, for a minimum period of two months. Following this period, competency is assessed at the completion of the mentorship programme by means of a standardised evaluation tool in structured clinical settings. Furthermore, since the intensive nature of clinical officer and nurse training, "team leaders" for both cadres are selected on-site, with the expectation that they will maintain training other members of staff during and upon completion of this clinical mentorship (Morris *et al.*, 2009:3). A recent study in Khayelitsha South Africa showed increased confidence of nurses to manage patients on ART after mentorship (Green *et al.*, 2014:1).

One of the constraints of mentoring is that the mentor should be an experienced clinician. Supportive supervision and clinical mentoring should be frequently provided to all health workers inside the structure and functions of health teams. Individuals who are tasked with providing supportive supervision or clinical mentoring to health workers to whom tasks are being shifted should themselves be competent and have appropriate supervisory skills (WHO, 2008:2).

A key informant in a study on perspectives of task shifting commented that the mentoring process is not working very well due to service provider constraints (both nurses and doctors are too busy for mentoring) (Orner *et al.*, 2010:16).

2.6.4 Health systems and support

The lack of health system resources and support, inadequate infrastructure, lack of equipment, inadequate ventilation and patient waiting rooms have been identified as barriers. Furthermore the paper-based management systems, lack of guidance from managers, no norm or standard mode of practice, increasing workload and unresolved remuneration issues have been identified as barriers to the implementation and efficiency of task shifting (Orner *et al.*, 2010:46-47). Previous barriers recognised is a shortage of nurses working at primary care facilities. Additional barriers were lack of additional consulting rooms, arranging additional training in clinical skills and pharmacology, together with the expansion of clinical mentoring (Cameron *et al.*, 2012:98-100). Health systems were already challenged by infrastructural and logistical limitations. Limitations included resources constraints, pharmacy restructure, information systems problems and transport. NIMART resulted in increased administration workload of

nurses (George *et al.*, 2012:66).

In every site, there was a shortfall of all categories of primary health care workers. Human resources shortages included nurses, doctors, pharmacists and social workers. Nurse workload increased through task shifting from doctors' tasks to nursing tasks (George *et al.*, 2012:66).

2.6.5 Continuous quality assurance

The WHO (2008:2) recommends that countries implementing task shifting should guarantee that the performance of all cadres of health workers are assessed alongside clearly defined roles, competency levels and standards. Morris *et al.*, (2009:9.5) illustrates how a comprehensive continuous quality assurance programme for task-shifting was implemented through : “(i) evaluation of clinical care via targeted chart reviews and monthly site reports from electronic medical records; (ii) feedback and training in areas of poor site performance, and (iii) an exchange programme between clinics to improve overall clinical quality”.

2.7 SUMMARY

Great progress in enhancing the quality of life of people living with HIV/AIDS, through ART programmes, had been made through in the years. Nurses were empowered to administer and initiate ART, which broadened the support and care to patients including bringing treatment to the doorstep of patients at local clinics. Accessibility of ART is made possible by decentralising services to primary health care centres. Professional nurses have been trained and mentored in initiating ART.

2.8 CONCLUSION

ART initiations at primary health care centres decreased the burden on hospitals in South Africa. Hospitals could concentrate on cases that are more complex. The researcher is therefore of the opinion that in order to ensure that high quality and effective antiretroviral treatment does take place, registered nurses needs to be evaluated on their knowledge and confidence. Otherwise, if training does take place and transfer of skills does not occur, but the attitude of staff may cause the implementation of ARTs to be ineffective and the quality of life of patients is not enhanced.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter provides an in-depth discussion of the research methodology that was applied to investigate factors that influence the HIV management confidence and knowledge of professional nurses prescribing ART in a rural and urban district in the Western Cape. The study setting, research design, population and sampling, instrumentation, pilot study, data collection and data analysis methods are discussed.

3.2 AIM AND OBJECTIVES

The study aim was to determine the factors that influence the HIV management confidence and knowledge of professional nurses prescribing ART in a rural and urban district in the Western Cape.

The objectives were to:

- Determine the HIV management confidence of nurses prescribing ART.
- Determine the HIV management knowledge of nurses prescribing ART.
- Evaluate whether individual and health system factors such as training, continuous mentoring and experience were associated with confidence ratings and knowledge scores.

3.3 STUDY SETTING

The study was conducted in primary health care clinics in the Western Cape. One urban and one rural district were included. These were the City of Cape Town (City Health) and the Cape Winelands districts. After receiving authorisation from the City of Cape Town (urban), all the sub-districts approved the research. In the Cape Winelands (rural) district, only three sub-districts (Drakenstein, Witzenberg and Stellenbosch) approved the research. Two other sub-districts in Cape Winelands declined the study, namely Breede-Valley and Langeberg.

In the Cape Winelands, participants from 23 primary healthcare (PHC) clinics participated and in the City of Cape Town, participants from nine of the 29 PHC clinics that rendered ART services took part. In the rural areas (Cape Winelands), the PHC and mobile clinic settings are different compared to the urban setting. For example, in the Cape Winelands, mobile clinics are used to provide a service to the farm communities. In the Stellenbosch, Witzenberg and Drakenstein sub-districts, the professional nurses who work in the PHC clinics deliver comprehensive health care called the “One Stop Shop”. This means that all the services are provided by one primary health care trained professional nurse. These services include reproductive health, antenatal care, NIMART, TB treatment, child health, Integrated Management of Childhood Illnesses (IMCI), curative services for adults and paediatrics, and chronic disease management. The Community Day Centres (CDC’s) in the same area are larger. These CDC’s have fragmented services delivered by different PHC professional nurses. For example, professional nurses are allocated to provide a curative service either to adults or paediatrics, NIMART or chronic disease management. Mobile clinics also render a comprehensive service.

In the urban areas (City of Cape Town), the manner in which PHC services are delivered also varies. In some clinics, the PHC professional nurses deliver comprehensive health care through the “One Stop Shop”. The Community Health Centres (CHC’s) in the same area have fragmented services and professional nurses are allocated to specific PHC services. Most clinics (in rural and urban settings) are located in the not so affluent / disadvantaged communities, while other clinics are in middle class communities. Most of the PHC clinics are situated in Black and Coloured communities. Clinics are accessible for everybody. Most clinics are within walking distance of patients’ homes. In the rural areas, the mobile clinics attend to patients on farms once a month. Services are provided daily on different farm routes with a four-week cycle. If patients are sick and the mobile clinic is not on their farm route, they have to attend the clinic that from which their mobile clinic originates. For example, the patients from Devon Valley mobile clinic have to attend or access Idas Valley clinic, which is at least eight kilometres away.

3.4 RESEARCH DESIGN

According to Grove *et al.* (2013:195), a research design is the blueprint for conducting a study. Quantitative research is defined by Grove *et al.* (2013:706) as a formal, objective and

systematic study process to describe and test relationships and to examine cause and effect interactions among variables.

A non-experimental, quantitative research approach was applied to identify the factors influencing the HIV management confidence and knowledge of professional nurses prescribing ART in the Western Cape. Since NIMART training is operational for the past six years and is in its implementation phase, an analytical, cross-sectional study design was deemed appropriate to measure these factors at one point in time (Grove *et al.*, 2013:691). Cross-sectional analytical designs are used to determine the existence and magnitude of relationships between independent variables and a dependent variable of interest. The research design is also referred to as a descriptive correlational design. According to Polit and Beck (2014:159), researchers use this type of design to examine the relationships between variables without manipulating the variables.

3.5 POPULATION AND SAMPLING

According to Grove *et al* (2014:509), the population refers to a particular group of individuals, or elements, who are the focus of a research project. Sampling is a sub-group of the population that is selected for inclusion in a specific study (Grove *et al.*, 2014:509).

According to the NIMART authorisation list obtained from the DOH in October 2014, there were 372 nurses authorised in NIMART in the Western Cape in six districts: Overberg (12); Eden (93); Cape Winelands (96); Central Karoo (6); West Coast (5) and Cape Metro pole - (City of Cape Town) (160). The districts were stratified into rural and urban districts and the rural and urban district with the most nurses trained in NIMART was purposefully selected for the study. These two districts were City of Cape Town (urban) and Cape Winelands (rural).

Based on a list obtained from the Department of Health, 256 nurses were authorised to prescribe NIMART in the two selected districts. However, when the researcher contacted the individual clinics, only 146 authorised nurses (67 in the City of Cape Town and 79 in the Cape Winelands) met the inclusion criteria for the study and were currently working in the clinics of the sub-districts that granted permission for the research. As advised by a statistician, all the nurses authorised to prescribe NIMART in the two selected districts (N=146) were invited to participate in order to account for the clustering effect in the sub-districts and for participants

who did not complete the questionnaire or refused to participate.

Forty participants refused to participate in the study and a further 21 participants could not be approached. The reasons for the potential participants refusal was that they were 'not interested' in participating, too busy doing other research, or 'physically exhausted'. In some cases, no reason was provided for declining and in other instances; the potential participants were on leave. In addition, the researcher could not approach the staff members at one clinic, since the facility manager declined the research. .

In the Cape Winelands, 49 (69% of the accessible population in the district) participants completed the questionnaires, 18 (25%) refused to participate and four (6%) were absent, on leave or not available when the research was conducted. In the City of Cape Town, 28 (42% of the accessible population in the district) participants completed the questionnaires, 22 (33%) refused to participate and 17 (25%) were absent, on leave or not available when the research was conducted.

From the 85 participants that agreed to participate in the study, eight participants from the Cape Winelands district were included in the pilot study and therefore excluded from the main study. For the main study, the researcher distributed 77 questionnaires and 77 questionnaires were returned, a 100% response rate.

In order to test the hypotheses that nurses with recent training and / or continuous mentoring would have higher confidence and knowledge ratings, pre- and post- test data from a pilot study done at Stellenbosch University on students who completed a six months HIV / TB competency training course was used to calculate the sample size (Crowley, 2014:1). Based on the mean differences and standard deviations in the knowledge and confidence ratings, a sample size of 34 in the exposed group (recently trained) and 68 in the non-exposed group (not recently trained) was needed (95% confidence; 80% power). The number of participants in each of these groups could however only be determined when the data were analysed and is discussed further in chapter four.

3.5.1 Inclusion criteria

Registered nurses who had been authorised to prescribe ART in the selected districts for a minimum of one year.

3.6 INSTRUMENTATION

A self-completion questionnaire (Appendix 4) was designed by the supervisor and researcher based on the literature and a previous instrument. The questionnaire included closed-ended questions about the demographic details, influencing factors, HIV management confidence and HIV management knowledge. One open-ended question was included.

The study supervisor and the researcher used the South African Clinical Mentorship Manual for Integrated Services (2011) as an organising framework to develop the questionnaire. The sections of the instrument related to knowledge and confidence consisting of items (questions) asking participants to rate their confidence using a Likert-type scale (1 through 4) and multiple choice knowledge questions. The confidence and knowledge items were pilot tested on nursing students before and after the completion of a competency-based course in HIV / TB management at Stellenbosch University. The Cronbach's alpha for the competency items was 0.94 (Crowley, 2014:1). For the purpose of the study, only items that measured HIV management competencies and knowledge for adult care was included. Items measuring demographic and influencing variables and an open-ended question were also included.

The final questionnaire was validated by five experts in the field of HIV/AIDS, research and nursing. Experts were asked to rate the clarity and relevancy of the items in the questionnaire. Their feedback was incorporated in the final questionnaire. In addition, two experienced clinicians working for the City of Cape Town made suggestions for further improving the clarity of the questions. The researcher and supervisor also consulted with a statistician. The questionnaire took 25 to 60 minutes to complete and had five sections. Each of these sections will now be discussed.

3.6.1 Section A (questions1-4)

Section A consisted of the participant's demographic data that includes gender, age, highest professional qualification and current function / job.

3.6.2 Section B (questions5-32)

Section B gathered information about individual and health system factors such as HIV management experience, training, quality assurance mechanisms, continuous mentoring, support, workload and general satisfaction. The questions included closed-and open-ended questions and measured on five-point Likert scales. The participants were required in the close-

ended questions to choose from a set of alternatives, for example, a ‘yes’ or ‘no’ response, multiple choice questions, checklist-type questions or frequency options. Open-ended questions were included where it was necessary for participants to explain their response.

Section B was divided into five sub-sections: HIV management experience, training, continuous mentoring and support, health system support, workload and general satisfaction and quality assurance mechanisms.

3.6.3 Section C (questions33-54)

Section C gathered information about how confident the participants were about their ability to perform specific HIV related clinical skills. A Likert-type scale (1 through 4), was used:

Not at all confident: I do not know how to do this task;

Somewhat confident: I can perform this task with support;

Extremely confident: I am able to do this task and consider myself competent / proficient;

I consider myself an expert and can teach this skill to others.

Questions included skills such as triaging, urgent referral of people living with HIV, performing a physical examination, identifying opportunistic infections, co-morbidities and eligibility for ART.

3.6.4 Section D (questions55-80)

Section D consisted of multiple choice knowledge questions. The participant was required to select only one answer. There was one open-ended question where they were requested to explain what a viral load is. Questions focused on the knowledge required to perform HIV management skills.

3.6.5 Section E (question 81)

Section E was an open-ended question that gathered information from participants about anything that could help them to improve their confidence and knowledge in managing patients living with HIV.

3.7 PILOT STUDY

Grove *et al.* (2013:343) stated that a pilot study is done before the main study. It is a smaller version of the main study, conducted to improve the methodology. Eight participants in the Cape Winelands district were randomly selected from the PHC clinics to participate in the pilot study. The participants who first agreed and were available to participate took part. The researcher worked in Stellenbosch sub-district and these participants were easily accessed. The pilot was conducted in the rural district because the purpose was only to identify any unclear questions. The pilot test included participants with various language backgrounds and I could therefore test if the questions were understood by all. The pilot study was performed to evaluate if the participants understood the informed consent forms and the questions in the questionnaire and to assess how long it took them to complete the questionnaire. The pilot study data were captured in order to do preliminary descriptive analysis and create a template for data entry for the main study. No changes were made to the questionnaire. The pilot study data were excluded from the main study.

3.8 RIGOUR

Bowling (2014:160) states that the perception of rigor is applicable in relation to the reliability and validity of the data and the reduction of bias. Rigour refers to several essential descriptions of the research design. It can include the following: i) the attentiveness of the significance of interpretation and not perception or assumption, ii) the systematic and meticulous collection, analysis and interpretation of the data, iii) the maintenance of meticulous and detailed records, and iv) the skill of an independent, trained investigator to re-analyse the data using the same processes and methods and attain the same conclusions.

The researcher ensured rigour by strictly following the research methodology as set out in the study proposal under the supervision of the study supervisor, carefully recorded and described the data collection and analysis procedures, kept accurate records of raw data and data analysis files and interpreted the findings with the assistance of a statistician.

3.8.1 Validity

Polit and Beck (2014:745) state that validity is a quality criterion referring to the amount to which inferences made in a study are accurate and well founded. In measurement, an instrument measures what it is intended to measure to the degree. For ensuring instrument validity, the

researcher made use of content and face validity.

Content validity is the degree to which the items in an instrument adequately represent the universe of content for the concept being measured (Polit & Beck, 2014:723). Content validity can be measured with a validity coefficient. The validity coefficient is an index, usually ranging from 0 to 1, yielding an estimate of how valid an instrument is.

Face validity is often confused with content validity, but it is more superficial according to Bowling (2014:174). It simply refers to the investigators' subjective assessments of the presentation and relevance of the questionnaire. For example, do the questions appear to be relevant, reasonable, unambiguous and clear?

Face and content validity were ensured by making use of the literature, a review of the instrument by experts in the field of HIV and the pilot study. Content validity was determined by calculating a Content Validity Index (CVI) for each item (called the I-CVI) in the questionnaire based on the feedback of five experts. I-CVI was calculated by determining the percentage of experts who rated the specific item as relevant. For an item to be considered relevant, 4 of the 5 experts had to rate the item as relevant (an I-CVI of 0.8) (Polit & Beck, 2017:311). For six items in the questionnaire, one of the five experts rated the item as not relevant (an I-CVI of 0.8). However, this is still acceptable according to the literature. For the remaining items, all the experts rated the items as relevant (an I-CVI of 1). They made suggestions to improve the clarity of items and these suggestions were incorporated in the final instrument.

3.8.2 Reliability

Reliability is the degree of consistency or dependability with which an instrument measures an attribute according to Polit and Beck (2014:741). The reliability coefficient is a quantitative index, usually ranging in value from 0 to 1 that provides an estimate of how reliable an instrument is. Composite scales are evaluated for internal consistency and it is the most widely used reliability approach in nursing research. Internal consistency is evaluated by calculating the coefficient alpha or Cronbach's alpha (Polit & Beck, 2014:203).

The Cronbach's alpha coefficient was used to establish the reliability of the Likert scale items

that measured confidence. The previously reported Cronbach's alpha for the confidence items was 0.94 (Crowley, 2014:1). In this study, the Cronbach's alpha for the 22 confidence items was 0.95. The higher the coefficient, the more accurate the measure is. A Cronbach's alpha of above 0.8 is considered acceptable (Polit & Beck, 2014:203).

3.9 DATA COLLECTION

Ethics approval was obtained from the Health Research Ethics Committee (HREC) at Stellenbosch University. Permission was obtained from the Department of Health by registering the study online via the National Health Research Database. The Western Cape Province, Worcester district head office and the appropriate Medical Superintendents from the chosen sub-districts approved the study. Thereafter, permission was obtained from the PHC managers from the Cape Winelands before the PHC clinics could be approached. Approval for the City of Cape Town was obtained through applying on their City of Cape Town Research Database website. After receiving authorisation from the City of Cape Town, the sub-districts approved the research.

The researcher contacted the sub-districts who agreed to participate via email and thereafter this was confirmed telephonically. Dates, times and venues were set by the individual participants at convenient times in their own clinics. Written informed consent was obtained from participants and they were informed that the data would be used for research purposes. Participation was voluntary and participants could withdraw at any time. All data was handled in a confidential manner and only the researcher, study supervisor and statistician have access to the original data. No participant names were recorded on the questionnaires to ensure anonymity. Minimal risks or discomforts were experienced by participants since dates, times and venues for completion of questionnaires was arranged at their preference. Although the researcher is NIMART trained, she is not in an HIV/AIDS/STI/TB (HAST) managerial position and was therefore not personally known to the participants.

Before commencing the research, a fieldworker was trained and informed about the questions that may arise during completion of the questionnaires. The trained fieldworker assisted with data collection for one day only in the Witzenberg sub-district because of the long distances between the clinics and the availability of participants for that specific day.

The questionnaire took between 25-60 minutes to complete. The fieldworker and researcher obtained informed consent and supervised the completion of the questionnaires individually. Most participants completed it in their consulting room or in the tea room if it was not occupied. The researcher or fieldworker answered questions if there were any uncertainties. The signed consent form and questionnaire were placed in an envelope and kept at a secure place known to the researcher. Data collection took place between September 2015 and March 2016. Several participants declined to participate due to various reasons as stated before. Participants who declined to participate were not forced to participate and were treated with respect, politeness and dignity.

3.10 DATA ANALYSIS

Quantitative analysis is the manipulation of numeric data through statistical procedures for the purpose of describing phenomena or assessing the magnitude of relationships among variables (Polit & Beck, 2014:739).

Data were entered into Microsoft Excel, imported and analysed with a statistical analysing programme, IBM SPSS (version 23). The captured data were individually verified by the researcher. Furthermore, the data was sent to the study supervisor and a preliminary descriptive analysis was performed to identify any obvious data entry errors. Discrepancies were pointed out and rectified by the researcher.

A statistician from the Biostatistics Unit at the Faculty of Medicine and Health Sciences assisted with the statistical analysis. HIV management confidence and knowledge were measured as continuous variables by calculating the total scores. Descriptive statistics were used to describe the data and appropriate statistical tests were used to test for relationships between influencing factors, HIV management confidence and knowledge. The type of statistical test depended on the level of measurement of the independent and dependent variables.

Levels of measurement, as cited in Grove *et al.* (2013:385), refers to the rules for assigning numbers to objects so that a hierarchy in measurement can be established. It is also mentioned that the levels of measurement, from lower to higher, are nominal, ordinal, interval and ratio.

Descriptive statistics are used to describe the data and inferential statistics to make inferences about the population (Polit & Beck, 2014:215). Descriptive statistics include frequency distributions for nominal and ordinal level variables and measures of central tendency (mode, median and mean) and variability (standard deviation (SD), interquartile range (IQR) and range for continuous (interval and ratio) variables. Descriptive statistics were performed for each of the variables in the study.

Inferential statistics are based on the laws of probability and are used to test for relationships between variables. Inferential statistics are computed to depict conclusions and create inferences about the greater population based on the sample data set (Grove *et al.*, 2013:542).

As explained below, there are two classes of inferential statistics: parametric and non-parametric statistics.

Parametric statistical analyses are commonly used. The analysis is referred to as parametric statistical analysis because the findings are inferred to the parameters of a normally distributed population. **Non-parametric statistical** analysis, or distribution-free techniques, can be used in studies that do not meet the assumptions of a normal distribution and do not have at least interval level data (Grove *et al.*, 2013:542). Due to the fact that these statistics have lower statistical power, many researchers choose to submit ordinal data to parametric statistical procedures. If the instrument or measurement procedure yielding ordinal data has been rigorously evaluated, parametric statistics are justified (Pallant, 2016:230). For example, researchers often analyse data from a Likert scale with strong reliability and validity as though they are interval level data. A level of significance of $\alpha \leq 0.05$ was used in this study.

3.10.1 Chi-square test

According to LoBiondo-Wood and Haber (2010:575) the Chi-square test is a non-parametric statistic that is applied to verify whether the frequency found in each category is different from the frequency that would be expected by opportunity.

3.10.2 T-test

According to Grove, Gray & Burns (2014:513), a t-test is a parametric analysis technique, used to establish differences between the mean values of two samples or groups. For example, the mean knowledge scores (continuous variable) of nurses who received recent training and nurses who did not receive recent training (nominal variable). A continuous variable is a

variable that can take on an infinite range of values along a specific continuum (Polit & Beck, 2014:723). A nominal variable or categorical variable have two or more categories without having any kind of natural order. They are variables with no numeric value.

3.10.3 Mann-Whitney U

The Mann-Whitney U test is used to determine differences between two independent groups on a continuous measure. Instead of comparing means, as in the case of the t-test, it compares medians. It is the non-parametric alternative for the independent samples t-test (Pallant, 2016:230).

3.10.4 ANOVA test

The ANOVA test is a statistical procedure for testing mean differences among three or more groups. It compares variability between groups with variability within groups, yielding an *F*-ratio statistic (Polit & Beck, 2014:719).

3.10.5 Kruskal-Wallis test

The Kruskal-Wallis test is a nonparametric test used to measure the difference between three or more independent groups and is based on ranked scores (Polit & Beck, 2012:732). It is the non-parametric alternative for the ANOVA test.

3.10.6 Pearson's product-moment correlation coefficient

Pearson's product-moment correlation was the first of the correlation measures developed and is the most commonly used (Grove *et al.*, 2013:561). This coefficient (statistic) is represented by the letter *r*, and the value of *r* is always between -1 and +1. A value of zero indicates no relationship between variables. The correlation coefficient is used to determine the relationship between two variables measured at least at the interval level of measurement.

3.11 SUMMARY

This chapter provides the reader with detailed information regarding the research methodology of this study. The research methodology regarding the aim, study setting, population, sampling, instrumentation, pilot study, data collection and data analysis were discussed. The results are presented and discussed in the next chapter.

CHAPTER 4: RESULTS

4.1 INTRODUCTION

Chapter 3 focused on the research design and the processes of the research. This chapter provides data analysis and interpretation of the study results and follows the outline of the questionnaire (Appendix 4) used for data collection. The data in this study was analysed with the support of a statistician, using computerised data analysis software, namely, IBM Statistical Package for the Social Sciences (IBM-SPSS version 24). The quantitative data were carefully captured to ensure accuracy. The data is predominantly presented in frequency tables and graphs. Decimal numbers were rounded to the first decimal. Descriptive statistics were performed for each of the variables in the study. The statistical tests that were used were the Chi-square, the T-test, Kruskal-Wallis, ANOVA and correlation coefficients, with a level of significance of $\alpha < 0.05$.

4.2 SECTION A: DEMOGRAPHIC DATA

Section A was divided in demographic data related to the facility or clinic and demographic data of the individual participants.

4.2.1 Facility demographic information

In the front of the questionnaire, there was a section consisting of 11 questions for the researcher to complete. This facility data are presented first. Data presentation includes the district and sub-districts, types of facilities and the facility details such as services rendered and number of staff.

Districts

The research occurred in the Cape Winelands and City of Cape Town districts as displayed in Table 4.1 below. Most of the participants ($n=49$, 63.6%) were from the Cape Winelands district and only ($n=28$, 36.4%) were from the City of Cape Town. Most of the facilities participants were recruited from ($n=20$; 69%) were in the Cape Winelands.

Table 4.1: Number of participants and facilities according to district

Response options	Participants (n=77)		Facilities (n=29)	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Cape Winelands	49	63.6	20	68.9
City of Cape Town	28	36.4	9	31.1
Total	77	100	29	100.0

Sub-districts

The two districts were further divided into sub-districts and Table 4.2 below shows the sub-districts that were included in the research. The sub-districts with the highest representation of participants were Drakenstein (n=27; 35.1%); Khayelitsha (n=15; 19.5%); Witzenberg (n=12, 15.6%) and Stellenbosch (n=10; 13%). Most of the health care facilities participants were recruited from, were in the Drakenstein sub-district (n=11; 37.9%). This was also the district with the most health care facilities and participants were generally willing to participate in the study.

Table 4.2: Number of participants and facilities according to sub-district

Response options	Participants (n=77)		Facilities (n=29)	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
Drakenstein	27	35.1	11	37.9
Khayelitsha	15	19.5	5	17.2
Witzenberg	12	15.6	4	13.8
Stellenbosch	10	13.0	5	17.2
Eastern Sub-district	6	7.8	1	3.4
Northern Plain	3	3.9	1	3.4
Western sub-district	2	2.6	1	3.4
Northern sub-district	2	2.6	1	3.4
Total	77	100	29	100.0

Type of facilities

In Table 4.3 the number of participants in different types of facilities in the Districts and sub-districts are displayed and 53.2% (n=41) of participants worked in Primary Health Care clinics, while 39% (n=30) worked in Community Day Care facilities. Only 5.2 % (n=4) worked in Community Health Centres and one (1.3%) participant worked in a mobile clinic. The other 1.3% (n=1) refers to the PMTCT Manager from Head Office who did not work in a particular facility.

Table 4.3: Number of participants and facilities according to type of facility

Response options	Participants (n=77)		Facilities (n=29)	
	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)
PHC clinic	41	53.2	16	55.2
Community Day Centre	30	39.0	10	34.5
Community Health Centre	4	5.2	1	3.4
Mobile clinic	1	1.3	1	3.4
Other	1	1.3	1	3.4
Total	77	100	29	100.0

Facility distance from the nearest referral hospital

The results illustrated in Table 4.4 indicate that 65.5% (n=19) of facilities were in a radius of less than 10km from the nearest referral hospital, indicating that almost two thirds of facilities were in close approximation to referral sites. Other facilities (n=10; 34.5%) were in a radius of 10-50km away from the nearest referral hospital.

Table 4.4: Facility distance from the nearest referral hospital (n=29)

Response options	Frequency (n)	Percent (%)
< 10km	19	65.5
10-50 km	10	34.5
Total	29	100.0

Services rendered at health care facilities

In the table below the various services rendered at the health care facilities are reflected. A wide range of services together with providing HIV and ART services were rendered. One participant, the PMTCT Manager, worked at the Head Office. The Head Office does not render any services and therefore data for services were counted as 'missing'. Of the nine services listed, the minimum number of services rendered in facilities was 5 and the maximum 9, with a mean of 8.7 (SD 0.6).

Table 4.5: Services rendered at health care facilities (n=28)

Service	Response options	Frequency (n)	Valid percent (%)
HIV testing and counselling	Yes	28	100
	No	0	0
Post exposure prophylaxis	Yes	27	96.4
	No	1	3.6
Antenatal care	Yes	27	96.4
	No	1	3.6
Managing adults	Yes	28	100
	No	0	0
Managing children	Yes	23	82.1
	No	5	17.9
TB treatment	Yes	27	96.4
	No	1	3.6
ART	Yes	28	100
	No	0	0
Women's health	Yes	27	96.4
	No	1	3.6
STI treatment	Yes	28	100
	No	0	0

Supporting staff

The table below displays the availability of supporting staff at all the health care facilities. In most of the facilities, there are sufficient supportive staff (for example, Clerks / Support officers; Counsellors; Enrolled nurses; Enrolled Nurse Assistants; Doctors; and Pharmacist Assistants), with some limitations to Data Capturers and Pharmacists.

Table 4.6: Supporting staff (n=28)

Staff category	Response options	Frequency (n)	Valid percent (%)
Data capturer	Yes	13	46.4
	No	15	53.6
Clerk/Support officer	Yes	27	96.4
	No	1	3.6
Counsellor	Yes	27	96.4
	No	1	3.6
Enrolled nurse	Yes	25	89.3
	No	3	10.7
Enrolled nurse assistant	Yes	24	85.7
	No	4	14.3
Doctor	Yes	27	96.4
	No	1	3.6
Pharmacist	Yes	11	39.3
	No	17	60.7
Pharmacist assistant	Yes	23	82.1
	No	5	17.9

Average monthly headcount of facility

Table 4.7 below reflects the average headcount per facility. The median headcount was 2496.5 (IQR 1460.5-5441.5), indicating a high patient load in the facilities with relatively high variability between facilities. The other questions that the researcher completed (questions 9-11) are discussed in section 4.3.

Table 4.7: Facility average monthly headcount

Statistic	n	Minimum	Maximum	Median	IQR
Facility average monthly total headcount (last 3 months)	29	620	10549	2495.5	1460.5-5441.5

4.2.2 Participant demographic information (participant questions1-4)

The aim of this section was to capture the participants' demographic information. It is formulated into four questions and the data is presented in frequency tables. The demographic data on the training, qualifications and experience of professional nurses trained in NIMART were analysed with descriptive statistical analysis.

Gender

The results illustrated in Table 4.8 indicate that the majority of participants were females (n=71; 92.2%) and the minority (n=6; 7.8%) were males.

Table 4.8: Gender (n=77)

Response options	Frequency (n)	Percent (%)
Male	6	7.8
Female	71	92.2
Total	77	100.0

Age

Table 4.9 shows the mean age of participants as 43.6 years with a standard deviation (SD) of 9.98, the youngest being 25 years of age and the oldest being 64 years of age. The age distribution is indicative of an older nursing population.

Table 4.9: Age (n=77)

	N	Minimum	Maximum	Mean	SD
Age	77	25	64	43.6	9.98

Highest professional qualifications

Table 4.10 reflects the highest professional qualifications of the participants. Almost two thirds of the participants were qualified with a postgraduate Diploma in Primary Health Care. This is the appropriate qualification to be able to assess, diagnose and treat (including prescription of medication) (De Maeseneer, Willems, De Sutter, Van de Geuchte & Billings, 2007:24).

Table 4.10: Highest professional qualification (n=77)

Response options	Frequency (n)	Percent (%)
Postgraduate diploma in PHC	44	57.1
Undergraduate diploma	21	27.3
Undergraduate degree	8	10.4
Other	4	5.2
Total	77	100.0

Current function or job Table 4.11 shows that most of the respondent performed clinical work as a Professional Nurse. Participants in the ‘other’ category were providing different services, for example, the PMTCT Manager from head office prescribed ART if there was understaffing in certain clinics. Another participant was appointed as a psychiatric Registered Nurse but was also NIMART trained and provided ART. One participant indicated that she was a Clinical Mentor but was also allocated to clinics to provide ART.

Table 4.11: Current function or job (n=77)

Response options	Frequency (n)	Percent (%)
Clinical work as a PN	63	81.8
Facility Manager	8	10.4
Other	5	6.5
Clinical mentor	1	1.3
Total	77	100.0

4.3 SECTION B: INFLUENCING FACTORS

In this section, the researcher discusses the data related to the factors influencing the confidence and knowledge of professional nurses prescribing ART. This section consisted of questions 5-32 (see the questionnaire in Appendix 4). Each question had options from which participants could choose the most appropriate response.

4.3.1 HIV management experience (questions 5-11)

In questions 5-11, participants reported their experience in managing patients with HIV. How long have you been managing patients with HIV?

Participants' responses are summarised in Table 4.12. The table shows that the majority of participants (n=28; 36.4%) had between 2-5 years of experience in HIV management, with only 5.2% (n=4) having less than one year of experience.

Table 4.12: How long have you been managing patients with HIV? (n=77)

Response options	Frequency (n)	Percent (%)
Less than 1 year	4	5.2
1 to less than 2 years	25	32.5
2 - 5 years	28	36.4
More than 5 years	20	26
Total	77	100

Are you currently initiating adults on antiretroviral therapy?

As reflected in Figure 4.1, the majority of participants (n=70, 90.9%) were initiating adults on ART at the time of the study and very few were not initiating (n=7, 9.1%). Based on comments from participants, their job descriptions changed continuously. In different clinics, some participants were assigned to render specific tasks and rotated every three months. Rotating of nurses depends on the clinic setting and whether comprehensive services are provided in the facility. The staffing complement was also important. If one or two professional nurses were available, a comprehensive service that includes ART prescription is provided. With a larger staffing complement, participants tended to render only one service, for example ART provision, reproductive health or TB treatment / management at a certain time.

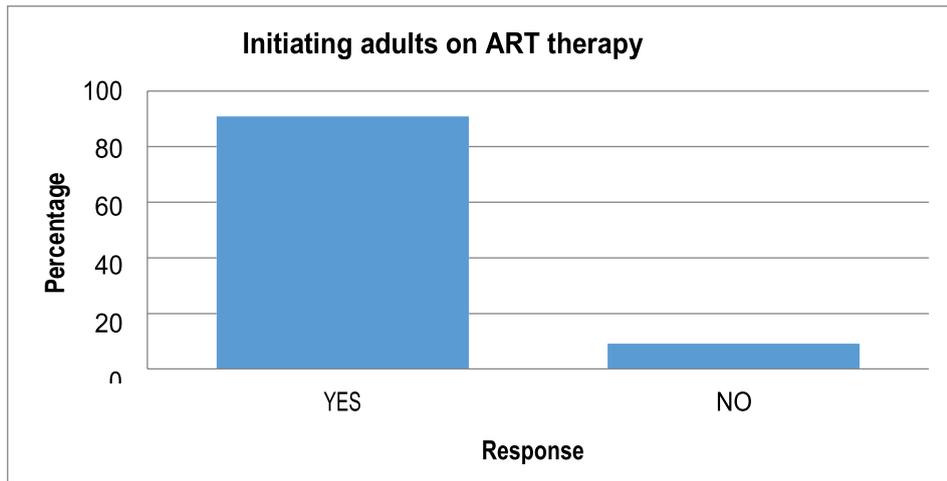


Figure 4.1: Participants currently initiating adults on ART therapy

From the facility statistics collected by the researcher (question 9 in the section the researcher completed), the minimum monthly number of patients initiated on ART by participants (n=70) within the three months prior to data collection was 1 and the maximum 45. The mean was 9 (SD8.2; 95% CI7 to 11) and the median was 7 (IQR9). This indicates that all the participants had recent experience in ART initiation.

Are you currently initiating pregnant women on antiretroviral therapy?

As reflected in Figure 4.2, the majority of participants were initiating pregnant women on ART (n=65, 84.4%) and a small percentage of 15% (n=12) were not initiating ART in pregnant women. The reason for not initiating pregnant women provided by participants was that it was not in their current job description.

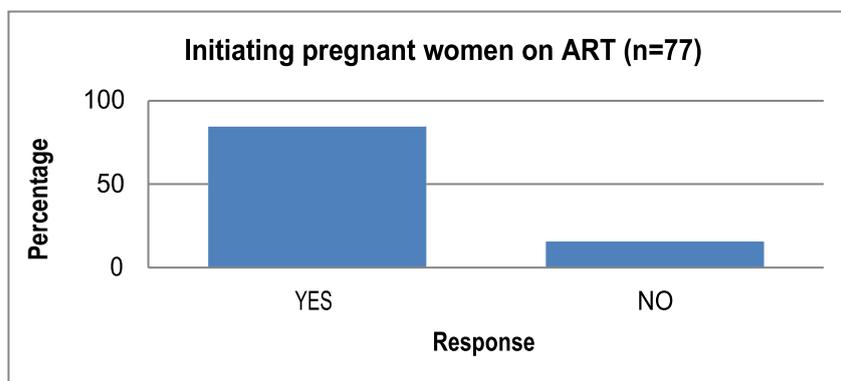


Figure 4.2: Participants currently initiating pregnant women on ART

How long have you been initiating ART?

Only 74 participants responded to this question. The majority of participants had been initiating ART between 1 but less than 2 years (n=34) and this represented 45.9% of the participants, whilst the second group were initiating between 2-5 years (n=28) and represented 37.8% of participants. Only 8.1% (n=6%) were initiating ART for more than 5 years and 8.1% (n=6) less than a year. The discrepancy between the number of participants indicating that they were currently initiating ART (Figure 4.1) and the number that indicated their experience may mean that some participants have experience in ART initiation, but was not initiating ART at the time of the study.

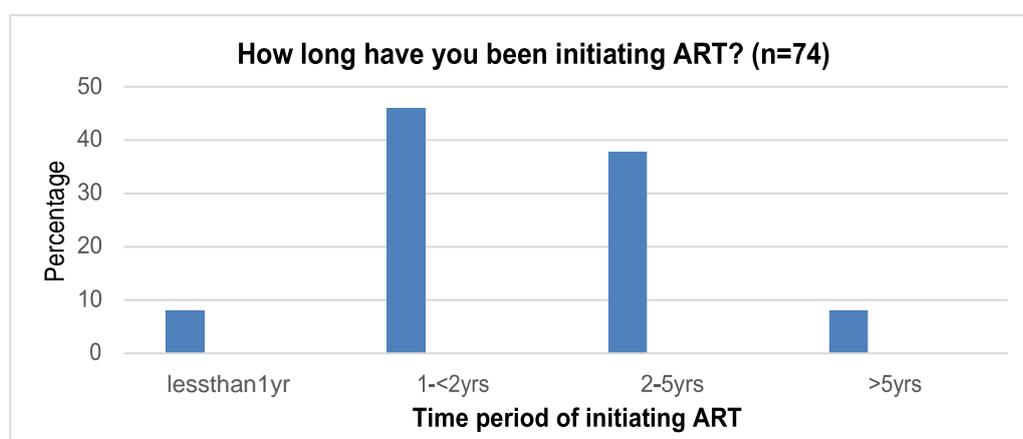


Figure 4.3: How long participants have been initiating ART

How much time do you spend on average to initiate a patient on ART?

Only 74 participants answered this question. Table 4.13 reflects the average time participants spent on a patient when initiating ART, which were a minimum of 10 minutes and a maximum of 75 minutes. The average time spend on a patient was 28.6 minutes (95% CI 25.6 to31.6).

Table 4.13: Time spent initiating a patient on ART (n=74)

	N	Minimum	Maximum	Mean	SD
How much time (in minutes) do you spend on average to initiate a patient on ART?	74	10	75	28.6	12.8

Do you provide follow-up care for clients on ART?

As indicated by Table 4.14 the majority (n=75; 97.4%) of participants positively responded that they provide follow-up care for their clients whilst only 2.6% (n=2) indicated that they do not render follow-up care. The reason for not providing follow-up care given by some participants was that their role is merely to initiate ART. According to the facility statistics collected (question 10 in the section the researcher completed), the maximum number of patients followed-up by the participants (n=74) per month in the three months prior to data collection was 1000, indicating a very high patient load. The mean was 208.5 [(SD244.6; 95% CI 160.3 to 273.6)] and the median was 126.5 (IQR347).

Table 4.14: Do you provide follow up care for patients on ART? (n=77)

Response options	Frequency (n)	Percent (%)
Yes	75	97.4
No	2	2.6
Total	77	100

How much time is spent on average to provide follow-up care to patients on ART?

According to Table 4.15, the 75 participants who provided follow-up care indicated that they spent a minimum time of 5 minutes to a maximum of 45 minutes on a follow-up patient. This means the average time spent on a follow-up patient was 14.3 minutes [(95% CI 12.6 to 15.9)], indicating that participants spent less time following-up a patient on ART than to initiate a patient on ART.

Table 4.15: Average time spent to provide follow-up care to patients on ART

	n	Minimum	Maximum	Mean	SD
How much time (in minutes) do you spend on average to provide follow-up care to a patient on ART?	75	5	45	14.3	7.3

4.3.2 Training (questions12-20)

The questions in this section measured the training of the participants: Training in HIV management, PALS PLUS / PACK and Dispensing

According to Table 4.16 all participants (n=77; 100%) received training in HIV management and PULSA PLUS PACK. Less than half of the participants (n=33; 42.9%) had completed a dispensing course. Examples of HIV management courses provided by the participants were: a basic HIV course provided by Médecines Sans Frontières (MSF), Anova, Faircare, and a Stellenbosch University certificate in the management of patients on antiretroviral and tuberculosis treatment (CMART).

Table 4.16: Training (n=77)

Training course		Frequency (n)	Percent (%)
HIV management	Yes	77	100
	No	0	0
PALSA PLUS/PACK training	Yes	77	100
	No	0	0
Dispensing course	Yes	44	57.1
	No	33	42.9

Recent Training in HIV Management, PACK/PALSA PLUS and Dispensing

The participants provided the month and the year since they completed the training, allowing the researcher to calculate the number of years since their last training. According to Table 4.17, participants (n=77) were last trained in HIV management between 0 and 9 years ago, while participants (n=77) were last trained in PALSA PLUS/PACK between 1-11 years ago. Participants (n=44) indicated that dispensing training was completed between 2-15 years ago.

Table 4.17: Years since last training

Years since last training	n	Minimum	Maximum	Mean	SD
HIV management training	77	0	9	3	1.5
PALSA PLUS/PACK training	77	1	11	4	2.9
Dispensing training	44	2	15	5.4	2.9

The variable measuring the years since the last training was used to categorise whether participants were trained less than three years ago or more than three years ago. In Table 4.18, it shows that 59.7% (n=46) of participants underwent training in HIV management more than

3 years ago and n=31 (40.3%) of participants underwent training in HIV management 3 or less years prior. Furthermore, the table also indicates that 61% (n=47) were trained in PAKK more than 3 years ago and only n=30 (39%) were trained 3 or less than 3 years ago. Over half of the participants therefore received HIV Management or PAKK training more than three years ago.

Five participants stated they were either busy with their updated PAKK training or scheduled to commence with training although they had completed their PAKK PLUS training before. In Table 4.16 there were no options to differentiate between PAKK PLUS and PAKK training.

Table 4.18: Recent training in HIV Management and PAKK / PAKK PLUS

Training	Duration	Frequency (n)	Percent (%)
HIV Management	More than 3 years	46	59.7
	3 years or less	31	40.3
PAKK PLUS/PAKK	More than 3 years	47	61
	3 years or less	30	39

NIMART training

With regard to NIMART training, participants were asked whether they received any mentoring for NIMART, how long the mentoring was scheduled for and to provide the date mentoring was completed. Table 4.19 indicates that 100% (n=77) of participants had received NIMART training mentoring. Of the participants who indicated the duration of NIMART training mentoring (97.4%, n=75), most participants (37.7%, n=29) indicated that they had received between 2 weeks and 2 months of mentoring. Two participants (2.6%, n=2) selected the option of 'other' for the duration of mentoring, indicating that they had less than one week of mentoring.

Participants provided the date since they completed their NIMART training and the date was used to calculate the number of years since NIMART training was completed. The minimum number of years since NIMART mentoring was completed was one year and the maximum 7 years (mean 2.97; SD 1.3). The number of years since NIMART mentoring was completed was further categorised to determine whether NIMART mentoring was completed less than 3 years ago or more than 3 years ago. In Table 4.19, those who were recently trained in NIMART (3 years or less) were in the majority 53 (68.8%) while those participants who have undergone

training more than 3 years ago were only 31.2%(n=24).

Table 4.19: NIMART training

NIMART training and mentoring		Frequency (n)	Percent (%)
NIMART mentoring received	Yes	77	100
	No	0	0.0
Duration of NIMART mentoring	1 week	20	26
	2 weeks	5	6.5
	Between 2 weeks and 2 months	29	37.7
	More than 2 months	21	27.2
	Other	2	2.6
Recent NIMART training	More than 3 years	24	31.2
	3 Years or less	53	68.8

4.3.3 Continuous mentoring and support (questions21-24)

The questions in this section measured continuous mentoring and support. According to Table4.20 below, 51.9% (n=40) of participants reported that the ART doctor visited the clinic daily; while 36.4% (n=28) of participants only received weekly visits. One participant (1.3%) indicated that the ART doctor visits once a month, while some participants (n=8; 10.4%) disclosed that no ART doctor visits their facility. From the results in Table 4.20, the majority (n=57; 74%) of participants indicated that they do have a clinical mentor or supervising clinician for HIV / TB / ART in their clinic or district assigned to them. A quarter (n=20; 26%) of participants indicated that they do not have a clinical mentor or supervising clinician for HIV / TB / ART in their clinic or district assigned to them.

Of the 57 participants that indicated that they had a clinical mentor, n=20 (35.1%) had daily contact sessions with their clinical mentor or supervising clinician, while n=19 (33.3%) had contact weekly. Only n=14 (24.6%) had monthly contact with their mentors and three (5.3%) had contact once a year. One participant (1.8%) never had any contact. The 57 participants all (n=57; 100%) reported that they could discuss difficult cases with their mentor or supervising clinician (Table4.20).

Table 4.20: Continuous mentoring and support

Mentoring and support		Frequency (n)	Percent (%)
How often does the ART doctor visit the clinic?	Daily	40	51.9
	Weekly	28	36.5
	Monthly	1	1.3
	Annually	0	0
	Never	8	10.4
Are clinical mentors or a supervising clinician for HIV/TB/ART assigned to your clinic or	Yes	57	74.0
	No	20	26.0
How often do you have contact sessions with your clinical mentor or a supervising clinician?	Daily	20	35.1
	Weekly	19	33.3
	Monthly	14	24.6
	Annually	3	5.3
	Never	1	1.8
Are you able to discuss difficult cases with your mentor or supervising clinician?	Yes	57	100
	No	0	0

4.3.4 Health system support, workload and general satisfaction (question 25-29)

Questions 25-29 addressed which other tasks were performed in addition to managing patients on ART, health system support, workload and the general satisfaction of participants with their work.

In Table 4.21 below, other tasks performed in addition to managing ART are reflected. The majority of participants performed additional duties in HIV testing and counselling (n=60; 77.9%); antenatal care (BANC) (n=54;70.1%); managing sick adults (n=60; 77.9%); managing sick children (n=54; 70.1%); TB treatment (n=49; 63.6%); women's health (n=73; 94.8%) dispensing of medication (n=53;68.8%); and STI treatment (n=77;100%). Clinic management (n=31; 40.3%) and mentoring (n=30; 39%) are performed by less than half of the participants. Out of nine other tasks/services rendered, the minimum numbers of other tasks/services performed was 1 and the maximum 9 [(mean 6.1; 95% [CI 5.5 to 6.5)].

The researcher collected data on the average monthly number of HIV –uninfected patients each participant saw in the three months prior to the study (question 11 in the section completed by the researcher). Data from all 77 participants were collected of which the minimum was 0 and the maximum 800 [(mean 324; SD 229.7; 95%; [CI 276.1 to 380.4)]. The median was 300 (IQR 379). This indicates that the participants had to deliver arrange of services to HIV-infected and HIV- uninfected patients.

Table 4.21: Tasks performed in addition to managing patient on ART (n=77)

Task		Frequency (n)	Percent (%)
HIV testing and counselling	Yes	60	77.9
	No	17	22.1
Antenatal care (BANC)	Yes	54	70.1
	No	23	29.9
Managing sick adults	Yes	60	77.9
	No	17	22.1
Managing sick children	Yes	54	70.1
	No	23	29.9
TB treatment	Yes	49	63.6
	No	28	36.4
Women’s health	Yes	73	94.8
	No	4	5.2
Dispensing of medication	Yes	53	68.8
	No	24	31.2
Clinic management	Yes	31	40.3
	No	46	59.7
Mentoring	Yes	30	39
	No	47	61
STI treatment	Yes	77	100
	No	0	0

Workload, motivation, facility equipment and general satisfaction.

In Table 4.22 below, more than half of the participants (n=43; 55.8%) indicated that their workload was not acceptable. Nine participants (11.7%) indicated that they were not motivated towards their work, whilst the majority (n=68, 88.3%) indicated that they were motivated (Table 4.22).

Most of the participants (n=58; 75.3%) revealed that the facilities and equipment are adequate to deliver HIV care. As reflected in Table 4.22, 48.1% (n=37) of participants indicated that they are not satisfied with their working conditions. Although the majority (n=40; 51.9%)

indicated that they were satisfied.

Table 4.22: Workload, motivation, facility equipment and general satisfaction

Question		Frequency (n)	Percent (%)
Do you feel your workload is acceptable	Yes	43	55.8
	No	34	44.2
Do you feel motivated towards your work?	Yes	68	88.3
	No	9	11.7
Do you feel that the facilities and equipment at the clinic is adequate for the delivery of HIV care?	Yes	58	75.3
	No	19	24.7
Are you satisfied with your work conditions (e.g. work environment, salary, and work hours)?	Yes	40	51.9
	No	37	48.1

4.3.5 Quality assurance mechanisms (questions30-32)

Questions 30-32 measured whether participants received feedback about their personal performance relating to prescribing and monitoring ART and the clinic performance related to the provision of ART, as well as from whom feedback is received. Table 4.23 indicates that participants were more likely to receive feedback about the facility performance (n=62; 80.5%) than their own performance (n=51; 66.2%).

Table 4.23: Quality assurance mechanisms: Performance Feedback

Feedback received about:		Frequency (n)	Percent (%)
Personal performance relating to prescribing and monitoring patients on ART	Yes	51	66.2
	No	26	33.8
Performance of the clinic related to the provision of ART	Yes	62	80.5
	No	15	19.5

Table 4.24 below confirms that limited feedback is provided to participants who provide ART. Most feedback (n= 49; 63.6%) is received from Facility Managers and HAST Coordinators (n=23; 29.9%). Only 11.7% (n=9) of the participants received feedback from the NIMART

trainer and five participants (6.5%) received feedback from the supervising clinician. Participants who mentioned feedback from ‘others’ (n=8; 10.4%) included examples such as researchers and other experts.

Table 4.24: Quality assurance mechanisms: Personal Performance Feedback

Feedback received from		Frequency (n)	Percent (%)
Facility Manager	Yes	49	63.6
	No	28	36.4
HAST Coordinator	Yes	23	29.9
	No	54	70.1
Supervising clinician	Yes	5	6.5
	No	72	93.5
NIMART trainer	Yes	9	11.7
	No	68	88.3
Other	Yes	8	10.4
	No	69	89.6

4.4 SECTION C: HIV MANAGEMENT CONFIDENCE (QUESTIONS33-54)

Section C included several questions that measure the HIV management confidence of the participants in a list of HIV care and treatment skills. Table 4.25 below, indicates the responses of the participants about how confident they feel about their ability to do specific HIV related clinical skills. Participants were asked to rank their ability on 22 clinical skills.

The majority of the participants were extremely confident or rated themselves as experts in most of the skills.

The skills the participants were less confident in were:

No.5. Identify other co-morbidities such as psychiatric illness (depression, dementia, and psychosis), epilepsy, diabetes hypertension, heart failure, liver disease (enlarged liver): 27.3% (n=21) of participants selected somewhat confident.

No.7. Identify drug-interactions in commonly co-administered medications and contraindications to certain drugs: 36.4% (n=28) of participants selected somewhat

confident and (n=1; 1.3%) were not at all confident.

No.8. Identify the signs and symptoms of IRIS: 37.6% (n=29) of participants selected somewhat confident and (n=3; 3.9%) were not at all confident.

No.12. Order and interpret lab tests according to clinical assessment and with respect to current HIV protocols (for example, rapid and confirmatory HIV antibody tests, DNA-PCR, CD4count, viral load, Hep B surface antigen, sputum microscopy for AFB / Gene Xpert) 29.9% (n=23) of participants selected somewhat confident.

No.13. Interpret lab results (for example Hb and diff, rapid pregnancy test, RPR, creatinine clearance (calculate), liver enzymes (ALT, AST), cholesterol, triglycerides and glucose) 29.9% (n=23) of participants selected somewhat confident and (n=2; 2.6%) were not at all confident.

No.14. Identify abnormal laboratory results and manage appropriately: 24.7% (n=19) of participants selected somewhat confident and (n=1; 1.3%) were not at all confident.

No.16. Prescribing with concurrent illnesses- TB, epilepsy, hypertension, diabetes, asthma / COAD: 40.2% (n=31) of participants selected somewhat confident and (n=6; 7.8%) were not at all confident.

No.17. Appropriately stop/switch drug treatments (substitution of single drug due to adverse reactions, stopping prophylaxis: 37.7% (n=29) of participants selected somewhat confident and (n=13; 16.9%) were not at all confident.

An HIV Management confidence score was calculated based on the responses of the participants to the items in the scale. This score was converted to a percentage score to make interpretation easier. A higher score indicated more confidence. The mean score was 68.7 [(95% CI [66.3-71.1]). The minimum score was 45 and the maximum 85. The HIV management confidence scores are reflected in Figure 4.4 below.

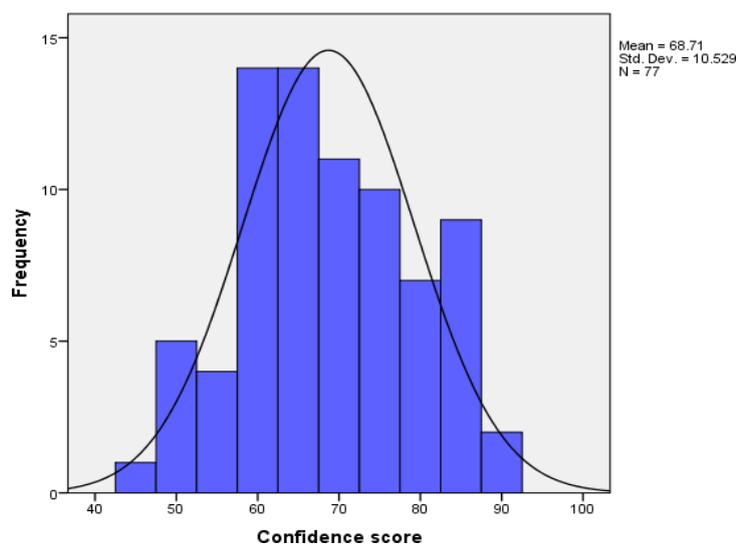


Figure 4.4: Histogram of HIV Management confidence score

The distribution of the HIV management confidence score was the same across categories of district (Mann Whitney U, $p=0.348$), meaning that participants in the Cape Winelands and City of Cape Town had similar scores. The distribution of the confidence score was also the same across categories of facility type (Kruskal Wallis Test, $p=0.474$).

The confidence score was not associated with the highest qualification participants attained (Kruskal Wallis Test, $p=0.967$) or their current function or job (Kruskal Wallis Test, $p=0.287$). It was also not associated with participants' perception of their workload (Mann Whitney U, $p=0.866$), their general work satisfaction (Mann Whitney U, $p=0.380$), whether they received regular feedback about their personal performance (Mann Whitney U, $p=0.444$), or the clinic's performance (Mann Whitney U, $p=0.762$). Confidence was also not correlated with the number of additional tasks/services performed by the participant ($r=0.059$; $p=0.610$).

Table 4.25: HIV Management Confidence

HIV care and treatment skills	Not at all confident n (%)	Somewhat confident n (%)	Extremely confident n (%)	Expert n (%)
1. Triage a patient living with HIV to identify and refer patient...	1 (1.3)	7 (9.1)	43 (55.8)	26 (33.8)
2. Obtain and properly document comprehensive health history.	0 (0)	3 (3.9)	46 (59.7)	28 (36.4)
3. Perform a complete physical examination on a patient...	0 (0)	4 (5.2)	34 (44.2)	39 (50.6)
4. Identify the signs and symptoms of opportunistic infections...	0 (0)	12 (15.6)	41 (53.2)	24 (31.2)
5. Identify other co-morbidities such as psychiatric illness...	0 (0)	21 (27.3)	38 (49.4)	18 (23.3)
6. Identify when patients are eligible for ART and prophylaxis	0 (0)	2 (2.6)	38 (49.4)	37 (48.1)
7. Identify drug-interactions in commonly co-administered medications...	1 (1.3)	28 (36.4)	37 (48.1)	11 (14.2)
8. Identify the signs and symptoms of IRIS	3 (3.9)	29 (37.6)	31 (40.3)	14 (18.2)
9. Identify adherence problems	0 (0)	3 (3.9)	47 (61)	27 (35.1)
10. Identify treatment failure for 1st line	0 (0)	10 (13)	39 (50.6)	28 (36.4)
11. Make a diagnosis based on history and physical	1 (1.3)	11 (14.3)	43 (55.8)	22 (28.6)

examination				
12. Order and interpret lab tests according to clinical assessment and with respect to current HIV protocols	0 (0)	23 (29.9)	31 (40.2)	23 (29.9)
13. Interpret lab results	2 (2.6)	23 (29.9)	35 (45.5)	17 (22)
14. Identify abnormal laboratory results and manage appropriately.	1 (1.3)	19 (24.7)	37 (48)	20 (26)
15. Prescribe appropriate treatment (for example OIs, first-line ART, TB).	0	9 (11.7)	37 (48.1)	31 (40.3)
16. Prescribing with concurrent illnesses...	6 (7.8)	31 (40.2)	24 (31.2)	16 (20.8)
17. Appropriately stop/switch drug treatments...	13 (16.9)	29 (37.7)	23 (29.9)	12 (15.5)
18. Give appropriately health information to patients...	0 (0)	8 (10.4)	40 (51.9)	29 (37.7)
19. Involving the patient in the treatment plan...	1 (1.3)	2 (2.6)	41 (53.2)	33 (42.9)
20. Provide adequate patient counselling...	0 (0)	4 (5.2)	40 (51.9)	33 (42.9)
21. Provide an appropriate follow up schedule.	1 (1.3)	8 (10.4)	38 (49.4)	30 (39)
22. Use HIV stationery and registers to document care.	1 (1.3)	1 (1.3)	35 (45.4)	40 (52)

4.5 SECTION D: HIV MANAGEMENT KNOWLEDGE (QUESTIONS 55-80)

Participants were given 26 questions to test their HIV management knowledge. Table 4.26 reflects the number and percentage of correct and incorrect responses. Participants had difficulty (and answered incorrectly) the questions that focused on the following areas of HIV management knowledge:

Cotrimoxazole prophylaxis eligibility (Question 1): More than one quarter of the participants (n=22; 28.6%) answered this question incorrectly. However, Table 4.25 (question 6) indicates that 97.5% (n=75) of the participants considered themselves experts or extremely confident in identifying patients who are eligible for IPT, cotrimoxazole and fluconazole prophylaxis.

Fluconazole prophylaxis eligibility (Question 2): More than half of the participants (n=41; 53.2%) answered this question incorrectly. However, Table 4.25 (question 6) indicates that 97.5% (n=75) of the participants considered themselves experts or extremely confident in identifying patients who are eligible for IPT, cotrimoxazole and fluconazole prophylaxis.

Opportunistic infection treatment: PCP (Question 8): More than a quarter of the participants (n=20; 26%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment for, example, opportunistic infections (OI's), first-line ART and TB.

Opportunistic infection treatment: Diarrhoea with cryptosporidium (Question 10): Almost one quarter of the participants (n=19; 24.7%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment for, for example, opportunistic infections (OI's), first-line ART and TB.

Opportunistic infection treatment: Oral hairy leukoplakia: (Question 11): More than half of the participants (n=47; 61%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment for, for example, opportunistic infections (OI's), first-line ART and TB.

Opportunistic infection treatment: Tinea capitis: (Question 12): More than half of the participants (n=45; 58.4%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment. For example, opportunistic infections (OI's), first-line ART and TB.

Opportunistic infection treatment: Toxoplasmosis: (Question 13): More than half of the

participants (n=60; 77.9%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment such as opportunistic infections (OI's), first-line ART and TB.

ART side-effects: Lopinavir/ritonavir: (Question 14): More than a fifth of the participants (n=17; 22.1%) answered this question incorrectly. However, Table 4.25 (question 18) indicates that 89.6% (n=69) of the participants considered themselves experts or extremely confident in giving appropriate health information to patients in terms that are easily understood such as the mechanism of action of ART's.

Drug-drug interactions: (Question 19): More than a third of the participants (n=37; 48.1%) answered this question incorrectly. However, Table 4.25 (question 7) indicates that 62.4% (n=48) of the participants considered themselves experts or extremely confident in identifying drug-interactions in commonly co-administered medications and contra-indications to certain drugs.

ART in pregnancy: (Question 20): More than a fifth of the participants (n=17; 22.1%) answered this question incorrectly. However, Table 4.25 (question 15) indicates that 88.4% (n=68) of the participants considered themselves experts or extremely confident in prescribing appropriate treatment such as opportunistic infections (OI's), first-line ART in adults including pregnant women.

ART contra-indications: (Question 21): More than a quarter of the participants (n=25; 32.5%) answered this question incorrectly. However, Table 4.25 (question 7) indicates that 62.4% (n=48) of the participants considered themselves experts or extremely confident in identifying drug-interactions in commonly co-administered medications and contra-indications to certain drugs.

ART drug switch: one drug: (Question 23): More than a fifth of the participants (n=16; 20.8%) answered this question incorrectly. In Table 4.25 (question 17) indicates that 44.9% (n=35) fewer participants considered themselves experts or extremely confident in appropriately stop/switch drug treatments, meaning, the substitution of a drug due to adverse reactions.

Understanding of virological failure: (Question 26): More than half of the participants (n=45; 58.4%) answered this question incorrectly. However, Table 4.25 (question 10) indicates that 87% (n=67) of the participants considered themselves experts or extremely confident in identifying treatment failure for 1st line ART's. Additionally, Table 4.25 (question 18) indicates

that 89.6% (n=69) of the participants considered themselves experts or extremely confident in giving appropriate health information to patients in terms that are easily understood. For example, mechanism of actions of ART, goals of treatment, and describe what drug resistance means and how it develops.

Table 4.26: Responses to HIV management knowledge questions

Question	Correct n (%)	Incorrect n (%)
1. Prophylaxis: cotrimoxazole	55 (71.4)	22 (28.6)
2. Prophylaxis: fluconazole	36 (46.8)	41 (53.2)
3. Opportunistic infections: PCP	68 (88.3)	9 (11.7)
4. Opportunistic infections: Cryptococcus	62 (80.5)	15 (19.5)
5. Opportunistic infections: Oesophageal candida	65 (84.4)	12 (15.6)
6. Opportunistic infections: Herpes simplex virus	64 (83.1)	13 (16.9)
7. Opportunistic infections: angular chelitis	67 (87)	10 (13)
8. Opportunistic infection treatment: PCP	57 (74)	20 (26)
9. Opportunistic infection treatment: peripheral neuropathy	75 (97.4)	2 (2.6)
10. Opportunistic infection treatment: diarrhoea with cryptosporidium	58 (75.3)	19 (24.7)
11. Opportunistic infection treatment: oral hairy leukoplakia	30 (39)	47 (61)
12. Opportunistic infection treatment: Tinea capitis	32 (41.6)	45 (58.4)
13. Opportunistic infection treatment: Toxoplasmosis	17 (22.1)	60 (77.9)
14. ART side effects: Lopinavir/ritonavir	60 (77.9)	17 (22.1)
15. ART side effects: Tenofovir	69 (89.6)	8 (10.4)
16. ART side effects: Zidovudine	65 (84.4)	12 (15.6)
17. ART side effects: Efavirenz	67 (87)	10 (13)
18. ART eligibility	67 (87)	10 (13)
19. Drug-drug interactions	40 (51.9)	37 (48.1)
20. ART in pregnancy	60 (77.9)	17 (22.1)
21. ART contraindications	52 (67.5)	25 (32.5)
22. ART contraindications	68 (88.3)	9 (11.7)
23. ART drug switch: one drug	61 (79.2)	16 (20.8)
24. Management of ART failure	65 (84.4)	12 (15.6)
25. Management of ART failure	65 (84.4)	12 (15.6)
26. Understanding of Virological failure	32 (41.6)	45 (58.4)

The HIV management knowledge questions were used to calculate an HIV management knowledge score. This score is expressed as a percentage of the total knowledge score. The mean HIV management knowledge score was 72.7 [(95% CI [69.8-75.6]). The minimum score was 38 and the maximum 100.

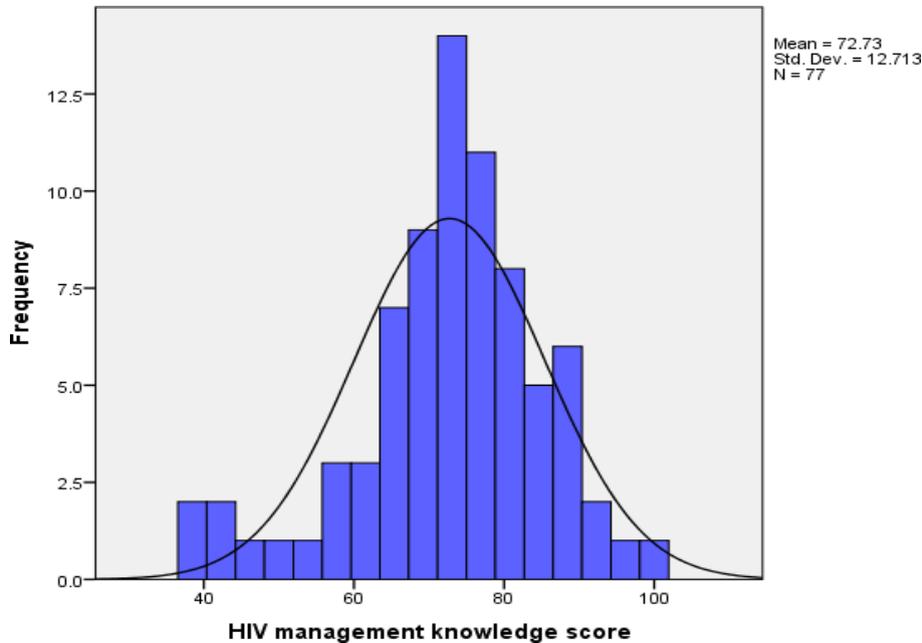


Figure 4.5: Histogram of HIV management knowledge score

Bivariate analysis indicated a small positive correlation between the confidence and knowledge scores ($r=0.247$, $p=0.02$). There was a small negative correlation between knowledge and the number of other tasks/services performed by the participant ($r= -0.251$; $p=0.028$). This means that the more other tasks a participant performed, the lower their HIV management knowledge score tended to be. There was a significant difference in distribution of the HIV management knowledge score across categories of district (Mann Whitney U, $p=0.004$). Participants in the Cape Winelands had a lower mean knowledge score (69.6%) compared to the mean knowledge score for participants in the City of Cape Town (78.2%). The distribution of the knowledge score was the same across categories of facility type (Kruskal Wallis Test, $p=0.176$).

The knowledge score was not associated with the highest qualification participants attained (Kruskal Wallis Test, $p=0.445$) or their current function or job (Kruskal Wallis Test, $p=0.239$).

It was also not associated with the participants' perception of their workload (Mann Whitney U, $p=0.549$) and general work satisfaction (Mann Whitney U, $p=0.601$).

There was a significant difference in the knowledge scores of participants who indicated that they received regular feedback about their personal performance (Mann Whitney U, $p=0.039$) and the performance of the clinic related to the provision of ART (Mann Whitney U, $p=0.008$). The mean knowledge score for participants who received regular personal feedback was 75.2% ($n=51$), compared to those ($n=26$) who did not receive regular feedback (67.9%). Similarly, those participants ($n=62$) who received regular feedback about the clinic performance related to the provision of ART had a mean knowledge score of 75.1% compared to a knowledge score of 63.1 of participants ($n=15$) who did not receive feedback.

4.6 SECTION E: OPEN ENDED QUESTION

In this section, participants could explain or mention what interventions could be initiated to improve their knowledge and confidence in managing patients living with HIV. Some participants ($n=12$; 16%) did not provide any comments.

The following recommendations were made:

Continuous NIMART updates:

A number of participants ($n=20$; 26%) indicated that continuous NIMART updates would benefit them.

The need for experience and guidance:

A number of participants ($n=20$; 26%) indicated more experience and guidance would be valuable for them.

Refresher courses for NIMART:

A smaller number of participants ($n=10$; 13%) specified the necessity for refresher courses for NIMART.

Clinical forums:

A number of participants ($n=8$; 10%) indicated that clinical forums, where difficult cases would be discussed, would be of great value to them.

Training in HIV guidelines:

The least number of participants ($n=7$; 9%) indicated that training in HIV guidelines would be of great value to them.

4.7 HYPOTHESIS TESTING

The third study objective was to evaluate whether individual and health system factors such as training, continuous mentoring and experience were associated with confidence ratings and knowledge scores. This was performed through hypothesis testing.

4.7.1 Hypothesis 1: Training

The first hypothesis was:

Professional nurses with recent training (three years or less) in HIV management have higher confidence ratings and knowledge scores compared with professional nurses who have not been recently trained.

HIV management confidence

The mean HIV management confidence score for participants trained in HIV Management more than 3 years previously was 70.5 (SD 9) compared to a mean of 66 (SD 12.1) for participants trained 3 years ago or less (Table 2.27). The T-test for independent groups indicated a borderline non-significant difference between the two groups ($t [df75] = 1.89, p = 0.06$).

Table 2.27 also indicates the mean HIV management confidence score for participants trained in PALS PLUS/PACK more than 3 years ago (69.5; SD 10.2) was compared to those who had been trained less than 3 years ago (68.6; SD 11.2). The T-test for independent groups indicated no significant difference between the two groups ($t [df70] = 0.32, p = 0.75$).

There was also no significant difference in the mean confidence score of participants that completed NIMART training more than 3 years ago or 3 years ago or less ($t [df75] = 1.5, p = 0.14$).

Table 4.27: HIV management confidence according to recent training

HIV management training		N	Mean	SD	Std. Error Mean
Confidence score	More than 3 years	46	70.5	9	1.3
	3 years or less	31	66	12.1	2.2
PACK training		N	Mean	SD	Std. Error Mean
Confidence score	More than 3 years	47	69.5	10.2	1.6
	3 years or less	30	68.6	11.2	2.1
NIMART training		N	Mean	SD	Std. Error Mean
Confidence score	More than 3 years	24	71.4	8.7	1.8
	3 years or less	53	67.5	11.1	1.5

HIV management knowledge

The mean HIV management knowledge score for participants trained in HIV management more than 3 years ago was 72.2 (SD13) compared to a mean of 73.5 (SD12.5) for participants trained 3 years ago or less (Table 2.27). The T-test for independent groups indicated no significant difference between the two groups ($t [df75] = -0.4, p = 0.67$).

Table 2.28 also indicates the mean HIV management knowledge score for participants trained in PALSAPLUS/PACK more than 3 years ago (68.1; SD 13) compared to less than 3 years ago (78.1; SD 10.5). The T-test for independent groups indicated a significant difference between the two groups ($t [df70] = -3.5, p = 0.001$). Participants trained in PALSAPLUS/PACK 3 years ago or less had significantly higher knowledge scores.

There was also no significant difference in the mean knowledge score of participants that completed NIMART training more than 3 years ago or 3 years ago or less ($t [df75] = -0.6, p = 0.56$).

Table 4.28: HIV management knowledge according to recent training

HIV management training		N	Mean	SD	Std. Error Mean
Knowledge score	More than 3 years	46	72.2	13	1.9
	3 years or less	31	73.5	12.5	2.2
PACK training		N	Mean	SD	Std. Error Mean
Knowledge score	More than 3 years	47	68.1	13	2
	3 years or less	30	78.1	10.5	1.9
NIMART training		N	Mean	SD	Std. Error Mean
Knowledge score	More than 3 years	24	71.5	13.7	2.8
	3 years or less	53	73.3	12.4	1.7

4.7.2 Hypothesis 2: Mentoring

The second hypothesis was:

Professional nurses who receive continuous mentoring have higher confidence ratings and knowledge scores compared with professional nurses who do not receive continuous mentoring.

HIV management confidence

The independent sample Kruskal-Wallis Test indicated that the distribution of HIV management confidence scores were not the same across categories of how long NIMART mentoring lasted ($p=0.006$). Posthoc analysis revealed that participants who received NIMART mentoring for 2 weeks had higher confidence scores than those who received mentoring for more than 2 months (Figure 4.6). This may mean that nurses requiring mentoring for longer, due to possibly not being competent in certain skills, are more likely to be less confident.

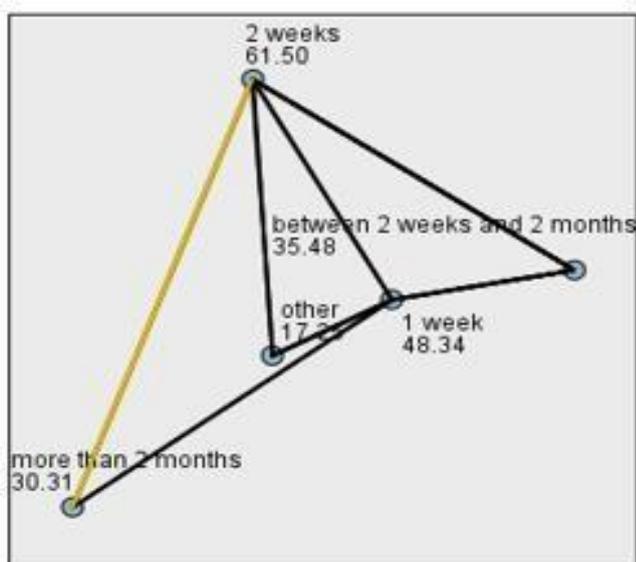


Figure 4.6: Pairwise comparison of how long the NIMART mentoring lasted. (Each node shows the sample average confidence of how long the NIMART mentoring lasted).

None of the other variables that measured mentoring, yielded any significant differences in confidence scores between the variable categories, such as how often the ART doctor visits the clinic ($p=0.63$); whether a mentor was assigned to the participant ($p=0.49$); how often the participant had contact sessions with the mentor ($p=0.41$) and whether they were able to discuss difficult cases with the mentor.

HIV management knowledge

None of the variables that measured mentoring yielded any significant differences in knowledge scores between the variable categories. The categories were duration of NIMART mentoring ($p=0.14$); how often the ART doctor visits the clinic ($p=0.23$); whether a mentor was assigned to the participant ($p=0.25$); how often the participant had contact sessions with the mentor ($p=0.14$); and whether they were able to discuss difficult cases with the mentor

4.7.3 Hypothesis 3: Experience

The third hypothesis was:

Professional nurses with more experience in HIV management have higher confidence ratings and knowledge scores.

HIV management confidence

The distribution of HIV management confidence was the same across categories of how long the participants had been managing patients with HIV (Kruskal-Wallis Test $p=0.18$) and a cross categories of how long the participants had been initiating ART (Kruskal-Wallis Test $p=0.08$). Bivariate analysis indicated a small positive correlation between the HIV management confidence score and the average number of patients on ART followed-up in the last 3 months ($r=0.25$, $p=0.03$).

HIV management knowledge

The distribution of HIV management knowledge was the same across categories of how long the participants were managing patients with HIV (Kruskal-Wallis Test $p=0.34$) and across categories of how long the participants have been initiating ART (Kruskal-Wallis Test $p=0.09$).

Bivariate analysis indicated a small positive correlation between the HIV management knowledge score and the average number of patients initiated on ART in the last 3 months ($r=0.27$, $p=0.02$) and a medium positive correlation for the average number of patients on ART followed up ($r=0.34$, $p=0.003$).

4.8 SUMMARY

In this chapter, the descriptive statistics were provided and the statistical tests performed according to the research objectives and hypotheses. The findings indicate moderately high confidence and knowledge. Bivariate analysis indicated a weak positive correlation between confidence and knowledge. Hypothesis testing indicated that recent training did not influence HIV Management confidence. The period of NIMART mentoring and the number of ART patients initiated and followed up in the past three months, was associated with HIV management confidence.

Recent PALS PLUS/PACK training influenced HIV management knowledge. The number of ART patients initiated and followed-up in the past three months was associated with HIV management knowledge. Participants who received regular feedback about their own and the facilities' performance relating to ART tended to have higher knowledge scores and the number of other tasks / services provided by participants in addition to ART management was negatively associated with HIV management knowledge. In chapter 5 the findings will be further discussed according to the study objectives.

CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

In the previous chapters, the researcher provided a background to the study, discussed the literature related to the study topic, the research methodology and the study results. In this chapter, the results are discussed in relation to the literature and conclusions are drawn. Study limitations are explained and certain recommendations are presented.

5.2 DISCUSSION

The aim of this study was to explore and determine the factors that influence the HIV management confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape. A brief discussion of the findings of this study, as they relate to the study objectives, follows.

5.2.1 Objective 1: Determine the HIV management confidence of nurses prescribing ART

As discussed in chapter 1, confidence is defined “as a subjective assessment of specific skills in a particular area”. Confidence has also been labelled as a result that determines if someone is prepared or not, to participate in an activity (Steward *et al.*, 2000:903-909). Rackal *et al.* (2012:68) found that patients who received care from clinicians who viewed themselves as experts in HIV care tended to have better outcomes.

In the present study, participants rated their confidence to perform and their level of expertise in certain HIV management related competencies. The participants’ responses about how confident they felt prescribing ART, reflected that the majority were extremely confident or rated themselves as experts in most of the skills. However, when considering the overall confidence score, the mean was 68.5 (95% CI 66.3-71.1). Based on the data, the researcher is 95% confident that the true confidence score is between 66.3% and 71.1%. When dichotomising the scores, less than half (n=35, 45.5%) of the participants had a confidence score above 70%. Further, the overall mean score, on a scale of 1 to 4, where 4 means the participant consider him / herself an expert, was 3.1 (SD 0.47). When dichotomising the mean score, 44 participants (57.1%) perceived themselves to be extremely confident or experts

overall and 33 (42.9%) were not at all or somewhat confident. The results therefore imply that a large percentage of participants demonstrate a lack of confidence in all the HIV management competencies.

The participants reported the highest confidence in the use of stationery (with 51.9% considering themselves experts) and to perform a physical examination (with 50.6% considering themselves experts). The participants were less confident in identifying drug-interactions in commonly used medications, since only 14.3% considered themselves to be experts and stopping or switching drug treatments (with only 15.5% considering themselves experts). They were also less confident in prescribing for concurrent illnesses and in identifying the signs and symptoms of Immune Reconstitution Inflammatory Syndrome (IRIS) (fewer than 20% of participants considered themselves experts).

Green *et al.* (2014:7), in their study on the effect of NIMART training and mentoring, used nurse self-assessment to determine nurses' perceptions of individual and clinical confidence. They used a five-point Likert scale of 1-5 (1= not very confident; 2 = somewhat confident; 3= confident; 4 = very confident; 5= confident if using a manual). The nurses had mean confidence ratings above 3 for all of the HIV related services post training and mentoring. In some areas, such as TB screening and cotrimoxazole prescription in adults, confidence ratings were also high before the provision of training and mentoring. Areas where high confidence was reported post training and mentoring were: HIV counselling and testing, the normal course of ARVs, WHO staging, working out creatinine clearance and BMI calculation. Areas where nurses had less confidence were: procedures for lactate testing, managing cardiac failure, enlarged liver, neck stiffness, recognition of side-effects, understanding IRIS and the ART register. However, it was identified that confidence was not necessarily translated into practice and the authors cautioned that confidence could not be equated to competence and the completion of routine practices (Green *et al.*, 2014:8).

In the study by Green *et al.* (2014:7), the sample size was only 21 participants. All the participants received the same training and mentoring and the post-assessment was done soon after their training. This may partly explain the higher mean confidence scores compared to the 77 participants in the present study that were exposed to different courses. Further, they used a five-point scale whereas the present study used a four-point scale.

From the study results it appears as if the participants were less confident to perform skills that were previously considered to be in the domain of the doctor such as managing patients with more than one chronic illness, patients with complications and also with interpreting laboratory results. In the context of this study, the participants may have referred these cases to a doctor and not managed them themselves. However, skills such as identifying drug-interactions are important to recognise for appropriate and timely referral (Green *et al.*, 2014:6). Further, all the competencies are essential in order to ensure that the quality of care is not compromised when tasks are shifted from doctors to nurses.

Higher confidence may be due to nurses feeling that they are ‘trusted’ with tasks being shifted to them. In another study, greater satisfaction and a sense of accomplishment among nurses was experienced due to task shifting (Davies *et al.*, 2013:11). The confidence of nurses could therefore subjectively be influenced by feelings of empowerment because of their expanded roles. In the present study, 88.3% of participants indicated that they were motivated towards their work, although only 51.9% of participants felt satisfied with their work conditions. Nurses’ motivation or satisfaction was however not related to their HIV management confidence in this study.

Another factor that may further influence the nurses’ confidence is their workload and whether they render a comprehensive service or only provide HIV care (George *et al.*, 2012:66). In this study, confidence scores were not associated with the perception of their workload or the number of additional tasks they performed. However, more than half (55.8%) of the participants indicated that their workload was unacceptable.

5.2.2 Objective 2: Determine the HIV management knowledge of nurses prescribing ART

According to Gray *et al.* (2013:15), knowledge plays a pivotal role in a person’s actions since it is essential information that one acquires in a variety of ways. Knowledge that is acquired through research is essential for describing, explaining, predicting and controlling nursing phenomena. Knowledge is one of the components of competence (ICN, 2008:40). In order for nurses to become proficient and experts, they need to acquire knowledge.

This can be achieved through training, which then directly increases experience. With reference to task shifting, nurses need to gain additional knowledge in the management of ART.

Therefore, specific training courses have been developed to empower nurses in order to gain more knowledge.

A multiple-choice questionnaire consisting of 26 questions was used to measure the participants' knowledge related to the management of people living with HIV. The study shows that participants had a relatively high mean knowledge score of 72 (95% CI of 69.8-75.6). It is, however, difficult to determine what level of knowledge could be considered adequate. Cameron *et al.* (2012:98-100) used a pass mark of 70% as a cut-off point to indicate adequate knowledge for a group of nurses that were trained in NIMART and who completed a 60-question multiple choice open book test. With 70% used as a benchmark for the appropriate knowledge level, most of the participants in the present study have adequate knowledge, since n=48 (62.3%) had a score of n=70 and above and n=29 (37.7%) a knowledge score below 70. There were, however, participants with very low scores, with the minimum score of 38. Further, it means that 37.7% of the participants who are NIMART trained and prescribe ART may not have adequate knowledge. Cameron *et al.* (2012:99) found that 62% of nurses who failed the NIMART open book exam were initiating patients in practice, despite having inadequate knowledge.

Participants had high knowledge scores regarding treatment for peripheral neuropathy (97.4% indicated the correct answer) and the side effects of Tenofovir, with 89.6% indicating the correct answer. Nurses also had high knowledge scores for identifying Pneumocystis pneumonia (PCP) (88.3% correct) and ART contraindications (88.3% correct). The participants were less knowledgeable regarding the treatment for Toxoplasmosis (22.1% correct), oral hairy leukoplakia (39% correct) and Tinea capitis (41.6% correct). Participants were also less knowledgeable about the meaning of virological failure, since only 41.6% demonstrated adequate understanding of the question. Further, only 51.9% provided the correct answer for the question related to drug-drug interactions.

From the questions it appeared that, the participants' knowledge was not congruent with their perception of competency. For example, although 97.5% of participants rated themselves extremely confident or experts in identifying patients eligible for prophylactic treatment, 28.6% answered the question related to cotrimoxazole prophylaxis incorrectly and 53.2% answered the question related to fluconazole prophylaxis incorrectly. This was further confirmed by the weak positive correlation ($r=0.265$) between the overall knowledge and confidence ratings.

mean knowledge score (72.7) was higher than the mean confidence score (68.7). That may mean that knowledge does not necessarily translate into confidence.

It is further worth mentioning, that the participants from the Cape Winelands (rural district) had significantly lower mean knowledge scores (69.6) compared to the mean knowledge score of the participants from the City of Cape Town (78.2). The results also indicated that a small negative correlation ($r = -0.251$) exists between the knowledge and number of other tasks that were performed by the participants. These results show that the more tasks a participant had to perform, the lower their HIV management knowledge scores were. The finding that the knowledge score was negatively correlated with the number of other tasks performed may indicate that nurses are not able to maintain high levels of knowledge in all areas of PHC. The results showed that most of the participants rendered a variety of PHC services and mostly did not provide dedicated HIV services, but had to attend to other patients daily. Participants from the Cape Winelands reported significantly more other tasks (mean=7.04) compared to the participants in the City of Cape Town (mean=4.25) ($t(df75) = 6.57, p=0.00$). It can therefore be deduced that the higher mean knowledge score for participants in the City of Cape Town may be due to nurses being allocated to deliver specific HIV services rather than a comprehensive PHC service as previously mentioned in chapter 3. It may be easier for these nurses to remember the HIV guidelines and knowledge related to HIV management if they provide a dedicated service.

5.2.3 Objective 3: Evaluating whether individual and health system factors such as HIV-training, continuous mentoring and experience are associated with confidence ratings and knowledge scores.

This chapter highlights the important factors identified in the literature that can influence the confidence and knowledge of nurses. These factors include training, continuous mentoring and experience. Training, mentorship, clinical practice and continuous assessment are all factors that assist nurses in developing their competency and expertise (DOH, 2011:4). These abovementioned factors help the novice to become proficient and eventually an expert. When considering the concept “From Novice to Expert” developed by Patricia Benner, nurses that are trained in a new skill begin as novices and have to advance through steps to reach the level of expert (George, 2013:592). According to Benner (1984), nurses learn and develop an understanding and acquire skills overtime, from both an educational foundation and from personal experience. For example, clinical knowledge and expertise in NIMART are acquired

through NIMART training and experience is acquired when practicing NIMART.

5.2.3.1 Training

WHO (2008:2) recommended that nurses complete an appropriate training programme that will equip them with appropriate knowledge, emphasising that task shifting should ensure that quality of care is not compromised. Therefore, the persons that these tasks are shifted to should be competent to perform these tasks. According to the ICN (2008:40), competence is comprised of three elements, namely, knowledge, skills and attitudes. The Clinical Proficiency Pathway depicts didactic training as the beginning of the pathway to expertise (DOH, 2011:4).

In this study a variety of HIV management training courses were attended by the participants. For example, basic HIV courses are provided by MSF, Anova, Faircare and the CMART course is provided by Stellenbosch University. All of the participants were trained in PALS PLUS / PACK, had completed an HIV management course and participated in NIMART training as per the NIMART guidelines of the Western Cape (Green *et al.*, 2014:2). Only 57.1% of participants had completed a dispensing course. A dispensing certificate is not a requirement of the Western Cape guidelines and most clinics have either a pharmacy assistant (82.1%) or a pharmacist (39.3%) who can dispense medication. Cameron *et al.* (2012:99) found that only 38% of participants in their study indicated that they had a dispensing certificate, which is lower than in the present study. They also found that only 79% of the nurse participants had previous formal training in HIV management. Furthermore, in the study by Cameron *et al.* (2012:99), only 55% of the participants had formal training in Primary Health Care (PHC), which is comparable to the 57.1% of participants in the present study who had completed a postgraduate diploma in PHC. It is therefore clear that a qualification in PHC or Health Assessment, Treatment and Care and a Dispensing certificate are not requirements to prescribe ART in the study context, but that the PALS PLUS/PACK training and completing an HIV management course are. There was no association between the participants' professional / formal qualifications and their confidence or knowledge.

With regards to how recently the participants received training, nearly 60% of participants were trained in PACK / PALS PLUS or HIV management more than three years ago, with some who had been trained 9- 11 years ago. The majority of participants (69.6%), however, completed NIMART training less than three years ago. In the open-ended questions, some participants indicated that they would appreciate continuous NIMART updates or refresher

courses and those they would attend training in the HIV guidelines. Currently, there are no explicit guidelines specifying when NIMART trained nurses should attend updates. From the researchers' personal experience, NIMART updates are currently provided in the districts in the form of in service training. Nurses practicing NIMART are required to attend every third year.

Confidence ratings did not differ across categories of being recently trained or not, for all the different trainings opportunities available. However, knowledge scores were higher for participants recently trained in PALS PLUS/PACK. Knowledge scores did not differ across categories of being recently trained or not for the other training opportunities. Although no cause and effect can be inferred, it can be deduced from the results that recent PALS PLUS / PACK training is likely to improve the HIV management knowledge of nurses.

5.2.3.2 Mentoring

The Clinical Proficiency Pathway (DOH, 2011:4) depicts clinical mentoring alongside clinical practise and continuous assessment on the path to competency and proficiency. When a clinician is competent, proficient or an expert, they are able to make independent clinical decisions. The purpose of mentoring is to acquire skills to competently initiate, but also manage patients according to established clinical protocols, for a minimum period of two months (Morris *et al.*, 2009:4). The Western Cape Department of Health guideline advises a minimum of 40 hours of NIMART one-on-one mentorship following didactic training (Green *et al.*, 2014:2). The SANC does not specify an explicit number of cases that should to be seen in order for NIMART authorisation to be conferred. Jones and Cameron (2017:840) conducted a study in the health districts of Tshwane (Gauteng Province), Nkangala (Mpumalanga Province), and Capricorn and Vhembe (Limpopo Province) to describe the evolution of clinical mentoring for NIMART trained professional nurses by roving mentoring teams in PHC. Semi-structured interviews were conducted with 92 NIMART nurses and the median mentoring since training was 25 months. It therefore appears that there is no set period for mentoring. Eighty cases are required to be seen by the nurse in consultation with a mentor, according to the Clinical Mentorship Guideline for Integrated Services, in order for the nurse to be authorised in NIMART (DOH, 2011:19).

In the present study, all nurses had received NIMART mentoring. The duration of mentoring varied, with the majority of participants (37.7%) receiving between 2 weeks and 2 months of

mentoring, followed by those receiving more than 2 months of mentoring (27.6%) and those who received one week of mentoring (26.0%). In terms of continuous support, only 74.0% indicated that they had a mentor or supervising clinician assigned to them. Of those who had a mentor assigned, 30.7% frequently met with the mentor (monthly, annually or never). From the open-ended questions it was evident that some nurses required more support and guidance.

This study indicates that the period of NIMART mentoring is associated with HIV management confidence, with nurses mentored for a period of two weeks indicating the highest level of confidence compared to shorter (e.g. 2 weeks) or longer mentoring periods (e.g. 2 months). The period of mentoring was, however, not associated with HIV management knowledge. The conceptual framework refers to mentoring or continuous assessment as an important process in becoming an expert (DOH, 2011:4). One would therefore argue that the longer the period of mentoring or the more intense the mentoring, the higher the confidence should be. The results of this study with reference to mentoring is, however, contradictory to the Clinical Proficiency Pathway and that of Benner (1984) and it means that there might be other factors that influenced the confidence and knowledge of those participants who were mentored over a period of more than 2 months. The findings from this study support a 2 week NIMART mentoring period. It may be that a 2-week mentoring period is more intense. More case studies are presented to mentees to explore and gain knowledge. Perhaps those who were mentored for a longer period, for example, for more than 2 months, did not have intensive contact sessions and case studies or the contact sessions may have been too far apart. Due to infrequent mentee-mentor sessions, it may have taken longer to see the number of required cases with the mentor. A study conducted by Orner *et al.* (2010:46-47) found that nurses and doctors were too busy for mentoring, which may result in less frequent contact sessions. A longer period of mentoring therefore, may not translate to the acquisition of more knowledge and confidence in practice. Furthermore, in this study, having an assigned mentor or the frequencies of contact sessions with the mentor was not associated with the participants' level of confidence or knowledge.

In a recent study evaluating five years of mentoring in four health districts by Jones *et al.* (2017:840), semi-structured interviews were conducted with a convenient sample of 92 participants consisting of NIMART nurses, facility managers, roving mentors and their operational managers. Data were obtained from routine monitoring and evaluation reports and from the DoH District Health Information System. Participants were interviewed and recorded.

Data revealed that clinical mentoring by roving mentor teams has allowed nurses to develop competency in initiating and maintaining ART. The authors, however, cautioned that clinical mentoring is expensive since it is an additional component to the current health systems. The qualitative data also indicated that on-going mentoring for nurses enabled them to complete their mentoring process and to deal with complicated HIV cases (Jones *et al.*, 2017:842). Another study conducted by Green *et al.* (2014:4-5) in Cape Town, resulted in the majority of ART initiations being performed by nurses following this mentoring programme. Mentoring therefore improved the quality of ART management and nurses' confidence.

Although mentoring was not associated with the participants' knowledge in the present study, participants who received regular feedback about their personal and clinical performance had significantly higher knowledge scores (75.2) compared to those with limited or no feedback (67.9). Feedback was mostly received from the Clinic Manager or HAST coordinator. George *et al.* (2012:6) similarly found that regular feedback provided about individual and clinic performance related to the provision of ART, is likely to influence nurses' HIV management confidence. However, the Clinical Mentorship Manual for Integrated Services (DOH, 2011:4-5) distinguishes between clinical mentorship and supportive supervision. Although both have similar goals and some overlapping activities, supervision tends to emphasise health facility management and is more hierarchical, whereas mentoring is more focused on the enhancement of the skills of the mentee. Mentoring therefore, should be more effective in improving the confidence and knowledge of nurses than feedback from supervisors. The results may mean that mentoring is not currently being implemented or practised effectively.

5.2.3.3 Experience

The Clinical Proficiency Pathway (DOH, 2011:4) and Benner's concept of 'Novice to Expert' implies that knowledge and confidence should increase as the clinician gains experience (George, 2013:593). According to the data in this study, the majority (36.4%) of the participants had between 2-5 years' experience in HIV management. Although the majority (90.9%) of participants were initiating and managing adults on ART, some were not initiating ART at the time of the study due to changing job descriptions. However, all the participants had recent experience in ART initiation. The HIV management confidence and knowledge scores were the same across all categories of experience. These categories included the participants' duration of managing HIV-positive patients and initiating ART. However, the average number of HIV-positive patients seen or the caseload may be an indication of the intensity of experience

and was associated with both HIV management confidence and knowledge. There exists a small positive correlation between the HIV management confidence score and the average number of patients on ART followed-up in the last 3 months. Furthermore, the bivariate analysis indicates a small positive correlation between the HIV management knowledge score and the average number of patients initiated in the last three months and a medium positive correlation between the HIV management knowledge score and the average number of patients on ART followed-up in the past 3 months. These findings are similar to Benner's conceptual model as discussed in chapter one. Benner's stages from novice to expert, indicates that understanding is gained through experience. However, from the data it appears that total years of experience do not appear to influence confidence and knowledge, but that more clinical practice experience, e.g. seeing more patients or the caseload, does. This means that the more patients the nurses managed, the more knowledgeable they become. Furthermore, there was a significant negative correlation between the HIV knowledge score and the average number of other/non-ART patients the participants managed in the past three months ($r = -0.364$, $p = 0.001$). Furthermore, analysis also revealed that the participants in the City of Cape Town had significantly higher numbers / caseloads of reported ART initiations and follow-ups compared to the Cape Winelands that may further explain why the average knowledge score was higher for the City of Cape Town. A systematic review completed by Rackal *et al.* (2012:68) with a total of four studies, involving 8488 PLWH, revealed improved outcomes for patients treated by a provider with more HIV training and experience. All the studies were conducted in North America. No issues were addressed concerning the level of training expertise required by providers in limited resource countries. The authors concluded that if providers did not consider themselves experts and provided care for few HIV-positive patients, there is a trend towards worse patient outcomes.

5.3 LIMITATIONS OF THE STUDY

This study only explored the knowledge and confidence of professional nurses prescribing ART in two districts in the Western Cape in an urban and rural setting. Although 29 facilities partook in this study, only 77 participants completed the questionnaires. Certain facilities were either not available to partake in this study and others did not respond to the request to participate in the study. This limits the generalisation of the findings to all the facilities in the two districts.

Only professional nurses prescribing ART for 1 year or more were included in this study. While there were professional nurses at facilities who recently completed their courses in HIV management, they were not qualified to participate according to the study inclusion criteria. This excluded quite a number of professional nurses prescribing ART.

The NIMART trained database at the two districts were not up to date and some participants who qualified to be included in the study and who were contacted by the researcher to partake in the study, were either not available or no longer working at facilities in both districts. Some participants did not honour their appointments and on various occasions when the researcher arrived the completion of the questionnaire, they were either not available or on leave.

Furthermore, it was required that all participants complete the questionnaire in the presence of the researcher or fieldworker. Some participants did not avail themselves at the time to participate. This may be due to the participants feeling that their knowledge may be tested. Reassurance was provided by stating that all data would be handled confidentially and anonymously. Questionnaires could not be mailed or handed out to the participants to complete on their own due to the knowledge section that was part of the questionnaire. The sample size could therefore have been larger if these challenges were limited to a minimum.

The small sample size further limited the power of the statistical tests to detect significant differences between groups. For example, it was determined beforehand that a sample size of 34 in the exposed group (e.g. recent training) and 68 in the non-exposed group (e.g. not recently trained) was needed (95% confidence; 80% power) to detect significant differences in knowledge and confidence between the groups. However, when the data was analysed, there were fewer participants in both groups. This may therefore have caused a type II error.

For this study, a self-assessment tool was used to measure how confident nurses are in performing HIV management skills. The challenge of using this tool is the fact that the assessment of competency is complex and self-assessment is never completely objective (Steward *et al.*, 2000:903). However, Steward *et al.* (2000:903) commented that it could be used for individuals to identify the gaps in their own clinical performance. The gaps identified in this study can therefore be addressed through training and skills development.

Lastly, the cross-sectional nature of the study implies that no cause and effect relationships between the variables explored can be inferred.

5.4 CONCLUSIONS

The hypothesis testing indicated that recent training, mentoring over a long period and having more experience does not influence HIV management confidence. A two-week period of NIMART mentoring and a greater number of ART patients initiated and followed up in the past three months, were associated with more HIV management confidence.

Recent PALS PLUS / PACK training was associated with better HIV management knowledge. None of the other training courses was associated with HIV management confidence or knowledge. Furthermore, the number of ART patients initiated and followed-up in the past three months was associated with HIV management knowledge.

Participants, who received feedback on a regular basis about their own and the facilities' performance relating to ART, tended to have higher knowledge scores and the number of other tasks / services provided by participants in addition to ART management was negatively associated with HIV management knowledge.

Furthermore, participants in the Cape Winelands (rural area) had a lower mean knowledge score compare to participants in the City of Cape Town (urban area). With reference to the abovementioned discussion, the findings did not show enough evidence to support the research hypothesis. The hypotheses were:

- A. Professional nurses with recent training (three years or less) in HIV management will have higher confidence ratings and knowledge scores compared with professional nurses who have not been trained recently. Confidence ratings were the same across categories of training. The mean knowledge score was significantly higher for participants who recently completed PALS PLUS/PACK training versus those who completed training more than three years ago. The results therefore only support the notion that recent PALS PLUS / PACK training may be associated with higher HIV management knowledge.
- B. Professional nurses who receive continuous mentoring have higher confidence ratings and knowledge scores compared to professional nurses who do not receive continuous

mentoring. Confidence was not consistent across categories for the duration of mentoring and participants who completed a period of two weeks mentoring had the highest mean confidence rating. Regular feedback about performance related to HIV mentoring period followed by regular feedback to NIMART trained nurses about their performance on a facility level.

- C. Professional nurses with more experience in HIV management have higher confidence / number of patients seen that is associated with the HIV management confidence and knowledge of professional nurses.

5.5 RECOMMENDATIONS

The following recommendations are made based on the study findings and are discussed below:

5.5.1 Recommendation related to training.

The study showed that participants with recent PACK training had a higher mean HIV management knowledge score. This may be attributed to the annual revision of PACK Adult guidelines in order to incorporate the latest guidelines. According to Fairall *et al.* (2012:1), the PACK Adult guideline covers over 40 common symptoms and 20 chronic conditions commonly seen in PHC patients. The researcher, therefore, suggests that providing regular PACK training updates, which include the HAST/NIMART module, for NIMART authorised nurses may enhance their knowledge. A number of participants' also suggested that continuous NIMART updates would be of great value to them.

Although the results did not indicate that recent training in HIV management was associated with higher knowledge or confidence, it may be due to the different training courses offered. It therefore may be beneficial to standardise the didactic HIV management training to better evaluate the outcomes of the course. One such course that may enhance and facilitate nurses' ability to assess, diagnose and treat HIV/AIDS-related conditions and Tuberculosis (TB), is a six-month post-graduate course, the Certificate in the Management of patients on ART and TB (CMART). The researcher personally gained knowledge by attending this six-month postgraduate certificate course. The course is only one manner in which the knowledge of nurses can be enhanced through training. According to a study done by Davies *et al.* (2013:11) nurses who received training in NIMART felt empowered due to the knowledge gained during training. Furthermore, nurses were able to assist patients and no longer needed to refer them to

other referral sites.

5.5.1.2 Recommendations related to mentoring

Didactic training is important but it is too brief and not effective in itself to result in sustainable changes in clinical practise. Therefore, on-going mentoring is advised (Orner *et al.*, 2010:46-47). Regular clinical mentoring and supportive supervision should be provided (DOH, 2011:4). The researcher suggests a dedicated/intensive mentoring period of 2 weeks. According to this study's results, participants who underwent NIMART mentoring for 2 weeks had higher confidence scores than those who received mentoring for more than 2 months. Furthermore, some of the participants indicated that clinical forums, where difficult cases could be discussed, would be of great value to them.

Not all the participants were assigned to a mentor at the time of this study. None of the variables that measured mentoring such as how often the ART doctor visits the clinic, whether a mentor was assigned to the participant, how often the participant had contact sessions with the mentor and whether they were able to discuss difficult cases with the mentor, was associated with HIV management confidence and knowledge. This may indicate that mentoring is not currently being implemented in an effective way. The concept of roving mentors as reported in the study by Jones *et al.* (2017:842) indicates the importance of dedicated mentors to enable nurses to become competent in managing ART. However, this is costly. Furthermore, the study explained that although mentoring took place in four districts it was only evaluated after five years. The researcher of this study further suggests as indicated in the study by Jones *et al.* (2017:842), that other methods of mentoring, for example, telephonic consultations could be useful. According to the study by Green *et al.* (2014:5), Médecins Sans Frontières (MSF), a Non-Governmental Organisation (NGO) supported the development of a Western Cape provincial Trainer-of-NIMART mentor's course in Khayelitsha in 2011. This NGO support made it possible for the DOH to take over the programme and is now successfully educating approximately 20 new mentors annually. NGO support may therefore be needed to ensure mentor capacity and therefore the researcher suggests that NGO support could be expanded to other districts.

5.5.1.3 Recommendations related to experience

The study results indicate that experience related to the patient caseload was associated with higher HIV management confidence and knowledge. Furthermore, a number of the participants

in this study indicated the need for experience and guidance. In a study conducted in Kenya, it was emphasised that investing in capacity building in nurses' will ensure that the trained nurses will provide comprehensive HIV care and treatment. The gaps between HIV nursing policy, training, competency and practice has been a great concern and it is important to ensure that nurses who are trained get adequate opportunities to practice their skills. Continuous investment in advancing the regulations and quality assurance will ensure a full scope of practice for NIMART nurses (Smith *et al.*, 2016:322-330). In order to ensure that NIMART trained nurses are offered sufficient opportunities to practise their skills, the researcher suggest that they work in HIV/ART settings and services for longer to develop experience. However, it may not be feasible to implement this in all settings due to the primary health care approach of providing integrated services (Stein *et al.*, 2008:240). Alternatively, the researcher suggests that NIMART trained nurses who initiate and follow-up few patients (lower caseloads) need to have access to a mentor to assist them when they initiate patients or encounter complex cases. Updated HIV guidelines must be easily available and accessible every day for referencing and consultation by nurses who do not have a high caseload of HIV patients.

5.5.1.4 Recommendation for future research

This study occurred at 29 healthcare facilities with 77 participants who prescribe ART'S and the researcher would recommend that a larger study with more participants might show a different outcome. It may be interesting to explore other factors that may influence the knowledge and confidence of professional nurses prescribing ART. For example, why there was a significant difference between the knowledge of professional nurses prescribing ART in a rural and urban setting. The nature of the relationship between knowledge, confidence and clinical practice should also be further explored. The effect of different training courses and mentorship models could be explored in order to identify effective didactic training methods and the ideal model for clinical mentoring that will be both effective in improving nurse outcomes and cost-effective.

5.6 DISSEMINATION

The study findings will be presented to head office of the City of Cape Town and Cape Winelands and submitted to the National Health Research database. The findings will further be presented at a national conference, at the Stellenbosch University Nursing and Midwifery Research Day and an article will be published in a peer-reviewed journal.

5.7 CONCLUSION

The study investigated various factors that influence the knowledge and confidence of professional nurses prescribing ART in an urban and rural setting and it gave an account of what is currently happening at the healthcare facilities that partook in the study. The majority of participants had adequate HIV management knowledge and reported to be very confident or experts in the HIV management skills and competencies.

With regard to the factors influencing HIV management knowledge and confidence, the research results revealed that participants trained recently in PULSA PLUS / PACK (3years ago or less) had significantly higher knowledge scores. Regular feedback about clinic and personal performance was associated with higher HIV management knowledge. Regular feedback is therefore important, since it reveals or affirms knowledge in addition to areas that require further mentoring and training. Participants who received mentoring over a period of two weeks had a higher mean confidence score compared to other periods of mentoring. A higher caseload of HIV-positive patients was also associated with higher knowledge and confidence. The results support the theoretical framework that training, mentorship and clinical practice experience are associated with knowledge and confidence. These factors assist the “novice” to become proficient and eventually an “expert”. Understandable and purposeful recommendations pertaining to the factors that influence the knowledge and confidence of professional nurses prescribing ART in an urban and rural setting were made throughout the discussion.

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APPENDICES

APPENDIX 1: PERMISSION LETTER FROM WESTERN CAPE DEPARTMENT OF HEALTH

Western Cape Department of Health Provincial Administration Building 4 Dorp Street
Cape Town 7700

02 December 2014

Dear Sir/Madam

PERMISSION TO CONDUCT RESEARCH STUDY

I hereby would like to request permission to conduct a research study titled: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape.

The primary aim is to determine the factors that influence the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape.

I would like to conduct the study at primary health care clinics in the Cape Winelands and Cape Metro pole districts with professional nurses prescribing antiretroviral therapy. I have attached a summary of the research proposal that outlines important ethical aspects and information regarding the proposed data collection process. I would like to draw your attention to the study questionnaires that will be completed by professional nurses prescribing antiretroviral therapy. The study will be conducted in an ethical manner as stipulated by the study proposal. Your assistance and support is greatly appreciated.

Kindly inform me regarding my request as soon as possible.

Principal Investigator: Deborah Judy Solomons

E-mail: daniel2004@telkomsa.net cell phone: 0828315001

Research Supervisor: Talitha Crowley

Department of Medicine and Health Sciences: Division of Nursing University of Stellenbosch
Contact number: 021 9389036 E-mail: tcrowley@sun.ac.za

APPENDIX 2: ETHICAL CLEARANCE



UNIVERSITEIT STELLENBOSCH-UNIVERSITY
jou kennisvermoë • jou kennis se vermoë

Approval Notice New Application

16-Mar-2015

SOLOMONS, Deborah Judy

Ethics Reference #: S14/12/268

Title: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district.

Dear Mrs Deborah SOLOMONS,

The New Application received on 08-Dec-2014, was reviewed by members of Health Research Ethics Committee 1 via Expedited review procedures on 16-Mar-2015 and was approved.

Please note the following information about your approved research protocol:

Protocol Approval Period: 16-Mar-2015 -16-Mar-2016

Please remember to use your protocol number (S14/12/268) on any documents or correspondence with the HREC concerning your research protocol.

Please note that the HREC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

After Ethical Review:

Please note a template of the progress report is obtainable on www.sun.ac.za/rds and should be submitted to the Committee before the year has expired. The Committee will then consider the continuation of the project for a further year (if necessary). Annually a number of projects may be selected randomly for an external audit.

Translation of the consent document to the language applicable to the study participants should be submitted.

Federal Wide Assurance Number: 00001372

Institutional Review Board (IRB) Number: IRB0005239

The Health Research Ethics Committee complies with the SA National Health Act No.61 2003 as it pertains to health research and the United States Code of Federal Regulations Title 45 Part 46. This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki, the South African Medical Research Council Guidelines as well as the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health).

Provincial and City of Cape Town Approval

APPROVAL

2004 (Department of Health).

Provincial and City of Cape Town Approval

Please note that for research at a primary or secondary healthcare facility permission must still be obtained from the relevant authorities (Western Cape Department of Health and/or City Health) to conduct the research as stated in the protocol. Contact persons are Ms Claudette Abrahams at Western Cape Department of Health (healthres@pgwc.gov.za Tel: +27 21 483 9907) and Dr Helene Visser at City Health (Helene.Visser@capetown.gov.za Tel: +27 21 400 3981). Research that will be conducted at any tertiary academic institution requires approval from the relevant hospital manager. Ethics approval is required BEFORE approval can be obtained from these health authorities.

We wish you the best as you conduct your research.

For standard HREC forms and documents please visit: www.sun.ac.za/rds

If you have any questions or need further assistance, please contact the HREC office at 219389156.

Included Documents:

CV A van der Merwe

Protocol Synopsis

Application form

Declaration A van der Merwe

Declaration D Solomons

Application form_signed page

CV T Crowley

Consent form

Declaration T Crowley

DOH permission letter

Checklist

CV D Solomons

Protocol

APPENDIX 3: EXTENDED ETHICAL CLEARANC



UNIVERSITEIT•STELLENBOSCH•UNIVERSITY
jou kennisvenoot • your knowledge partner

Ethics Letter

12-May-2016

Ethics Reference #: S14/12/268

Title: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district.

Dear Mrs Deborah Solomons,

The HREC approved the following progress report by expedited review process:

Progress Report dated 16/03/2015 - 16/03/2016

The approval of this project is extended for a further year

Approval date: 12 May 2016

Expiry date: 12 May 2017

If you have any queries or need further help, please contact the REC Office 219389819.

Sincerely,

REC Coordinator
Ashleen Fortuin
Health Research Ethics Committee 1

APPENDIX 4: QUESTIONNAIRE

For office use (Researcher to complete):		
Facility details		
1	District	
2	Sub-district	
3	Clinic name	
4	Type of clinic	PHC CDC CHC Mobile Other
5	How far is your clinic from the nearest referral hospital?	<input type="checkbox"/> <10km <input type="checkbox"/> 10 –50km <input type="checkbox"/> > 50km <input type="checkbox"/> > 100km

6	Services (select all available services)	HIV testing and counselling Post-exposure prophylaxis Ante natal care Managing adults with problems Managing children with problems TB treatment ART Women's health (family planning, pap smears) STI treatment
7	Select the category of staff and indicate the number	<input type="checkbox"/> Data capturer <input type="text"/> Clerk / support officer Counsellor Enrolled nurse Enrolled nurse assistant Doctor Pharmacist Pharmacist-assistant
RMR data (last 3 months)		
8	<u>Clinic</u> average monthly total head count (last 3 months)	
Influencing factors: HIV management experience		
9	<u>Participant</u> average number of patients initiated on ART per month (last 3 months)	

10	<i>Participant</i> average number of patients on ART followed up per month (last 3 months)	
Influencing factors: Health system		
11	<i>Participant</i> average number of other patients (non-HIV) seen per month (last 3 months)	

Participant questionnaire

Thank you for agreeing to complete the questionnaire on factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape. Your contribution will help the researcher to have a better understanding about these factors and how to improve the NIMART programme and patient care.

Demo graphic information: QUESTION 1 -4

Influencing factors: QUESTION 5 -32

Confidence questions: QUESTION 33 -54

Knowledge questions: QUESTION 55 -80

Open-ended question: QUESTION 81

SECTION A: DEMOGRAPHIC INFORMATION

Personal details

Please mark with a 'X' in the block on the right or write in the space provided

1	Gender	Male Female
2	Age	

3	Highest professional qualification	Undergraduate Diploma Undergraduate Degree Post graduate diploma in Primary Health Care Other, indicate the qualification: _
4	What are your current function / job?	Clinical work as a professional nurse Clinical mentor Facility manager Other, indicate the function: _____
SECTION B: INFLUENCING FACTORS		
HIV management experience		
5	How long have you been managing patients with HIV?	<input type="checkbox"/> Less than one year <input type="checkbox"/> – 2years <input type="checkbox"/> – 5years <input type="checkbox"/> > 5 years
6	Are you currently initiating adults on antiretroviral therapy?	<input type="checkbox"/> Yes <input type="checkbox"/> No If no, provide a reason
7	Are you currently initiating pregnant women on antiretroviral therapy?	<input type="checkbox"/> Yes <input type="checkbox"/> No If no, provide a reason
8	If YES to question 6 and 7, how long have you been initiating ART?	<input type="checkbox"/> Less than one year <input type="checkbox"/> 1 – 2years <input type="checkbox"/> 2 – 5years <input type="checkbox"/> > 5 years <input type="checkbox"/>
9	How much time do you spend on average to initiate a patient on ART?	_____ Minutes

10	Do you provide follow-up care for clients on antiretroviral therapy?	<input type="checkbox"/> Yes <input type="checkbox"/> No If no, provide a reason
11	How much time do you spend on average to provide follow-up care to a patient on ART?	_____ Minutes
Training		
12	Have you received any training in HIV management? <i>(e.g. . any basic HIV course provided by MSF, Anova, Faircare, CMART)</i>	Yes No
13	If YES to question 12 specify the course name and most recent date you received training.	Course name:_ Date: Month__Year__
14	Have you completed PALS PLUS / PACK training?	<input type="checkbox"/> Yes <input type="checkbox"/> No
15	If YES to 14, provide the date of the most recent PALS PLUS / PACK training.	Date: Month__Year__
16	Have you completed a dispensing course?	<input type="checkbox"/> Yes <input type="checkbox"/> No
17	If YES to 16, provide the date of the completion of the dispensing course.	Date: Month__Year__
18	Have you received any mentoring for NIMART training?	<input type="checkbox"/> Yes <input type="checkbox"/> No

19	If YES to question 18, how long was the NIMART mentoring for?	<input type="checkbox"/> 1week <input type="checkbox"/> 2weeks <input type="checkbox"/> between 2 weeks and 2months <input type="checkbox"/> more than 2months <input type="checkbox"/> other, please specify_
20	When did you complete NIMART training?	Date: Month__Year__
Continuous mentoring and support		
21	How often does the ART doctor visit the clinic?	<input type="checkbox"/> Daily <input type="checkbox"/> Weekly Monthly <input type="checkbox"/> Annually <input type="checkbox"/> <input type="checkbox"/> Never
22	Do you currently have a clinical mentor or supervising clinician for HIV/TB/ART in your clinic or district assigned to you?	<input type="checkbox"/> Yes <input type="checkbox"/> No
23	If YES to 22, how often do you have contact sessions with your clinical mentor or a supervising clinician?	<input type="checkbox"/> Daily Weekly Monthly Annually Never <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

24	If YES to 22, are you able to discuss difficult cases with your mentor or supervising clinician?	Yes No If no, provide a reason
Health system support, workload and general satisfaction		
25	What other tasks do you perform in the clinic in addition to managing patients on ART? (<i>select all that apply</i>)	HIV testing and counselling Antenatal care(BANC) Managing sick adults/ curative care Managing children /curative care TB treatment Women’s health (family planning, pap smears) STI treatment Dispensing of medication Clinic management Mentoring
26	Do you feel your workload is acceptable	Yes No If no explain briefly:
27	Do you feel motivated towards your work	<input type="checkbox"/> Yes No If no explain briefly:
28	Do you feel that the facilities and equipment at the clinic is adequate for the delivery of HIV care	Yes No If no explain briefly:

29	Are you satisfied with your work conditions (<i>e.g. work environment, salary, work hours</i>)	Yes No If no explain briefly:
Quality assurance mechanisms		
30	I receive regular feedback from the supervising clinician or clinic manager about my personal performance relating to prescribing and monitoring patients on ART (<i>e.g. number of initiations, quality of management and documentation</i>)	Yes No If no explain briefly:
31	I receive regular feedback about the performance of the clinic related to the provision of ART (<i>e.g. lost to follow-up, VL suppression rates, patients remaining in care</i>)	Yes No If no explain briefly:
32	If YES to question 31-32, from whom do you receive feedback? (<i>select all that apply</i>)	Facility manager HAST coordinator Supervising clinician NIMART trained professional nurse Other, specify whom

SECTION C. HIV Management confidence.					
<p>Directions: The following questions ask how confident you feel about your ability to do specific HIV related clinical skills. For each task, assume that you have to do it THIS WEEK. Then place a check mark in the box that you feel best shows how confident you are:</p> <p>1=not at all confident: I do not know how to do this task 2=somewhat confident: I can perform this task with support,</p> <p>3=extremely confident: I am able to do this task and consider myself competent/proficient</p> <p>4=I consider myself an expert and can teach this skill to others</p>					
HIV CARE AND TREATMENT SKILLS		1	2	3	4
33	Triage a patient living with HIV to identify and refer patients that need urgent treatment or referral				
34	Obtain and properly document comprehensive health history (medical, family, social) and symptoms screening				
35	Perform a complete physical examination on a patient including weight monitoring, BMI calculation, cervical/pap smears on female patients				
36	Identify the signs and symptoms of opportunistic infections (for example PCP, TB, oral hairy leucoplakia etc.) and appropriately stage the patients according to the WHO staging				
37	Identify other co-morbidities such as psychiatric illness (depression, dementia, psychosis), epilepsy, diabetes hypertension, heart failure, liver disease (enlarged liver)				
38	Identify when patients are eligible for ART and prophylaxis (cotrimoxazole, IPT and fluconazole)				
HIV CARE AND TREATMENT SKILLS		1	2	3	4

39	Identify drug-interactions in commonly co-administered medications and contra-indications to certain drugs.				
40	Identify the signs and symptoms of IRIS				
41	Identify adherence problems				
42	Identify treatment failure for 1 st line				
43	Make a diagnosis based on history and physical examination				
44	Order and interpret lab tests according to clinical assessment and with respect to current HIV protocols(for example rapid and confirmatory HIV antibody tests, DNA-PCR, CD4 count, viral load, Hep B surface antigen, sputum microscopy for AFB/ GeneXpert, sputum culture, stool exam for ova and parasites, urine dipstick)				
45	Interpret lab results (for example Hb and diff, rapid pregnancy test, RPR , creatinine clearance (calculate), liver enzymes (ALT, AST), cholesterol and triglycerides, glucose, Lactate, CLAT).				
46	Identify laboratory results and manage abnormal appropriately				
47	Prescribe appropriate treatment (for example OIs, first-line ART, TB).				
48	Prescribing with concurrent illnesses- TB, epilepsy, hypertension, diabetes, asthma/COAD				
49	Appropriately stop/switch drug treatments (substitution of single drug due to adverse reactions, stopping prophylaxis)				
50	Give appropriately health information to patients in terms that are easy to understand (mechanism of actions of ART, goals of treatment, and describe what drug resistance means & how it develops)				

51	Provide adequate patient counselling (adherence counselling and support, psychosocial support, risk behaviours)				
52	Involving the patient in the treatment plan (asking the patient about their beliefs about the disease, readiness to start life- long treatment, best ways to promote adherence)				
HIV CARE AND TREATMENT SKILLS					
		1	2	3	4
53	Provide an appropriate follow up schedule				
54	Use HIV stationery and registers to document care				

SECTION D. Knowledge questions (Circle the correct answer)

55. Which of the following persons should get cotrimoxazole? Select one:

- a) 21 year old, HIV positive pregnant woman with painless swollen glands
- b) 22year old, HIV positive man, not yet on ART with a CD4 count of 250
- c) 30 year old male on TDF, FTC and EFV for 1 year and CD4 of250
- d) 40 year old male on TDF,FTC and EFV for 5 years who develops TB

56. Which of the following statements about fluconazole prophylaxis is **TRUE**: Select one:

- a) Fluconazole prophylaxis should be given to all patients who had oesophageal candidiasis

- b) Secondary fluconazole prophylaxis should be continued for patients who had Cryptococcal meningitis or a positive CLAT / CrAg until the CD4 count is >200
- c) Fluconazole prophylaxis should be given to all patients with a CD4 count of <100
- d) Fluconazole should be given for life to all patients who had Cryptococcal meningitis

For question 57-61, match the pathogen with the clinical finding that fits best. Write a, b, c, d, e, f in the space provided below.

57. ___ PCP(PJP)	a. Odynophagia
58. ___ Cryptococcus	b. Fissures at mouth corners
59. ___ Oesophageal candida	c. Painful blisters
60. ___ Herpes simplex virus	d. Headaches
61. ___ Angular chelitis	e. Dermatomes rash
	f. Shortness of breath

For question 62 –67, match the diagnosed disease/symptom with the most appropriate treatment. Write a, b, c, d, e in the space provided below.

62. ___ PCP	a. no medical treatment necessary
63. ___ Peripheral neuropathy	b. loperamide
64. ___ Diarrhoea with cryptosporidium	c. cotrimoxazole
65. ___ Oral hairy leukoplakia	d. fluconazole
66. ___ Tinea capitis	e. pyridoxine
67. ___ Toxoplasmosis	

For question 68 – 71, match the drug with the most likely side effect. Write a, b, c, d in the space provided below.

68. ___ Lopinavir/ritonavir(LPV/r)	a. nightmares
69. ___ Tenofovir(TDF)	b. renal failure
70. ___ Zidovudine (AZT)	c. diarrhoea
71. ___ Efavirenz(EFV)	d. anaemia

72. Which of the following persons **do not** qualify for ART yet?

- a) 35 year old with history of PCP; CD4 of 280
- b) 20 year old with CD4 of 375 and oral candidiasis
- c) 40 year old with CD4 of 550 and pruritic papular eruption
- d) 24 year old with CD4 of 650 and tuberculosis

73. Which of the following drugs can safely be used together?

- a) phenytoin and EFV
- b) TDF and streptomycin
- c) NVP and rifampicin
- d) TDF and atenolol

74. A HIV positive pregnant woman has a serum creatinine of 65 and no symptoms of mental illness. Which ARV's do you prescribe?

- a) TDF 300mg, FTC 200mg, EFV 600mg once daily from 12 weeks pregnancy and breastfeeding.
- b) AZT, 300mg BD at 12 weeks throughout pregnancy and breastfeeding

- c) TDF 300mg, FTC 200mg, EVF 600mg once daily throughout pregnancy and breastfeeding and continue.
- d) AZT 300mg, 3TC 150mg, NVP 200mg BD from 14 weeks and throughout pregnancy

75. In which of the following cases will the nurse **NOT** be able to start first line ART:

- a) RPR positive
- b) Serum creatinine of 105 in 35 year old male, 65kg, 1.63m
- c) Current psychiatric disease
- d) Patient has not disclosed HIV status

76. Which drug is contraindicated if a patient has an eGFR of less than 50?

- a) Efavirenz
- b) Benzathine penicillin
- c) Emtricitabine
- d) Tenofovir
- e)

For question 77–79, match the clinical finding / result with the most correct management. Write a, b, c in the space provided below.

77. _____

78. _____

79. _____

<p>77. ___ Regimen: TDF,FTC,EFV: eGFR < 50 and Hep B negative, VL50</p>	<p>a) Increase adherence b) Switch one ART drug c) Switch to second line</p>
<p>78. ___Regimen: TDF, FTC, EFV: VL > 1000 for second time and Hep B negative</p>	
<p>79. ___ Regimen: TDF, FTC, EFV: VL > 1000 for the first time and Hep B negative</p>	

80. What do you understand by virological failure?

SECTION E: OPEN QUESTION

81. Can you think of anything that will help you to improve your confidence and knowledge in managing patients living with HIV?

APPENDIX 5: Participants information leaflet and consent

PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

TITLE OF THE RESEARCH PROJECT: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district.

REFERENCE NUMBER:

PRINCIPAL INVESTIGATOR: D.J. Solomons

ADDRESS: 63 Luckhoff Street Idasvalley Stellenbosch 7600 **CONTACT NUMBER:** 0828315001 or 021 8872721

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher or fieldworker any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you could be involved. Also, your participation is **entirely voluntary** and you are free to decline to participate. If you say no, this will not affect you negatively in any way whatsoever. You are also free to withdraw from the study at any point, even if you do agree to take part.

This study has been approved by the **Health Research Ethics Committee at Stellenbosch University** and will be conducted according to the ethical guidelines and principles of the international Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

The primary aim is to determine the factors that influence the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district in the Western Cape.

The study will be conducted at primary health care clinics in the Cape Winelands and Cape Metro pole districts. The study aims to recruit 256 professional nurses who are authorised to prescribing antiretroviral therapy. Participants will be subjected to complete a questionnaire for at least 60 minutes. Participants will not be exposed to any medication in the study.

Why have you been invited to participate?

Many nurses have been trained and certified in nurses-initiated and –managed antiretroviral therapy (NIMART). However, studies have not focused on the confidence and knowledge of nurses who are currently prescribing ART. Studies show different entry criteria for NIMART training, various training methods and variable outcomes. Furthermore, various other health systems barriers to the implementation of NIMART have been identified that could impact on the success and sustained effect of NIMART.

What will your responsibilities be?

Participants are expected to respond honestly to the questions posed in the questionnaire. Your contribution will help the researcher to have a better understanding about these factors and how to improve the NIMART programme and patient care. Participants are expected to complete the demographic information, confidence, multiple choice questions and open-ended questions.

Will you benefit from taking part in this research?

Great progress in enhancing the quality of life of people living with HIV/AIDS through antiretroviral treatment programmes has been established in the past years. Professional nurses were empowered to administer and initiate ART through training and mentoring, which broadened the support and care to patients but also brought treatment to the doorstep of patients at local clinics. A questionnaire, although it's inherit limitations is acknowledged, is a useful tool to assess the confidence and knowledge of professional nurses and identify gaps or challenges that they may face when prescribing ART. This also paves the way for future training interventions or protocol

adaptations based on the scientific findings of this study.

Are there in risks involved in your taking part in this research?

Minimal risks or discomforts will be experienced by participants since dates, times and venues for completion of questionnaires will be arranged to coincide with regular meetings were possible.

If you do not agree to take part, what alternatives do you have?

Participation is voluntary. Refusal to participate in the research study will have no impact or effect on the professional nurses' qualifications.

Who will have access to your completed questionnaire?

All data will be handled in a confidential manner and only the investigators will have access to the original data. No participant names will be recorded on the questionnaires to ensure anonymity.

Will you be paid to take part in this study and are there any costs involved?

No you will not be paid to take part in the study.

Is there anything else that you should know or do?

You can contact Mrs. D.J Solomons at tel. 0828315001 or 0218872721 if you have any further queries or encounter any problems.

You can contact the study supervisor, Mrs T Crowley or the Head of the Division of Nursing at 0219389036.

You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study doctor.

You will receive a copy of this information and consent form for your own records.

Declaration by participant

By signing below, I agree to take part in a research

study entitled: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district.

I declare that:

I have read or had read to me this information and consent form and it is written in a language with which I am fluent and comfortable.

I have had a chance to ask questions and all my questions have been adequately answered.

I understand that taking part in this study is **voluntary** and I have not been pressurised to take part.

I may choose to leave the study at any time and will not be penalised or prejudiced in anyway.

I may be asked to leave the study before it has finished, if the fieldworker or researcher feels it is in my best interests, as agreed to.

Signed at (*place*) on (*date*)2015.

.....

Signature of participant

Signature of witness

Declaration by investigator

I (*name*) declare that:

I explained the information in this document to.....

I encouraged him/her to ask questions and took adequate time to answer them.

I am satisfied that he/she adequately understands all aspects of the research, as discussed above

I did / did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) on (*date*) 2015

.....

Signature of investigator Signature of witness

Declaration by interpreter

I (*name*) declare that:

I assisted the investigator (*name*) to explain the
information in this document to (*name of participant*)
..... using the language medium
of

Afrikaans/Xhosa.

We encouraged him/her to ask questions and took adequate time to answer them.

I conveyed a factually correct version of what was related to me.

I am satisfied that the participant fully understands the content of his informed consent document
and has had all his/her question satisfactorily answered.

Signed at (*place*) on (*date*).....

.....

Signature of interpreter Signature of witness

APPENDIX 6: CERES AND DRAKENSTEIN



STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House, 8 Riebeeck Street, Cape Town, 8001
www.capegateway.gov.za

REFERENCE: WC_2015RP53_429
ENQUIRIES: Ms Charlene Roderick

PO Box 14189
Sinoville 0129
Synergetica Campus
Burkea Crescent 58

For attention: **Mrs Deborah Solomons**

**Re: FACTORS INFLUENCING THE CONFIDENCE AND KNOWLEDGE OF PROFESSIONAL NURSES
PRESCRIBING ANTIRETROVIRAL THERAPY IN A RURAL AND URBAN SETTING.**

Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.

Please contact **SURINA NEETHLING** ON **023 348 8120** to assist you with any further enquiries in accessing the following sites:

Ceres Hospital
Drakenstein

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (annexure 9) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za)
3. The reference number above should be quoted in all future correspondence.

Yours sincerely


DR A HAWKRIDGE
DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 31/8/2015.

CC L PHILLIPS

DIRECTOR: CAPE WINELANDS

APPENDIX 7: STELLENBOSCH



STRATEGY & HEALTH SUPPORT
Health.Research@westerncape.gov.za
tel: +27 21 483 6857; fax: +27 21 483 9895
5th Floor, Norton Rose House., 8 Riebeeck Street, Cape Town, 8001
www.capegateway.gov.za

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ENQUIRIES: Ms Charlene Roderick

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Thank you for submitting your proposal to undertake the above-mentioned study. We are pleased to inform you that the department has granted you approval for your research.

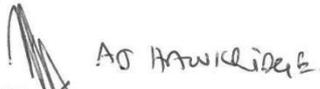
Please contact **SURINA NEETHLING** ON **023 348 8120** to assist you with any further enquiries in accessing the following sites:

Stellenbosch Hospital

Kindly ensure that the following are adhered to:

1. Arrangements can be made with managers, providing that normal activities at requested facilities are not interrupted.
2. Researchers, in accessing provincial health facilities, are expressing consent to provide the department with an electronic copy of the final feedback (annexure 9) within six months of completion of research. This can be submitted to the provincial Research Co-ordinator (Health.Research@westerncape.gov.za)
3. The reference number above should be quoted in all future correspondence.

Yours sincerely


DR A HAWKRIDGE
DIRECTOR: HEALTH IMPACT ASSESSMENT

DATE: 11/9/2015.
CC L PHILLIPS

DIRECTOR: CAPE WINELANDS

APPENDIX 8: CITY OF CAPE TOWN



CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

CITY HEALTH

Dr Hélène Visser
Manager: Specialised Health

T: 021 400 3981 F: 021 421 4894 M: 083 258 8718
E: Helene.Visser@capetown.gov.za

2015-10-12

Re: Research Request: Factors influencing the confidence and knowledge of professional nurses prescribing antiretroviral therapy in a rural and urban district 6504 (ID No: 10519)

Dear Ms Solomons,

Your research has been approved as per your request. NIMART nurses will be recruited from sites indicated on the attached NIMART-CMART Progress Report updated 07 September 2015.

Eastern Sub District:

Contact People

Dr P Nkurunziza (Sub District Manager)
Tel: (021) 850-4315 / 084 800 0644
Mrs T de Villiers (Head: PHC & Programmes)
Tel: (021) 850-4312

Northern Sub District:

Contact people

Dr A Zimba (Sub District Manager)
Tel/Cell: (021) 980-1230 / 084 627 2425
Mrs J Coetzee (Head: PHC & Programmes)
Tel/Cell: (021) 980-1211

Mitchells Plain Sub District:

Contact People

Mrs S Eiloker (Sub District Manager)
Tel: (021) 391-5012/ 084 222 1478
Mrs N Nqana (Head: PHC & Programmes)
Tel: (021) 391-0175/ 084 2221489

Southern Sub District:

Contact People

Mr M Cupido (Acting - Sub District Manager)
Tel: (021) 710-8295/ 084 2200 145
Mrs K Shuping (Acting Head: PHC & Programmes)
Tel: (021) 710-9383

Klipfontein Sub District:

Contact People

Mr K Nkoko (Sub District Manager)
Tel: (021) 630-1667/ 082 433 1332
Mrs T Nojaholo (Head: PHC & Programmes)
Tel: (021) 630-1626/ 084 220 0133

Khayelitsha Sub District:

Contact People

Dr V de Azevedo (Sub District Manager)
Tel: (021) 360-1258/ 083 629 3344
Mrs S Patel Abrahams (Head: PHC & Programmes)
Tel: (021) 360-1153/ 084 405 6065

CIVIC CENTRE ISIKO LOLUNGU BURGERSENTRUM
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Making progress possible. Together.

Tygerberg Sub District:

Contact People:

Mrs M Alexander (Sub District Manager)
Tel: (021) 938-8279 / 084 222 1471
Mrs D Titus (Head: PHC & Programmes)
Tel: (021) 938-8281 / 084 308 0596

Western Sub District:

Contact People:

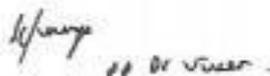
Mrs G Sifanelo (Sub District Manager)
Tel/Cell: (021) 514-4122 / 084 630 2903
Mrs M Stanley (Head: PHC & Programmes)
Tel/Cell: (021) 514-4124 / 072 329 6361

Please note the following:

1. All individual patient information obtained must be kept confidential.
2. Access to the clinic staff must be arranged with the relevant Managers such that normal activities are not disrupted.
3. A copy of the final report must be sent to the City Health Head Office, P O Box 2815 Cape Town 8001, within 6 months of its completion and feedback must also be given to the clinics involved.
4. Your project has been given an ID Number (10519). Please use this in any future correspondence with us.

Thank you for your co-operation and please contact me if you require any further information or assistance.

Yours sincerely



DR G H VISSER
MANAGER: SPECIALISED HEALTH

cc. Dr Nkurunziza & Ms de Villiers
Mrs Elloker & Ms Nqana
Mrs Alexander & Mrs Titus
Mr Cupido & Mrs K Shuping
Mrs Sifanelo & Mrs Stanley
Dr Zimba & Ms Coetzee
Mr Nkoko & Mrs Nojaholo
Dr de Azevedo & Mrs Patel Abrahams
Dr Jennings

APPENDIX10: TECHNICAL EDITING

DECLARATION BY TECHNICAL EDITOR

I, Jennifer Saunders herewith declare that I had technically edited the thesis of Deborah Solomons that is entitled‘ **FACTORS INFLUENCING THE CONFIDENCE AND KNOWLEDGE OF PROFESSIONAL NURSES PRESCRIBING ANTIRETROVIRAL THERAPY IN A RURAL AND URBAN DISTRICT**’

Yours sincerely

JJSaunders

(NDipl & BTech Library and Information Science)

Date: 2 December 2017