Cape Peninsula
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READINESS FOR PROVISION OF HIV CARE AMONG FINAL-YEAR NURSING STUDENTS FROM ONE UNIVERSITY IN THE WESTERN CAPE

by

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DECLARATION

I, **Mandiwana Pfarelo** declare that the contents of this thesis titled “Readiness for provision of HIV care among final-year nursing students from one university in the Western Cape” represent my own unaided work, and that the thesis has not previously been submitted for academic examination towards any qualification. Furthermore, it represents my own opinions and not necessarily those of the Cape Peninsula University of Technology.

Signature: … …….. **Dates: December 2020**

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ABSTRACT

Background: HIV is still a health burden that requires healthcare workers to have a high level of readiness for the provision of HIV care. Students are the healthcare workers of tomorrow, and they will play an important role in eradicating the HIV burden in South Africa. Therefore, it is essential to ensure that they are ready to provide care to people living with HIV.

Purpose: The purpose of the study was to determine the level of readiness among final-year nursing students for the provision of four aspects of HIV care at one university in the Western Cape nursing training institution.

Objectives: Guided by HIV care aspects adopted from the competency model, this study determined the level of readiness of final-year nursing students for the provision of HIV care, specifically with regard to HIV prevention, promotion of health of people living with HIV (PLWH), evaluation of the health status of PLWHIV, and HIV management.

Method and sample: A cross-sectional survey was conducted among 103 final-year nursing students registered for the 2017 academic year at an urban campus of one of the nursing training institutions in the Western Cape. An all-inclusive sampling technique was applied, and data were collected through the use of a self-administered questionnaire which was completed after written consent had been obtained from the respondents, taking into consideration and adhering to all ethical principles. The designated instrument was validated and tested for reliability prior to the commencement of the survey. Respondents returned the completed questionnaires to the researcher on the same day.

Using the IBM® SPSS® Statistics version 24 software, the collected data were captured for statistical analysis with the assistance of a statistician. A score was allocated to each item on the questionnaire, and descriptive and inferential statistics were conducted. Quantitative variables were described through analysis of the frequency of distribution, the median, mean, range, standard deviation and the percentage for categorical variables.

Findings: Overall readiness for HIV care among final-year nursing students at one of the nursing training institutions in the Western Cape is moderate, at 73.9%. The results drawn from all four HIV aspects (HIV prevention, health promotion for PLWHIV, evaluation of

health status for PLWHIV, and HIV management) were evaluated, with each explored on areas of interest, which were willingness, confidence, and knowledge. A clear picture emerged that the students are highly willing (84.2%), moderately confident (78.6%), but display low levels of knowledge (59%) in all aspects. Students displayed the highest percentages in readiness for health promotion for PLWHIV (79.5%), followed by HIV prevention (73.2%), evaluation of health (71.8%), and lastly HIV, with the lowest score (71.6%).

Conclusion: The results indicated a moderate level of readiness. This requires some intervention to be implemented to mitigate the situation in order to improve the readiness of final-year nursing students, thus improving nursing at hospitals and in the healthcare system.

Key words: Nursing students, readiness, HIV care

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TABLE OF CONTENTS

Declaration i

Abstract ii

Acknowledgements iv

Table of contents v

Figures and Tables x

Figures x

Abbreviations and acronyms xii

Definition of concepts xiv

1 Chapter 1 – Orientation to the study 1

1.1 Introduction 1

1.2 Background 2

1.3 HIV in South Africa 2

1.4 Pre-service nursing training in South Africa 4

1.5 HIV in-service training in South Africa 5

1.6 Nurses' HIV knowledge, willingness and confidence 6

1.7 Problem statement 7

1.8 Research question 8

1.9 The purpose of the study 8

1.10 Objectives of the study 9

1.11 Significance of the study 9

1.12 Rationale for the research 10

1.13 Layout of the thesis 10

1.14 Summary of the chapter 11

2 Chapter 2 – Literature review 12

2.1 Introduction....12
2.2 Conceptual framework....13
2.3 Under graduate nursing training in SA....15
2.4 Application of the framework to the study....16
2.5 Prevention of HIV infection by nurses....17
2.5.1 HIV counselling and testing (HCT)....17
2.5.2 Prevention of mother-to-child transmission (PMTCT)....20
2.5.3 Pre-exposure prophylaxis (PrEP)....22
2.5.4 Post exposure prophylaxis....23
2.5.5 Voluntary medical male circumcision (VMMC)....24
2.5.6 Behavioural intervention for HIV prevention....25
2.5.7 Challenges of implementing an HIV prevention intervention for people living with HIV....26
2.6 Promotion of health of PLWHIV by nurses....27
2.6.1 Promotion of nutrition in PLWHIV....28
2.6.2 Life-style changes and support for PLWHIV....29
2.6.3 Reproductive health service for PLWHIV....31
2.7 Evaluation of health status of PLWHIV by nurses....32
2.7.1 Retention of PLWHIV at health facilities....32
2.7.2 Monitoring HIV infection....33
2.7.3 Monitoring of opportunistic diseases....34
2.8 HIV management of PLWHIV by nurses....35
2.8.1 Initiation of treatment....35
2.8.2 Management of HIV opportunistic diseases....36
2.8.3 Palliative care....37
2.8.4 Compliance with treatment....37

2.9 Summary of the chapter 38
3 Chapter 3 – Research design and methodology 40
3.1 Introduction....40
3.2 Research paradigm 40
3.3 Research approach 41
3.4 Research design....42
3.5 Research setting....42
3.6 Population 42
3.7 Sample, sampling technique and sample size 43
3.8 Recruitment and data-collection process 44
3.9 Instrument 45
3.10 Pre-test of the instrument 46
3.11 Data analysis....47
3.12 Academic rigour....48
3.12.1 Validity....49
3.12.1.1 Content validity 49
3.12.1.2 Face validity....50
3.12.2 Reliability....51
3.13 Ethical considerations....51
3.13.1 Right to self-determination and voluntary consent 52
3.13.2 Right to justice and fair treatment 53
3.13.3 Right to confidentiality and privacy 53
3.13.4 Beneficence and non-maleficence....54
3.13.5 Treatment of data 54
3.13.6 Dissemination....54
3.14 Limitations of the study....55

3.15 Summary of the chapter 55
4 Chapter 4 – Presentation of research results 57
4.1 Introduction 57
4.2 Demographics of respondents 58
4.2.1 Age and gender 58
4.2.2 Marital status 60
4.2.3 Previous healthcare work-related experience of respondents 60
4.2.4 History of a family member or co-worker living with HIV 61
4.3 Readiness to provide HIV care 62
4.3.1 Respondents readiness for provision of HIV preventive care 64
4.3.1.1 Respondents willing to provide preventive HIV care 64
4.3.1.2 Respondents confident to provide preventive HIV care 65
4.3.1.3 Respondents' knowledge of HIV preventive care 66
4.3.2 Respondent's readiness with regard to promotion of health in people living with HIV 67
4.3.2.1 Respondents willing to promote the health of PLWHIV 67
4.3.2.2 Respondents confident to promote the health of PLWHIV 68
4.3.2.3 Respondents' knowledge of promotion of health of PLWHIV 69
4.3.3 Respondents' readiness in the provision of health status evaluation for people living with HIV 70
4.3.3.1 Respondents willing to evaluate the health status of PLWHIV 71
4.3.3.2 Respondents confident in evaluating the health status of PLWHIV 71
4.3.3.3 Respondents' knowledge in evaluating the health status of PLWHIV 73
4.3.4 Respondents' readiness in provision of HIV management to people living with HIV 74
4.3.4.1 Respondents willing to provide HIV management of PLWHIV 74

4.3.4.2 Respondents confident in providing HIV management of PLWHIV 75
4.3.4.3 Respondents' knowledge of providing HIV management of PLWHIV 76
4.4 Summary of the chapter 77
5 Chapter 5 – Discussion 79
5.1 Introduction 79
5.2 Demographics 79
5.3 Readiness to provide HIV care 81
5.3.1 Respondents' readiness in HIV prevention 81
5.3.2 Respondents' readiness in provision of health promotion for PLWHIV 86
5.3.3 Respondents' readiness for provision of health status evaluation for PLWHIV 90
5.3.4 Respondents' readiness in provision of HIV management of PLWHIV 94
5.4 Summary of the chapter 97
6 Chapter 6 – Conclusion and recommendations 99
6.1 Introduction 99
6.2 Conclusions of the study 99
6.3 Recommendations 102
6.3.1 Recommendations for nursing education institution 102
6.3.2 Recommendations for healthcare institutions 103
6.3.3 Recommendations for nursing students 104
6.3.4 Recommendation for further research 104
6.4 Summary of the chapter 105
7 Appendices 130
8 Appendix A – Research information 130
9 Appendix B – Consent form: Declaration by participant 133
10 Appendix C – Self-administered questionnaire 135
11 Appendix D - Letter of support from Student Counselling Department 139

12 Appendix E – Arrangements to access the campus 141

13 Appendix F – Ethics clearance certificates 142

14 Appendix G – Declaration from the editor 144

FIGURES AND TABLES

FIGURES

Figure 2-1: Conceptual framework guided by (Knebel et al., 2008) 15

Figure 4-1: Age distribution of respondents 59

Figure 4-2: Respondents' gender distribution 59

Figure 4-3: Respondents' marital status 60

Figure 4-4: Previous healthcare work-related experience of the respondents 61

TABLES

Table 3-1: Content Validity 50

Table 3-2: Reliability test 51

Table 4-1: History of a family member or co-worker having HIV 61

Table 4-2: Overall respondents' readiness level and in each HIV care aspect 64

Table 4-3: Respondents' willingness to provide HIV preventive care 65

Table 4-4: Respondents confident in providing HIV prevention 66

Table 4-5: Respondents' knowledge in HIV preventive care 67

Table 4-6: Respondents' willing to promote the health of PLWH 68

Table 4-7: Respondents confident to promote the health of PLWH 69

Table 4-8: Respondents' knowledge in promotion of health of PLWH 70

Table 4-9: Respondents' willing to evaluate the health status of PLWH 71

Table 4-10 Respondents' confidents in evaluating the health status of PLWH 72

Table 4-11: Respondents' knowledge to evaluate the health status of PLWH 73

Table 4-12: Respondents willing to provide HIV management of PLWH 75

Table 4-13: Respondents confident in providing HIV management of PLWH 76

Table 4-14: Respondents' knowledge in providing HIV management of PLWH..... 77

ABBREVIATIONS AND ACRONYMS

AIDS:	Acquired Immunodeficiency Syndrome
ART:	Antiretroviral Therapy
MBI:	Body Mass Index
CD4:	Cluster of Differentiation 4
CDC:	Centers for Disease Control and Prevention
HAART:	Highly Active Antiretroviral Treatment/Therapy
HCT:	HIV Counselling and Testing
HIV:	Human Immunodeficiency Virus
IBM® SPSS®:	Statistical Package for Social Sciences
LTFU:	Loss to follow-up
NACA:	National Agency for the Control of Aids
NGO:	Non-Profit Organisations
NIMART:	Nurse Initiated Management of Antiretroviral Therapy
PCR:	Polymerase Chain Reaction
PEP:	Post-Exposure Prophylaxis
PrEP:	Pre-Exposure Prophylaxis
PHC:	Primary Health Care
PLWHIV:	People Living With HIV
PMTCT:	Prevention of Mother-to-Child Transmission
PPE:	Personal Protective Equipment
SANC:	South African Nursing Council
STIs	Sexually Transmitted Infections
STRETCH:	Streamlining Tasks and Roles to Expand Treatment and Care for HIV

TB:	Tuberculosis
UNAIDS:	Joint United Nation Programme on HIV/AIDS
VMMC:	Voluntary Medical Male Circumcision
WHO:	World Health Organization

DEFINITION OF CONCEPTS

Nursing student is a person undergoing education and training at a registered nursing institution to become a learner nurse of all nursing categories including professional nurse, registered under Section 32 of the Nursing Act 33 of 2005. In this study, 'nursing student' refers to final-year students of the R425 nursing programme in one of the nursing training institutions in the Western Cape.

Readiness is the state of being willing and prepared to do something (*Concise Oxford English Dictionary*, 1990:1221). In this study, readiness implies being willing and confident to provide HIV care as well as having accurate and updated HIV care-related knowledge.

Willingness is a state of not objecting to do something (*Concise Oxford English Dictionary*, 1990:1702). In this study, willingness indicates having the desire and accepting to provide HIV care to PLWHIV.

Confidence is the belief in one's own abilities to do something and includes being successful (*Concise Oxford English Dictionary*, 1990:302). In this study, confidence refers to the student's view in his or her own ability to provide HIV care to PLWHIV.

Knowledge is the information, understanding and skills as acquired through education or experience (*Concise Oxford English Dictionary*, 1990:827). For the purpose of this study, knowledge refers to the understanding of HIV care aspects and the ability to apply and transfer the acquired information into practice by the final-year nursing student at a selected nursing training institution in the Western Cape.

HIV care refers to non-antiretroviral therapy clinical services, treatment of HIV-related infection, and non-clinical services that in combination with ART contribute towards reduction of ill-health and death among PLWHIV (UNAIDS, 2016b). In this study, HIV care relates to HIV prevention, promotion of health of PLWHIV, evaluation of health status for PLWHIV and HIV management of PLWHIV by nurses (Knebel et al., 2008).

Chapter 1 – Orientation to the study

1.1 Introduction

Human immunodeficiency virus (HIV) has been one of the country's major health concerns for more than three decades, and a substantial number of interventions have been implemented to fight this deadly disease (Van Dyk, 2013:4). Interventions to fight the epidemic have been implemented, such as the 90/90/90 global target which aims to ensure that 90% of the population living with HIV know their status, 90% of those diagnosed with HIV are on treatment, and 90% of those on treatment are virally suppressed (Rabkin et al., 2017:353). The 90/90/90 global target ending in 2020 has shown improvement, as globally, by the year 2019, 81% of people living with HIV knew their status. Among those diagnosed, 82% were on ART, and 88% of those on treatment were virally suppressed, while only 59% of people living with HIV were virally suppressed (UNAIDS, 2020b:3). This shows a slight increase of 2% to 4% for all the indicators from 2018 as documented by Marsh et al. (2019:S213). However, in 2019 in South Africa it was recorded that the first 90 target was achieved, as 92% of people living with HIV knew their status. Among those diagnosed, 75% were on ART, and 92% of those on treatment were virally suppressed, with only 64% of those living with HIV reported as being virally suppressed, globally (UNAIDS, 2020a:249). The success of many of the interventions requires the involvement of nurses as healthcare workers. According to the South African Nursing Council (SANC) 2016 statistics, more than 35 000 nurses are trained in South Africa annually. Such training can improve knowledge, confidence and willingness to provide HIV care to PLWHIV.

A 2011 study reported medium-level knowledge of HIV; nurses with experience had better knowledge and were more willing to provide HIV care than those without experience (Mulaudzi et al., 2011:30). In addition, Knebel et al. (2008) and Zuber et al. (2014:520) indicated that important aspects of HIV care were not included in pre-service training. This indicates that upon graduation, nurses might not be ready to provide HIV care independently, hence the need to establish their readiness level before graduation.

1.2 Background

HIV has existed worldwide for more than 35 years, and it continues to burden affected family members, community members, society and the country's economy in numerous ways (Van Dyk, 2013:4). The HIV epidemic has shown a negative impact on various workplaces as it directly affects morbidity and mortality, resulting in absenteeism which in turn leads to a decline in production, increased training costs for all new employees because of turnover, and a high labour attrition rate (Van Dyk, 2013:464). Thus, the world has made a commitment to eradicate the HIV epidemic by 2030, and the provision of antiretroviral therapy (ART) is one of the strategies planned to facilitate suppression of HIV replication (Barouch & Deeks, 2014:169, UNAIDS, 2016a). ART global coverage has shown a huge increase, with more than 26 million people on therapy, and ART has been proved to work effectively with minimal manageable side effects. ART provision has reduced AIDS-related death by 60% globally since 2004, and 36% in eastern and southern Africa since 2010 (UNAIDS, 2020b). However, the number of newly diagnosed people has increased, with as many as 1.7 million new HIV infections estimated during 2019, thus adding to 38 million people living with HIV worldwide towards the end of 2019 (UNAIDS, 2020b:1). Sub-Saharan countries account for more than 70% of global HIV infections, and South Africa accounts for 25% of the total figure (Kharsany & Karim, 2016:34). The production of competent nurse graduates ready to provide HIV care to PLWHIV is one of the measures with great potential in the fight against the HIV epidemic; hence nursing students need to be well equipped upon graduation.

1.3 HIV in South Africa

HIV infections in South Africa are still escalating, with an increase from 6.1 million in 2010, an estimated 7.7 million people living with HIV in 2018 (UNAIDS, 2019:62) and 7.8 million in 2020 (Statistics South Africa, 2020). There has been a reduction in the numbers of AIDS related deaths since 2010, with 50 % decrease moving from 140 000 to 71 000 in 2018 (UNAIDS, 2018). HIV prevalence in the Western Cape province, where the study was conducted, is about 12.6% of the total population 6 293 200 people (Human Sciences Research Council (HSRC), 2018:2). Noteworthy is the HIV prevalence among men involved in homosexual relationships. This is estimated to be between 22% and 48%, and

has increased by more than 10% in the Western Cape, while 40% prevalence is observed among sex workers in Cape Town and 16% among injecting drug users (UNAIDS, 2016a). In 2016, in the Western Cape, about 37% of new infections were young women between the ages of 15 and 24, as they are at almost four times greater risk than men of their age. Some of the reasons for increased prevalence among young women were poverty, gender-based violence, and intergenerational relationships (Avert, 2018).

South Africa has implemented numerous programmes to alleviate the burden of HIV; programmes such as the Prevention of Mother-to-child Transmission (PMTCT), Voluntary Medical Male Circumcision (VMMC), condom distribution, life skills, and ART provision, and even TV programmes such as *Soul Buddyz* and *Love Life* have played an essential role in HIV education and prevention (UNAIDS, 2016a). These have been successful to some degree, as South Africa has achieved the 90% target to diagnose people living with HIV and managed to reach 90% coverage of ART among pregnant women (UNAIDS, 2018:57). ART coverage has also increased to 72% among women diagnosed with HIV and up to 57% among men diagnosed with HIV in South Africa (UNAIDS, 2018:57). However, South Africa faces challenges with regard to expanding ART owing to a shortage of doctors to initiate the treatment, resulting in people having to wait for doctors to initiate it (Fairall et al., 2012:889). South Africa therefore engaged in task shifting, where nurses are expected to initiate and monitor patients on ART (Colvin et al., 2010:210). However, this task shifting adds to nurses' workloads and requires training. A further requirement includes logistics and an infrastructure-friendly environment for a seamless supply of treatment (Monyatsi et al., 2012:36).

Nurses are the backbone of health service delivery; they play a major role in providing HIV care and helping countries attain their global commitment to the goal (Rabkin et al., 2017:353). Among the different categories of healthcare workers, nurses are not only involved in the provision of ART; they also play an important role in monitoring, managing, preventing and treating HIV worldwide. Nurses comprise the largest complement of healthcare workers who render healthcare to HIV-infected patients at different stages; their ability and readiness to provide HIV care to PLWHIV require adequate HIV knowledge, confidence and willingness in both their capacity as professionals and as

individuals (UNAIDS, 2016a). Such abilities should be developed during their training; hence the value of determining Western Cape final-year nursing students' readiness for providing HIV care.

1.4 Pre-service nursing training in South Africa

In South Africa, nurses are trained at 149 registered educational institutions in South Africa. These institutions train approximately 35 350 students per annum to become registered nurses. They aim to provide student nurses with a wide range of knowledge, confidence and willingness to enable them to make a meaningful and sustainable contribution to the healthcare sector (SANC, 2016). Nursing training in South Africa consists of different categories of nurses. The first category constitutes registered professional nurses who study for four years to become comprehensively trained nurses such as general, psychiatric, and community nurses and midwives under the registration R425 (SANC, 2016). A further category comprises registered enrolled nurses who have completed a two-year course and who may progress through a bridging course to register as a general nurse practitioner. There is also the Higher Certificate in Auxiliary Nursing, a one-year programme. Since 2019, new pre-service programmes commenced with a four-year Bachelor of Nursing degree, with registration as a professional nurse and midwife at the end of the programme; a three-year Diploma in Nursing for a general nurse, and a one-year Higher Certificate: Auxiliary Nursing. All nursing categories play different roles as prescribed by the scope of practice (R2598), ranging from basic nursing care to extensive and intensive nursing care, with the professional nurse being in charge of ensuring care is provided comprehensively and acting as a supervisor to the other categories of nurses. During training, students are given an opportunity to have field exposure or practical experiential learning, enhancing their skills and competencies to be ready for practice upon graduation (SANC, 2016).

The literature has noted that in pre-service training, nurses are not always adequately prepared to provide HIV care to PLWHIV (Knebel, et al., 2008; Frain, 2017) and important aspects such as Nurse Initiated Management of Antiretroviral Therapy (NIMART) have not been well integrated into all curricula (Zuber et al., 2014). Furthermore, Marie Modeste and Adejumo (2015a) documented some of the struggles of new graduate nurses with

regard to the care and management of HIV, highlighting the shortfalls of the pre-service curriculum. Such shortfalls included limited knowledge, identification of side effects, and unfamiliarity with HIV-related policies (Marie Modeste & Adejumo, 2015a:347). Once in practice, nurses' competency with regard to HIV care and management is strengthened by in-service training.

1.5 HIV in-service training in South Africa

In South Africa, nurses play a major role in the task-shifting initiative which requires them to identify eligible candidates for ART, follow up patients who are on ART, monitor PLWHIV compliance with ART, monitor the effects of ART, and provide quality HIV nursing care, which include being able to do baseline bloods, drug monitoring, CD4 cell count and monthly dispensing of ART (Fairall, et al., 2012:890, Uebel et al., 2013:1).

In further elaboration, Knebel et al. (2008:1) note that nurses in Haiti also perform a leading role in HIV care treatment and prevention programmes; however, they receive insufficient training prior to commencing this service. Training in South Africa is not always included in pre-service training either (Ngcobo & Mchunu, 2019); this observation is similar to the situation in Botswana, where four weeks' ART management training and a four-week clinical mentorship course is offered post-graduation (Monyatsi et al., 2012:34). The aim of the aforementioned training is to teach practising physicians and nurses to prescribe and monitor the outcome of the treatment, manage the side effects of the treatment, do adherence counselling, and provide prophylaxis, and such training facilitates the implementation of task-shifting-related activities (Monyatsi et al., 2012:34).

Callaghan et al. (2010:6) reviewed task shifting for HIV treatment and care in Africa and established that non-physician healthcare workers, including nurses, are capable of providing effective HIV care equal to that of doctors, given adequate training and supervision. Therefore, it is important for nurses to be well informed about the integrated management of HIV and have a positive attitude towards caring for HIV patients, as well as confidence as healthcare workers (Dharmalingam et al., 2015:26).

In addition to ensuring that nurses are capable of providing HIV care, it is also crucial to ensure they are willing and confident to provide such care. In a study done in Israel, it

was observed that there was a moderate willingness to care for patients living with HIV. The study recommended that if students' behavioural beliefs about HIV changed and they were encouraged to care for those living with HIV, their confidence would improve, resulting in increased willingness to provide care (Ben Natan et al., 2015:E4).

1.6 Nurses' HIV knowledge, willingness and confidence

Various researchers have documented varied levels of knowledge and attitudes of nursing students with regard to HIV (Aghamolaei et al., 2009:299; Mulaudzi et al., 2011: 30, Sehume et al., 2012:19; Dharmalingam et al., 2015:22). Dharmalingam et al. (2015: 22) observed in India that the majority of nursing students had adequate HIV knowledge and positive attitudes; however, some were still biased, and this indicated the need to improve students' knowledge in order to improve their willingness to care for PLWHIV during their training. Similarly, Mulaudzi et al. (2011:30) indicated that the few nurses with high levels of HIV knowledge were those with many years of experience when compared with newly qualified nurses. This indicates the gap between the inexperienced neophyte nurses who had just completed their studies and those who had been working with PLWHIV for some time. It has also been noted that the younger and more inexperienced the nurse, the less the willingness to provide care to PLWHIV (Aghamolaei et al., 2009:299; Mulaudzi et al., 2011:30, Sehume et al., 2012:19; Dharmalingam et al., 2015:22). Unfortunately, those who were willing to provide care to PLWHIV often lacked knowledge of HIV care policies. The level of willingness, HIV knowledge and confidence in caring for PLWHIV thus depends on various factors such as the age and gender, as well as experience of a nurse or healthcare worker (Mulaudzi et al., 2011: 30).

In the process of caring for PLWHIV, nurses encounter blood and other bodily fluids; therefore, nurses are identified as vulnerable groups at risk of contracting occupational HIV infection. Therefore, it is essential for student nurses, as future professionals, to have adequate knowledge of the disease and safe practices to prevent HIV transmission (Goel et al., 2010:55; Frain, 2017:129). The paucity of HIV knowledge is not limited to nurses only, as indicated by a study at one university in South Africa. The study observed that final-year nursing and pharmacy students indicated the need to improve their knowledge regarding HIV, as they only possessed a moderate level of HIV knowledge (Naidoo et al.,

2012:4). These results are problematic in respect of the eradication of the HIV epidemic through total management by future healthcare professionals. Expectations of nursing students are extremely high, as they soon will be professionals, required to deliver the aforementioned type of care (Naidoo et al., 2012: 4).

1.7 Problem statement

HIV is a public health problem, and it affects individuals through a weakening of the immune system, thus leaving the body susceptible to opportunistic diseases (Alemayehu et al., 2017:1). Advanced HIV/AIDS has negative impact on labour productivity (Mohamed, 2020:33). This decreases economic growth, while households and communities suffer the consequences (Gezahegn & Upadhyay, 2014:1157). In order to change the impact of HIV on all aspects of society, role players should be willing and confident, and have current knowledge regarding HIV in order to deliver effective care of a high standard to PLWHIV, without discrimination or stigmatisation (Dharmalingam, 2015:22).

The South African government has opted to expand access to ART, and this requires nurses to initiate treatment and monitor patients on treatment to compensate for the shortage of doctors in the delivery of HIV care (Colvin et al., 2010:210). The focus is on providing nurses with the mandate to prescribe ART legally within the regulatory framework; however, it does not highlight the strategy to implement the process.

Nurses in the public sector have benefited from in-service training and support from overseas funded non-governmental organisations (Colvin et al., 2010:210). In South Africa, nurses are not trained to initiate and manage ART during pre-service education; therefore, nurses start their profession without necessarily being ready to provide comprehensive HIV care. Most organisations thus implement compulsory in-service training to teach new staff the basics of HIV care (Zuber et al., 2014:529; Ngcobo & Mchunu, 2019).

As previously stated, student nurses are the healthcare workers of tomorrow, and this makes them key role players in the fight against HIV, as they will be expected to carry out similar roles as health workers in the near future. They thus require a more than average

level of knowledge to fulfil their roles with regard to HIV prevention and management, and evaluation of the health status of PLWHIV.

This said, it is imperative for nursing training institutions to ensure that the curriculum provided is comprehensive in terms of equipping student nurses with sufficient HIV knowledge to enhance the development of positive attitudes towards the provision of quality HIV nursing care. One programme at a university in KwaZulu-Natal is noted as an example (Ngcobo & Mchunu, 2019). This facilitates the production of new nurses with sufficient knowledge, confidence and willingness to care for PLWHIV (Lui et al., 2014: 2).

The status quo in South Africa requires new nurse graduates to attend HIV courses prior to providing HIV care and management (Ngcobo & Mchunu, 2019). Literature has documented that the current pre-service nursing training does not adequately prepare nurses for the provision of HIV care (Knebel, et al., 2008; Relf et al., 2011:e6; Zuber et al., 2014:529), and similar observations were documented by Marie Modeste and Adejumo (2015a:336). Final-year nursing students are required to enter the healthcare system as part of the workforce, and the provision of HIV care will be an important part of their key performance areas; thus, it is important they are ready to perform and practise safely and efficiently. To date, there is no data available in the Western Cape indicative of the level of readiness of final-year nursing students to provide HIV care; hence, the need to determine Western Cape final-year nursing students' readiness to provide HIV care. This is crucial if one considers that there are over 7 million people living with HIV (PLWH) in South Africa (UNAIDS, 2019:62), and HIV is without a doubt acknowledged as a major health priority in the country.

1.8 Research question

What is the level of readiness, for provision of HIV care, among final-year nursing students from one university in the Western Cape?

1.9 The purpose of the study

The purpose of this study was to determine the level of readiness for the provision of HIV care among final-year nursing students from one university in the Western Cape province.

1.10 Objectives of the study

Guided by the HIV competency model as a framework in this study, the objectives of the study were:

- To determine the level of readiness, for HIV prevention, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for health promotion for PLWHIV, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for the evaluation of the health status in PLWHIV, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for provision of HIV management, among final-year nursing students from one university in the Western Cape.

1.11 Significance of the study

Nursing student should be able to manage HIV and should be ready to care for patients or people living with HIV. Nursing students should be willing to care for people living with HIV, be confident to care for people living with HIV, and should have knowledge about HIV. Based on the experience of the researcher, registered nurses manage HIV in different fields, ranging from prevention, promotion, monitoring and care. Final-year students are prepared to care for patients, including those living with HIV. This study established their readiness with regard to HIV care.

The findings of this study could enable the training institution to identify the preparedness of final-year nursing students with regard to the provision of HIV care for PLWHIV. Findings may provide information on the current state of training, and can be used by the training institution as part of their curriculum review. The study may also benefit healthcare sectors, as knowledge about the preparedness of future nurses may be applied in the preparation of orientation and on-boarding processes, as well as in-service training of new nurses.

1.12 Rationale for the research

The researcher is an operational manager of a medical ward in a tertiary hospital. The ward caters for patients with HIV infections. From observations done in the organisation where the researcher works, doctors frequently complain about nurses being unable to provide comprehensive HIV care independently.

Nurses rely on doctors to give instructions on the nature of care that PLWHIV should receive. The organisation where the researcher is employed took the initiative to provide newly qualified nurses with HIV short courses to improve their knowledge of HIV care, as well as their willingness and confidence to provide such care without depending on doctors; however, the funding for this course has been terminated owing to economic limitations and political reasons.

It is important for nurses to be ready in terms of knowledge about HIV care, confidence in providing HIV care, and willingness to provide HIV care. In this study, Western Cape final-year nursing students' readiness to provide HIV care was determined.

1.13 Layout of the thesis

The layout of the thesis is as follows: the first chapter gave an orientation to the study, while Chapter 2 presents a literature review, providing the background to the topic, as well as the framework adopted for this study.

Chapter 3 discusses the research design and methodology used in the study to determine the readiness of final-year students in one of the nursing training institutions in the Western Cape. Design and methodology include population, sample of data collection, validity and reliability of the instrument, ethical considerations, and data analysis methods.

Chapter 4 reports the results in accordance with the objectives. Results are discussed, and shown in tables and pictorially in figures.

Chapter 5 includes the interpretation and discussion of the findings of the study in respect of demographics, readiness in prevention of HIV, readiness in promotion of health among

people living with HIV, readiness with regard to evaluation of health status of people living with HIV, and readiness of students in managing PLWHIV.

Chapter 6 concludes the study, stating how the objectives were achieved and indicating the relationship of the findings to the conceptual framework. It also provides recommendations.

1.14 Summary of the chapter

Although the period allocated to achieving the 90/90/90 global target is nearing its end, HIV/AIDS is still a global concern. However, in South Africa, 92% of people living with HIV know their status; among those diagnosed, 75% are on ART; while 92% of people on treatment are virally suppressed. Globally, Only 64% of people living with HIV are reported as being virally suppressed (UNAIDS, 2020a:249). This outcome was achieved by hardworking health professionals, including nurses from various categories: enrolled nurses, professional nurses, and nurse specialists. Given the heavy workloads in health facilities, the system requires more nurses with appropriate knowledge who are willing and confident to alleviate the burden on the health system. Nursing students who are at the exit level thus should be fully prepared to function independently in caring for PLWHIV.

Gaps in some HIV care aspects (knowledge, willingness, and confidence) have been reported in several studies (Knebel et al., 2008; Mulaudzi et al., 2011; Zuber et al., 2014). It was thus deemed necessary to determine the level of readiness in respect of HIV care among final-year nursing students to ascertain their preparedness for HIV prevention, evaluation of health status, and promotion of health and management of HIV, using a scientific methodology.

Chapter 2 – Literature review

2.1 Introduction

The human immunodeficiency virus as a rapidly mutating condition has infected up to 38 million people worldwide (Land, 2016:127; UNAIDS, 2020a:6). Currently there is no cure for or effective vaccine against HIV; however, there have been positive results from the treatment through a reduction in the number of deaths and new infections (Kharsany & Karim, 2016:34).

South Africa has the highest number of people living with HIV in the world, estimated at about 7 million people in 2015 and 7.7 million in 2018; and HIV continues to be a societal burden, impacting healthcare workers and the economy (UNAIDS, 2016a:1; UNAIDS, 2018; UNAIDS, 2019:62).

In the fight against the HIV epidemic, healthcare institutions play a major role in the prevention, monitoring and treatment of HIV worldwide. As nurses form the bulk of healthcare providers and play an important role in the care of PLWHIV to ensure they receive quality and effective nursing care in South Africa, it is essential that they are trained and equipped to provide care to the more than seven million people living with HIV in the country (Dharmalingam, 2015:22).

South Africa trains nurses over a period of four years to qualify as professional nurses or two years if the nurse has done a previous enrolled nursing course (SANC, 2005). Part of the nurses' training includes communicable diseases and HIV is one of the common communicable diseases. This accord with the directives of the SANC for students to become knowledgeable, skilled healthcare workers with a positive attitude to care for patients (SANC, 2005:2).

Currently, when new graduate nurses start their employment as community service nurses after graduation, they are required to attend a series of HIV-related training courses before they are able to provide HIV-related care in clinical settings. This is standard practice in South Africa (Ngcobo & Mchunu, 2019). This highlights the importance of integrating HIV into nursing curricula and will promote updating current content on HIV. The integration will provide students with an opportunity to undergo

experiential learning with real patients living with HIV (Marie Modeste & Adejumo, 2015b). As a result, student nurses will be ready to take care of people living with HIV once their training is completed. Nursing students' preparedness for HIV care in a nursing training institution in the Western Cape is currently unknown. Therefore, the readiness of nursing students in their final year to provide care for people living with HIV should be determined, as this will provide an opportunity to identify possible gaps in their training, as well as ensuring that the in-service training covers aspects that the new graduate nurses need in the fight against HIV in South Africa.

Readiness to provide HIV care in this study relates to willingness, confidence and knowledge in four aspects of comprehensive HIV care based on the HIV care aspect framework (Knebel et al., 2008:6). For this literature review, a number of databases were searched, such as EBSCO host, Scopus, and Medline. This allowed the researcher to obtain current and relevant literature to inform the study. The four aspects are discussed in the literature review and include provision of HIV prevention, promotion of health of PLWHIV, evaluation of health status for PLWHIV, and HIV management of PLWHIV by final-year students (Knebel et al., 2008:6).

2.2 Conceptual framework

This study assessed final-year nursing students' readiness to provide HIV care, and was guided by an HIV care framework based on the work of Knebel et al. (2008). It is the responsibility of nursing students to understand these HIV care aspects before graduation. The five HIV care aspects and responsibilities emphasise the importance of the knowledge, confidence and willingness to play different roles related to HIV care, namely prevention of HIV; promotion of health; evaluation of health status; and ensuring care and management of the HIV infected people (Knebel et al., 2008). Each HIV care aspect has responsibilities, indicating what needs to be done. Establishing the level of nursing students' readiness for such responsibility was beneficial, as it highlighted possible deficiencies in knowledge, attitudes, confidence and willingness to render HIV care (Knebel et al., 2008).

HIV Care Aspect 1 covered important issues in HIV prevention (Knebel et al., 2008; Dehne et al., 2016:e323). Students are expected to have the knowledge and confidence

to educate individuals and the community about HIV prevention. Student nurses should be willing to provide pre-test counselling prior to HIV testing and post-test counselling, in a clinical setting.

HIV Care Aspect 2 encompassed health promotion for people living with HIV to improve their quality of life (Knebel et al., 2008; Clemenzi-Allen et al., 2020:259). Students are expected to have knowledge, confidence and willingness to conduct educational and promotional programmes such as healthy living, eating nutritional food, and the prevention of opportunistic diseases.

HIV Care Aspect 3 emphasised the importance of students in evaluating the health status of people living with HIV, identifying the stages of HIV in order to manage and treat people with HIV in accordance with WHO and CDC guidelines, and monitoring the disease through conducting tests relevant to the stage that the person with HIV is currently classified under (Knebel et al., 2008; Shoko & Chikobvu., 2019).

For the purpose of this study, HIV Care Aspects 4 and 5 as identified by Knebel, et al. (2008) were combined into one HIV care aspect, ‘HIV management’. This fourth HIV care aspect pertains to the knowledge, confidence and willingness required for caring, treating and supporting PLWHIV.

Possessing the above HIV care aspects is one step towards preparedness of final-year nursing students. Nursing students’ preparedness comprises their willingness and confidence to provide care and management of PLWHIV as developed by Knebel et al. (2008). The readiness of final-year nursing students with regard to the four HIV care aspects was investigated in this study, and the different aspects as well as the related content are illustrated in Figure 2-1.

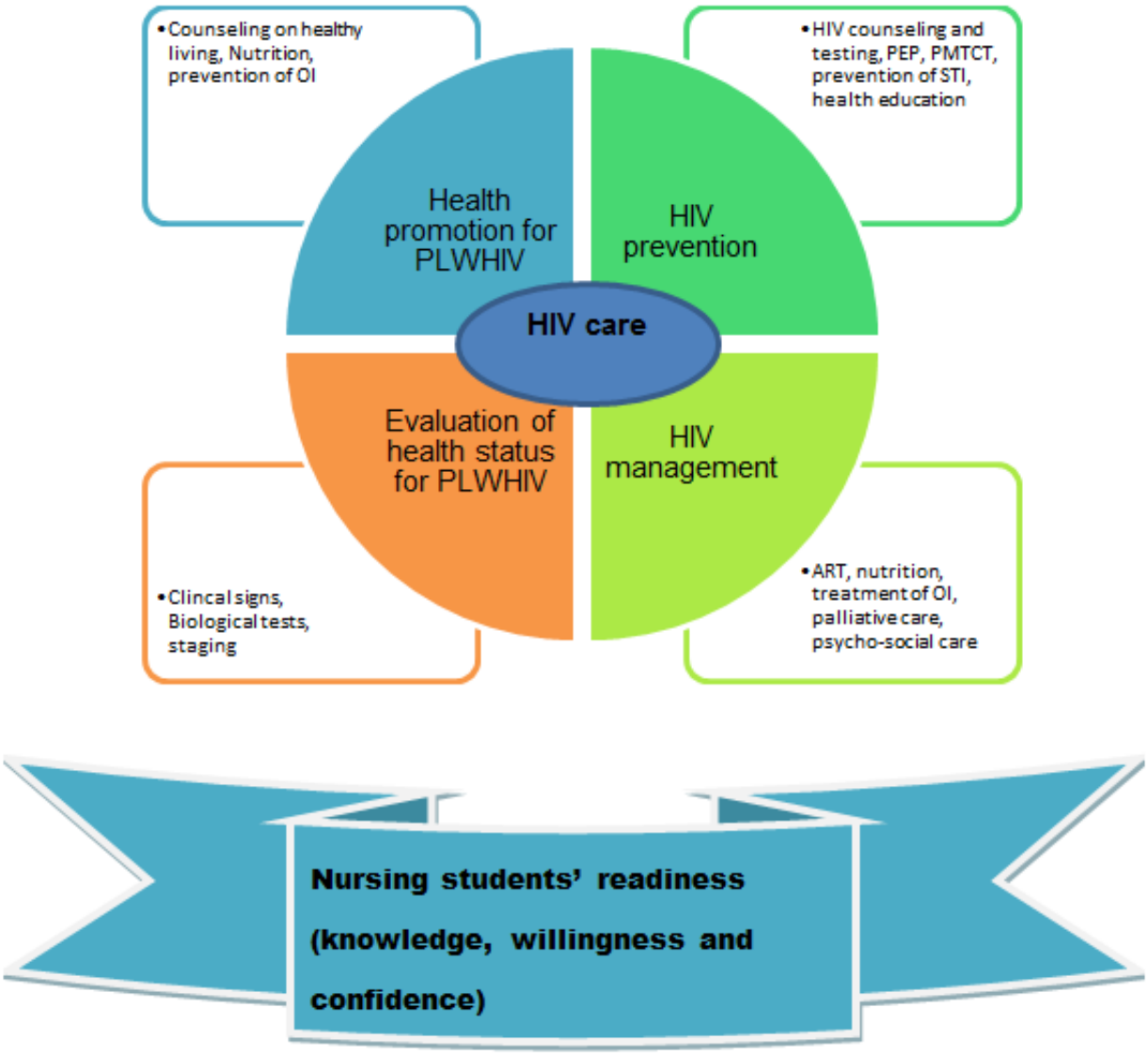

Figure 2-1: Conceptual framework guided by (Knebel et al., 2008)

2.3 Under graduate nursing training in SA

The minimum requirements for entry into a Bachelor of Nursing science training is national senior certificate or equivalent qualification at exit level four. The training institution registers the student for the duration of training with South African Nursing Council and the programme should be accredited (SANC, 2005:3).

On completion of the course, the student is expected to observe and address ethical and legal issues in relation to nursing and midwifery practice, while applying knowledge in

provision of safe nursing care which includes prevention of illness, management of illness and promotion of health, as well as to manage the health care facilities professionally and effectively by applying research and nursing process (SANC, 2005:2). One of the objectives of the undergraduate nursing programme emphasises that the nurse graduate should be able to diagnose individuals' health problems, plan implement and evaluate therapeutic action and nursing care at any point along the health and illness (SANC, 2005:4). In a country like SA where there are over 7 million people living with HIV, special emphasis on HIV is to be considered in the training of nurses.

2.4 Application of the framework to the study

The study aimed at determining the readiness of the final year nursing students on provision of HIV care and framework of the study advocates for empirical aspects to be considered when providing HIV care, namely prevention of HIV; promotion of health for PLWHIV; evaluation of health status for PLWHIV; ensuring care and management for the HIV infected people. This provides the direction in which the study took to clearly determine the readiness for HIV care.

Both learning outcomes and framework outlined the importance of application of knowledge in safe nursing care in inclusive of HIV care, which includes but not limited the prevention of illness, promotion of health and management of illness by applying nursing process. Therefore nursing student should be willing to provide HIV care, confident to provide HIV care and have knowledge to support their provision of HIV care in all aspects at the exit level of the qualification.

The undergraduate nursing programme's objectives requires the graduate nurse to be able to provide care through the whole continuum of illness and health, and that fits with the framework's aspects that include prevention and management. Furthermore, the framework fits the aspects of the UG nursing objectives, as it covers the diagnosis, planning, implementation and evaluation of therapeutic and nursing actions, which includes the provision of preventative care, curative and rehabilitative care.

2.5 Prevention of HIV infection by nurses

According to Chang et al. (2013:65), “Combination implementation for HIV prevention is the pragmatic, localised application of evidence-based strategies to enable high sustained uptake and quality of interventions for prevention of HIV.” Furthermore, strategies include “HIV testing and counselling, treatment as prevention, retention care, treatment support, VMMC, PMTCT, behavioural changes, pre-exposure prophylaxis, task shifting and structural intervention and demand creation” (Chang et al., 2013:70).

2.5.1 HIV counselling and testing (HCT)

HIV counselling and testing is the only way to get to know one’s serostatus; it is one of the essential components of HIV prevention strategies. This component involves other aspects, ranging from counselling, obtaining informed consent, and assessing risk behaviour. The services can be obtained at facilities such as mobile clinics, and through workplace wellness programmes and home-based services for those who are unable to reach facilities where healthcare workers can assist the population to know their status (Chang et al., 2013:67; Chimoyi et al., 2015). Nurses are capable of performing counselling, obtaining consent and doing testing; however, they struggle to do this in an integrated manner as expected in the management of sexually transmitted infections (Leon et al., 2013:12).

Training significantly increased HIV testing; for every general practitioner trained, practice HIV testing rates increased by 16% (testing rate ratio (TRR) 1.16, 95% confidence interval (CI) 1.05–1.28, *p* value = 0.004) (Pillay et al., 2018). This significant effect was demonstrated using an eight-year observation period, and was sustained over the post-intervention period. Averages of 1.42% of HIV tests were positive (Pillay et al., 2018). The effectiveness of the training may be related to the programme components not included in interventions that did not demonstrate an effect, such as peer-led teaching, and use of approaches to communication and rapid risk assessment tailored to the setting (Pillay et al., 2018). One of the interventions that the South African government strives to do in fighting the burden of HIV, is the provision of universal access to HIV testing and counselling as part of prevention and care. Large-scale HIV testing and counselling are

dependent on the implementation of the programme (Guillon, 2018:e1160). HIV counselling and testing is provided free in all public health facilities, even in schools (Strauss et al., 2018:64). Nurses are one of the major role players in HIV counselling and testing in South Africa. One study done in Kenya indicated that nurses are trained to provide services such as HIV testing and counselling as well as health education; however, not all nurses felt competent to do so (Smith et al., 2016:324).

The human rights of every patient should be respected at all times; these constitute the legal and ethical considerations of counselling and testing. There are principles to be applied in providing HIV care, such as counselling, informed consent, confidentiality, correct diagnoses, and referral to prevention, treatment and care (Department of Health, 2016b:2). Informed consent is signed after the individual has received information about HIV, the nature of the test, and its consequences. Testing of an individual is a voluntary action, therefore consent is given in writing and should be filed in the patient's records (Van Dyk, 2013:268). Group counselling can be conducted by an appropriately trained health worker, mentor or counsellor, but facilities must be available for individuals who wish to ask questions in private and post-counselling must be of a high standard (Department of Health, 2016b:2). Counselling and testing are now referred to as HIV testing services, and include counselling, prevention, treatment, care services and support, as well as coordination with laboratories for quality assurance and correct results (Department of Health, 2016a:1). The patient's results may not be disclosed to any other person without his or her consent or a court order. The information can only be shared with the healthcare workers who are directly involved with the care of the patient, as indicated in the National Health Act, No. 61 of 2003, Section 14 (Department of Health, 2003).

Counselling skills are crucial in determining the success or failure of the management of people undergoing counselling and testing. One of the important aspects neglected in counselling is psychosocial counselling for people found to be HIV positive; nurses may have HIV knowledge but lack the psychosocial skills that contribute to the physical wellbeing of the patient (Department of Health, 2016b:2). Counselling skills become better with experience; they require the counsellor to have knowledge of cultural background,

gender issues, educational levels and age ranges. The counsellor needs to have a wide range of knowledge with regard to human behaviour and psychology, as well as the impact of the condition on the individual (Foundation for Professional Development, 2014:23). The emotional impact of HIV infection leads to psychological challenges in patients. These are stress, anxiety, depression and suicidal thoughts (Van Dyk, 2013:288). Therefore, the nurse or counsellor needs to be well equipped to assess signs of distress, and should be able to provide counselling and referral for further management if needed.

The counsellor needs to be objective in the process of counselling; however, there is a tendency for counsellors (especially inexperienced ones) to become emotionally attached to individual cases; therefore, it is essential for psychological auditing to debrief the counsellor so that the counsellor can be in position to handle the psychological problems of others (Foundation for Professional Development, 2014:23).

Nurses carry a wide range of responsibilities with regard to HIV disease management, as they are expected to be competent, confident and skilled in all manifestations of HIV infection and all levels of HIV management. Apart from counselling, nurses provide psychological support and compliance counselling, and assist with monitoring and evaluation of people infected with HIV from the day of diagnosis (Foundation for Professional Development, 2014:29).

Meehan et al. (2015) noted that staff attitudes and competence gave a positive impression to patients who underwent HIV counselling and testing in Cape Town. The respondents reportedly experienced a high level of competence; however, recommendations were that policy makers ought to take note of the need to expand the HIV counselling and testing strategies, particularly to ensure that HIV counselling and testing is accessible and available at all times (Meehan et al., 2015). Counsellors refer patients to other healthcare providers when they cannot provide a wide range of services, for example, in cases of TB, sexually transmitted diseases, and rape. In the process of referring patients to other healthcare providers, the referral should be done with sensitivity, as often patients feel lost in the referral process. Patients should not feel as if it is a shift of burden or termination of a relationship (Van Dyk, 2013:258).

Role players who need counselling skills to tighten the management of HIV in South Africa are nurses, doctors, medical specialists, psychologists, psychiatrists, traditional healers, social workers, occupational therapists, and medical emergency services. They should be equipped with the requisite skills to counsel and support people living with HIV (Foundation for Professional Development, 2014:327).

These role players do different facets of counselling and management of HIV. Obstetricians and gynaecologists will counsel on mother-to-child transmission. Psychiatrists will counsel the patient on central nervous system pathology which results from HIV infection, for example, depression and suicidal ideation; traditional healers will provide critical support therapy and co-manage the HIV while working with healthcare professionals; while social workers extend the counselling to the family of the infected person as well as to community groups. Occupational therapists focus on assessing and equipping those living with HIV with skills to restore their ability to work or redeploy them to a sector where they can continue to contribute economically. Medical emergency service personnel play a major role when they have to provide the public with advice speedily to prevent infection transmission (Foundation for Professional Development, 2014:29).

The entire group of role players, including nurses, are required by law to keep records of consultations and treatments. The records should be locked up to prevent access by unauthorised individuals and to maintain confidentiality. The records should include personal patient details such as names, emotional status at each session, a summary of the main issues discussed in the session, and a summary of interventions the provider has implemented (Van Dyk, 2013:258)

2.5.2 Prevention of mother-to-child transmission (PMTCT)

The prevention of mother-to-child HIV transmission is another HIV intervention strategy that requires considerable nurse intervention. South Africa has achieved a less than five percent (5%) transmission target through a range of antiretroviral intervention treatments which have become standard practice; however, 90 to 95% of the children infected with HIV are infected through vertical transmission and the rest through unsterilized equipment

(Van Dyk, 2013:46). HIV can be transmitted during pregnancy, delivery, and while breastfeeding, and a series of steps is required to care for the infected child (Luzuriaga & Mofenson, 2016:761). A child is considered to be at high risk when the mother is newly diagnosed and did not commence ART before or after delivery, and at low risk when the mother has been on ART before conception or has started ART four weeks before delivery, with viral load less than 1000 copies/ml (Department of Health, 2018:11.26). Pregnancy itself does not seem to have an impact on the progression of HIV during the asymptomatic stage; however, it does progress the condition if the mother is already in an advanced stage of the HIV infection. It also has been noted that the HIV infection itself does not seem to have any adverse effects on pregnancy (Van Dyk, 2013:46).

Mother-to-child transmission during pregnancy can be reduced by ensuring that the viral load of the mother is undetectable; by preventing sexually transmitted diseases; by providing the mother with antiretroviral therapy from 14 weeks of pregnancy, currently from time of diagnosis; and by providing nutritional supplements such as vitamin A and iron supplements to prevent incidences of stillbirth, prematurity and low birth weight (Van Dyk, 2013:47). By encouraging the mother to follow up visits to the antenatal clinic, closely monitoring compliance with the treatment so that the mother can be on prophylaxis if necessary, and continuously providing counselling about safe sexual practices, family planning, and safe feeding methods, vertical transmission will be reduced (Van Dyk, 2013:47).

During labour and delivery, HIV mother to child transmission is very high, as the baby comes into contact with the mother's blood and mucus, especially during vaginal delivery (Department of Health, 2018:11.26). Transmission can be prevented by providing the mother with ART during labour and after labour, avoiding rupturing the membrane for more than four hours before delivery, by avoiding episiotomy and any trauma that may cause bleeding, and by opting for caesarean section (Department of Health, 2018:11.26). However, the risk of transmission remains during the breastfeeding period.

It has been noted that 20 to 30% of infected children are infected through breastfeeding (Van Dyk, 2013:48). However, considering the benefits of breastfeeding, it is recommended that children be breastfed for six months exclusively, without any food or

liquids, except medication, supplements and minerals to prevent disturbance of the gastrointestinal lining (Department of Health, 2018:11.27). Mothers should be educated on the safety, benefits and risks of breastfeeding (Van Dyk, 2013:48). Integration of PMTCT with other HIV prevention programmes may be of great benefit, especially if their impact is regularly evaluated to optimise their intended outcome (Chang et al., 2013:70). The PMTCT programme has drastically reduced mother-to-child transmission from 20% in 2004 to less than 2% in 2015; however, challenges remain in prevention of HIV infection among women of child-bearing age and prevention of unplanned pregnancies among women living with HIV. Special attention should be paid to such aspects to prevent mother-to-child transmission of HIV infection (National Institute for Communicable Diseases, 2015:5).

Among other studies, a study in Mangalore in India highlighted a gap in nurses' knowledge regarding the transmission of HIV, particularly mother to child (Achappa et al., 2012:982). This observation was supported by the findings of a study done in Nigeria, which indicated a lack of knowledge on how to prevent mother-to-child HIV transmission, while some nurses felt incompetent to prescribe ARV for pregnant women and HIV care for infants, including prophylaxis to HIV-exposed infants (Achappa et al., 2012:982; Mohammed et al., 2016:16-17; Smith et al., 2016:325). Nurses should be cognisant of the prevention of mother-to-child transmission even after birth, as the infants are continuously exposed to HIV if the HIV-infected mother is breastfeeding (Barron et al., 2013:72).

2.5.3 Pre-exposure prophylaxis (PrEP)

Pre-exposure prophylaxis reduces HIV acquisition and incidence (Sharma et al., 2018). The key population is sex workers, transgender and men having sex with men, as they are more at risk of HIV transmission (Silverman, 2011:478). The above risks are due to lack of power to negotiate the use of condoms; gender-based violence; multiple sexual partners; sexual engagement without protection; lack of effective healthcare facilities to provide preventive care to sex workers; and stigma and mistreatment preventing them from seeking pre-exposure prophylaxis (Silverman, 2011:478).

Pre-exposure prophylaxishas been adopted globally and has shown its effectiveness in other areas, because it is offered mainly to specific vulnerable and stigmatised groups and is often not offered as an integrated service (Amico & Bekker, 2019:e137). It has been suggested that PrEP be provided without having to explain the additional risks to men who have sex with men or to those who have sex with persons living with HIV as it is not easy for people to disclose such activities (O'Byrne et al., 2019:301). PrEP is a promising approach to prevention of HIV transmission in South Africa, and it forms the basis of taking ART before the infection. Tenofovir 300mg daily and Emtricitabine 200mg daily are currently in use for prevention of HIV infection; however, its use is problematic, as it is difficult to time when one will have sex and to take the prophylaxis 24 hours before sex; also, this treatment is prescribed by doctors (Department of Health, 2018:11.41).

This aspect is a concern in areas where there are not enough doctors to initiate these kinds of services; hence, these populations are disadvantaged in this regard (Sharma et al., 2018). Achieving a more positive outcome could be through decentralising the service to frontline health clinic registered professional nurses (Sharma et al., 2018).

Pre-exposure prophylaxisdelivered by nurses could be cost saving compared with PrEP delivered by general doctors or specialist physicians (O'Byrne et al., 2019:301). Positive outcomes of nurse-led PrEP have been reported, notably expanded access to PrEP, increased enrolment of clients, and no serious safety concerns (Schmidt et al., 2018).

2.5.4 Post exposure prophylaxis

HIV post-exposure prophylaxis (PEP) treatment is an intervention targeting those who have had exposure to infectious material from HIV seropositive individuals, including blood, saliva, semen, and vaginal secretions (Soweto Trust for Nurse Clinical Training, 2017:167). This service offers counselling to the source patient and to exposed persons prior to testing, followed by tests for HIV, U&E for creatinine and hepatitis B, and C tests if the source is found to be HIV positive (Soweto Trust for Nurse Clinical Training, 2017: 167).

In a previous Indian study, about 20% of healthcare workers were found to be unaware of post-exposure prophylaxis, and these results were alarming, since all healthcare

workers are supposed to be educated in this regard as they are at risk of contracting HIV in their workplace (Achappa et al., 2012:982). Similarly, in a study conducted in Kenya, it was revealed that only 66% of nurses were trained in post-exposure prophylaxis, and among those, only 46% were competent and only 33% confident to practise post-exposure prophylactic care (Smith et al., 2016:322-330).

Medicine prescribed for HIV post-exposure includes Tenofovir, 300mg daily, Emtricitabine 200mg, 12-hourly, and Lamivudine, 150mg, 12-hourly, in case of standard risk, and additional dosages of Lopinavir in case of high risk (Soweto Trust for Nurse Clinical Training, 2017:167). Post-exposure prophylaxis is also provided for non-occupational exposure such as people who have experienced rape, sexual assault and condom burst. It should be started as soon as possible after a sexual encounter, within the first hour, and not later than 72 hours post the encounter, after the exposed person has tested negative, to prevent HIV infection. This treatment is completed in 28 days (Soweto Trust for Nurse Clinical Training, 2017:167).

2.5.5 Voluntary medical male circumcision (VMMC)

Male circumcision is one of the oldest surgical procedures, believed not only to prevent HIV, but also to prevent diseases such as urinary tract infection, sexually transmitted diseases such as chancroid, and penile cancer (Gray, 2019:15). However, male circumcision should not be seen as sufficient, but should form part of a prevention package, and it has been reported to reduce the heterosexual prevalence of HIV by 60% (Ngcobo et al., 2018).

The main aim of such circumcision is to remove the skin which contains cells with HIV 1 receptors (microphages and Langerhans cells). The foreskin is thin and susceptible to trauma and abrasion, which may lead to easy entry of HIV (Van Dyk, 2013:55).

VMMC is a crucial component of combined HIV prevention, especially among populations situated in high-to-moderate HIV prevalence (Gray, 2019:18). South Africa, Tanzania, Kenya, and other African countries have showed significant outcomes through this intervention though community-based outreach, mobilisation, task-shifting initiatives, and

by use of non-surgical methods such as the Shang Ring and PrePex device (Chang et al., 2013:70).

Mutabazi et al. (2013:315) indicated that there are studies that show that male circumcision can reduce the risk of HIV infection by as much as 53% to 60%. The safety and efficacy of the PrePex device used by nurses to circumcise males was reported to be effective, however with some disadvantages, as it was slow in wound healing (Kigozi et al., 2014). In South Africa, male circumcision is promoted as part of the HIV prevention strategy and for healthy living, and nurses play a major role in promoting and performing this procedure. Nursing students in KwaZulu-Natal, however, displayed unwillingness to perform male circumcision. Intensive education and training of student nurses might improve the level of willingness to perform this procedure, together with appropriate health education (Naidoo et al., 2012).

Fewer nurses are being trained to provide male circumcision, and among those who were trained, one-third had not practised the skill since their training (Smith et al., 2016:324). Male circumcision should be considered part of the prevention package; training and certification for service providers are essential so that quality care is rendered with proper equipment (Foundation for Professional Development, 2014:21).

2.5.6 Behavioural intervention for HIV prevention

Behavioural change is an important aspect of HIV prevention in HIV-negative people to minimise new infections and to promote positive living among PLWHIV PLWHIVto prevent complications and reduce new incidences; therefore, counselling strategies addressing partner risk behaviour and promoting condom use have become standard in HIV care. Facilities should be able to supply clients with condoms, which will also help in the prevention of sexually transmitted diseases (Chang et al., 2013:70).

In order to prevent sexually transmitted diseases, people should be educated on safe sexual practices (Soweto Trust for Nurse Clinical Training, 2017:156). The risk of infection in these circumstances is increased by factors such as viral load of the partner, sexually transmitted disease present in one or both partners, uncircumcised men, vaginal dryness, and traumatic sexual intercourse. Healthcare providers, including nurses, should provide

sexual health education on the use of condoms, circumcision, hygiene, and good lubrication of the genitals. This would be beneficial in the prevention of HIV transmission (Soweto Trust for Nurse Clinical Training, 2017:156).

Not having a stable relationship is associated with a poorer quality of life in the social and environmental domains; nurses and other healthcare professionals should be able to emphasise the importance of social and emotional support in the context of HIV infection (Passos et al., 2015:812). There is a positive association between social support and better quality of life in PLWHIV PLWHIV(Neves et al., 2018:21). Health professionals should be able to evaluate the use of drugs as a mechanism to cope with the condition and intervene in time. The entire body of healthcare professionals should be aware of factors affecting the quality of life of PLWHIV. The assessment should be added to the clinical and physical assessment of the patient (Passos et al., 2015:812).

2.5.7 Challenges of implementing an HIV prevention intervention for people living with HIV

Continued support and maintenance of positive appropriate HIV care and prevention among PLWHIV PLWHIVare essential to improve health and maintain dignity, because these strategies address prevention of transmission of HIV by those who already know their serostatus (Jaiantilal et al., 2015:3).

One of the challenges is the limited involvement of men in HIV prevention and reproductive issues; this makes prevention of HIV difficult. Involving them will make it easier for them to disclose their status to their partners, comply with treatment, and prevent transmission, especially to pregnant women, thus preventing infecting the unborn baby (Khidir et al., 2018:1725).

Some of the challenges found in one South Africa study were driven by culture and social barriers (Iwelunmor et al., 2015:193). Some of the reasons mentioned were that it is embarrassing to discuss such topics with children, perceptions that parents would be permitting their children to have experimental sex by discussing such topics, children are too young to understand, and that the environment is not conducive to discuss sexual issues with children (Motsomi et al., 2016). Some of these challenges made it difficult for

PLWHIV PLWHIVto disclose their status and negotiate the use of condoms, fearing rejection, divorce, stigma, abandonment and discrimination, and leading to low male engagement with health facilities and HIV care (Iwelunmor et al., 2015:193). McKay et al. (2017:1394) investigated the impact of human resources on implementing evidence-based HIV prevention interventions. The challenges making it difficult for health facilities to emphasise positive prevention are socio-cultural aspects and environmental problems, which include high staff turnover, high patient load, time constraints, shortage of staff, and logistics.

Over and above all the challenges, there is a gap noted between training and self-perceived competency of nurses in HIV care and treatment (Smith et al., 2016:328). Even in South Africa, the lack of accreditation of HIV courses by the nursing professional body was also noted as a challenge in training of nurses to care for PLWHIV PLWHIV (Ngcobo & Mchunu, 2019). Similarly, in a study done in England, it was indicated that lack of accreditation makes it difficult to assess the programme to ensure its correct implementation (Piercy et al., 2018;10). Furthermore, investing in such commitment would be beneficial as noted in a study done in Kenya, where it was suggested that investment in nurse capacity is crucial to ensure that all nurses are prepared to provide comprehensive HIV care and treatment (Smith et al., 2016:328).

2.6 Promotion of health of PLWHIV by nurses

Highly effective pharmaceutical treatment has drastically reduced HIV mortality, PLWHIV life expectancy has increased and they can live normal lives; however, they have some challenges which require them to maintain healthy lives, both physically and mentally (Jose et al., 2016:OC19; Avert, 2018). PLWHIV health promotion includes a variety of interventions such as behavioural stress management, exercises, spiritual practices, nutrition, social support and psycho-immunological enhancement to focus on in order to maintain a healthy life (Avert, 2018), and nurses need to be equipped to support PLWHIV in these areas.

A study in Canada provided a greater understanding of nurses' current practice in the context of HIV care and sheds light on particular challenges pertaining to ART adherence and areas for practice improvement (Rouleau et al., 2019:e35). The findings provide a

solid basis upon which to design an education intervention for HIV nurses in the context of pre-service and continuous professional development. This should be undertaken as the next step of a wider research programme, including a strong relational dimension; nursing activities in support of ART adherence; relational, professional, and socio-political challenges; and the mobilisation of resources. It is important to ensure that staff that have attended professional development courses gain confidence to practice, and that they remain in practice. For example, it was noted in a study done in Kenya, that among 165 nurses, 114 were trained in HIV care but only 87 felt competent to carry out HIV care, and only 73 were actually practising and providing HIV care (Smith et al., 2016:322). Supporting best nursing practice in the context of HIV care will require professional development opportunities specifically targeted at nurses that reflect the complex challenges they face to enhance quality of care and improve health outcomes for PLWHIV (Rouleau et al., 2019:e35). Such training opportunities should cover a range of aspects required for promotion of health of PLWHIV, such as nutrition and reproductive health.

2.6.1 Promotion of nutrition in PLWHIV

A well-balanced diet, with a supply of minerals and vitamins such as A, C, D, E, B2, B6, B12 and folic acid, iron, and zinc supplements keeps the immune system healthy and prevents opportunistic infections (Maggini et al, 2018). It is recommended that people living with HIV eat energy-giving food, body-building food, and protective food, take supplements, and cultivate defensive eating practices (Van Dyk, 2013:392). Malnutrition in people living with HIV is common, accompanied by fever and diarrhoea, leading to weight loss caused by reduced food intake; therefore, it is crucial to introduce appetite stimulants, followed by investigation of the underlying cause and treatment of underlying infections (Foundation for Professional Development, 2017:241).

Food security in Africa compromises an effective response to the AIDS epidemic. The impact of a food assistance programme in Uganda was evaluated, and the findings demonstrated that food assistance programmes can add value to the physical component of health-related quality of life among PLWHIV (Maluccio et al., 2015). The study also demonstrated the link between food security and treatment compliance (Maluccio et al., 2015).

The South African government, particularly in the Western Cape, has implemented a nutritional therapeutic programme to overcome the effects of HIV, such as weight loss, and the related side effects of the treatment (Hansen et al., 2015:1, 4). Apart from provision of nutritional therapy to PLWHIV, infants who are HIV unexposed and exposed, need to grow and develop to be healthy, therefore it is important to adhere to exclusive breastfeeding as it puts them at very low risk of infection with HIV compared with mixed feeding (Rossouw et al., 2016).

Hansen et al. (2015:1) emphasised the importance of considering economic factors, and clinic logistics issues have compromised the effectiveness of nutritional programmes. Nurses are vital in facilitating nutritional programmes in order to improve the lives of PLWHIV, and they should be able to control the distribution of nutritious food, handle the budget, and be accountable for the expenditure; additionally, nurses should be ready and willing to conduct programmes of this nature (Yordy et al., 2017:149). In- depth educational programmes provided to nurses with regard to the implementation of nutritional screening resulted in quality improvement in promoting patient nutritional support, and the results indicated the valuable role that nurses play in development, implementation, and evaluation of quality nutritional care in a multi-disciplinary team (O'Connell et al., 2017:705; Yordy et al., 2017:149). Similarly, a study done in rural India assessed the impact of nurse-led nutritional intervention among PLWHIV and recommended improved nutrition in HIV care in India. It also emphasised that good nutritional support is beneficial in increasing the CD4 count (Nyamathi et al., 2018:2735).

2.6.2 Life-style changes and support for PLWHIV

To maintain good health while living with HIV, patients need to adhere to treatment. Healthcare workers, including nurses, should have strategies to promote and support PLWHIV to adhere to treatment, and that can be done through peer treatment supporters (Rouleau et al., 2019:e20). In some countries like Kenya, devices such as cell phones are used to remind PLWHIV to take their medication; however, reminders alone are insufficient. Treatment can be enhanced by regular laboratory monitoring that will give an indication to healthcare practitioners if the patient is complying with and adhering to the treatment or not (Chang et al., 2013:69). Adherence monitoring will provide the nurse or

healthcare worker with the opportunity to give support needed by PLWHIV on a regular basis (Chang et al., 2013:69; Rouleau et al., 2019:e20). Similarly, Bonato et al. (2018:528) supported the intervention of using cell phones to remind patients to engage in regular exercise. This was found to be effective, and patients became more physically fit, with good body composition and metabolic parameters.

In addition to medication adherence, PLWHIV need to maintain healthy lifestyles, including taking regular exercise and avoiding drugs and alcohol. Exercise maintains and builds lean muscle mass and promotes the wellbeing of those living with HIV. Exercise improves cardiovascular fitness and CD4 cell count, it increases body weight, improves mood and helps people cope better (Foundation for Professional Development, 2017). Conversely, drugs and alcohol can suppress the immune system, lower the CD4 cell count and increase the secondary infection rate. Heavy drinking may cause liver damage. Nurses should encourage those living with HIV to change their lifestyle if needed and discuss the benefits (Van Dyk, 2013:388).

Nurses should advise PLWHIV to avoid contracting any infections such as other sexually transmitted diseases, flu, or mumps, among others, as they suppress the immune system (Soweto Trust for Nurse Clinical Training, 2017:156). PLWHIV and nurses should keep the environment clean by following hygienic principles. PLWHIV should try to maintain a normal life. It does not mean they cannot enjoy normal sexual relations; however, caution is required as unsafe sexual practices can lead to reinfection and other sexually transmitted diseases (Van Dyk, 2013:389). Nurses are urged to give advice on health maintenance of PLWHIV (Soweto Trust for Nurse Clinical Training, 2017:156). For nurses to do this, it is recommended that they use a tool to broach sexual subjects, allowing them to cover risk reduction strategies such as PrEP for negative partners and condom use (De Munnik et al., 2017:61).

Another effective intervention recommended and practised is the use of support groups (Bateganya et al., 2015:S372). HIV chronicity on ART has resulted in increased life expectancy, therefore support groups, family support and HIV-positive peers are important (Warren-Jeanpiere et al., 2017:389). Counsellors and nurses should be relatable to support the person living with HIV (Van Dyk, 2013:389). The benefits of

support groups were noted in a study in Indonesia that found a positive correlation between family acceptance and peer support with regard to sexual behavioural risks, and nurses played a major role in encouraging families to accept PLWHIV,PLWHIV, resulting in fewer sexual behavioural risks (Edanto et al., 2019:189).

2.6.3 Reproductive health service for PLWHIV

Sexual reproductive health for PLWHIV is often neglected in South Africa, and there is a need to promote sexual reproductive care as part of the integrated national HIV care and treatment programmes (Smit at el., 2012). A Ugandan study reported although many HIV-infected women would like to conceive, safe conception services are still limited (Gwokyalya et al., 2019:64). Services such as counselling on available reproductive choices, positive prevention counselling, cervical cancer screening, and abortion were reported to be inadequate in South Africa (Smit at el., 2012). Methods of family planning should also be discussed with mothers infected with HIV. An intrauterine device is not recommended, since it increases the chance of pelvic inflammation, increasing the chance of transmission (Van Dyk, 2013:51).

Literature has reported that nurses are good at family planning service provision (Achappa et al., 2012:982, Mohammed et al., 2016:16-17, Smith et al., 2016:325). A study in Kenya noted that although nurses were found to be highly trained (94%) and highly competent (87%) in providing family planning for patients with HIV, only 71% were actually practising family planning management among patients living with HIV, hence integrating this expertise in supporting the reproductive needs of PLWHIV would be beneficial for this group (Smith et al., 2016:322).

Shortage of staff is one reason why the reproductive service for PLWHIV is compromised (Smit at el., 2012). Apart from a shortage of staff, poor inter-personal care and counselling skills, orientation of HIV service, disease management, and ineffective training methodologies were found to be some of the main reasons for poor reproductive service for people living with HIV in South Africa (Smit et al., 2012).

Close collaboration between the health and higher education sectors is needed and comprehensive competency-based capacity building plans for various health worker

cadres along the education and training continuum are required (Rabkin, 2018:1). Service integration may be practicable and feasible without putting more strain on service providers such as nurses, as some service providers should be sufficiently skilled to provide a comprehensive service to PLWHIV (Smith et al., 2016:322-330). Training, support and guidance to facilitate the integration of services are necessary to ensure that providers understand the importance of that kind of care to prevent ongoing transmission (Smit et al., 2012).

2.7 Evaluation of health status of PLWHIV by nurses

People living with HIV have many challenges, including mental health problems related to HIV infection that affects their quality of life. This requires that they remain in care and be regularly monitored, and nurses need to develop such competencies during their pre-service training.

2.7.1 Retention of PLWHIV at health facilities

The retention of people diagnosed with HIV at health facilities, monitoring of the condition progression, and management of opportunistic diseases are explored to emphasise the importance of evaluating the health status of PLWHIV. A qualitative study explored the perceptions and experiences of newly diagnosed clients on the role support groups play in linking and retaining newly diagnosed clients in HIV care in Mbandazayo, a peri-urban location in South Africa, and found that HIV support groups are critical in enhancing linkages and retention in care of newly diagnosed clients (Kave et al., 2019:9). Another intervention to enhance retention in care of PLWHIV was reported in a study done in the southern United States to develop an app to link and retain HIV diagnosed patients at a healthcare facility or provider (Laurence et al., 2019). The study found that the app was feasible and acceptable to PLWHIV, as about 77.9% of the users participated in the message board (Laurence et al., 2019).

As part of an initiative to reach and retain young people in HIV care, South Africa (Johannesburg) has introduced a SmartLink health app for Android smartphones, providing HIV-related laboratory results, information, support, and appointment reminders to engage with and link patients to care (Venter et al., 2019; Shrestha et al., 2020:10).

This study evaluates the ability of SmartLink to improve care for HIV-positive smartphone owners. The SmartLink app provides proof that this population reacts to mobile health interventions that engage patients in HIV care (Venter et al., 2019).

PLWHIV often do not return to the clinic after diagnosis to be re-checked for eligibility to start treatment. It is critical for PLWHIV to follow up for continuous HIV care to prevent mortality and morbidity due to HIV progression (Clouse et al, 2013). Loss to follow-up (LTFU) is a crucial indicator to evaluate the effectiveness of an HIV care and treatment programme (Teeraananchai et al., 2018:529). A study in Mozambique revealed a failed LTFU programme of 76% of HIV-positive infants who were not followed up and not initiated on ARV after birth (Viera et al., 2020:1).

Age and employment status play a role in LTFU, and adolescents are prone to less adherence compared with adults. Poor adherence was noted in unemployed patients compared with employed patients (Susilowati et al., 2019:581). It is thus vital to retain PLWHIV from the period of diagnosis, during the pre-ART period, to initiation of ART and beyond. Nurses should encourage PLWHIV to attend clinics regularly and should follow up with them to be able to monitor them and ensure they receive treatment and support (Clouse et al., 2013).

2.7.2 Monitoring HIV infection

PLWHIV need to be monitored regularly to establish their progress as well to identify problems early. This includes viral load and CD4 count monitoring (Tinaro et al., 2020:1). The role of the CD4 count in managing HIV is ever changing; it has moved from being the determinant for ARV initiation, to the determinant for opportunistic disease prophylactic initiation (Ford et al., 2017:123). CD4 cell count is used as an indicator of immunological status to determine when to start prophylactic treatment and indicates the effectiveness of ARV drugs (Ford et al., 2017:123). Therefore, it is important to monitor CD4 cells from the day of diagnosis to ensure that the patient gets HIV-related opportunistic disease prophylaxis in time if the CD4 cell count is less 200 (Lin et al., 2016:455). Viral load level shows the progression of the HIV infection in the body. Nurses and other healthcare professionals may monitor viral load six monthly after initiation of treatment to ensure the

effectiveness of the treatment or suggest alternatives (Foundation for Professional Development, 2017:76-77).

2.7.3 Monitoring of opportunistic diseases

Nurses carry a triple burden with regard to the HIV and TB epidemics as they need to render integrated care to prevent TB in PLWHIV.PLWHIV. People living with HIV are more vulnerable to TB and many other opportunistic infections (Geremew et al., 2020:1). Nurses are expected to assess signs and symptoms of TB, sexually transmitted infections (STIs), meningitis, diarrhoea, AIDS syndrome and other opportunistic diseases with each follow-up (Foundation for Professional Development, 2017:6).

HIV-related opportunistic disease prophylaxis plays a major role in reducing communicable disease burdens worldwide. However, lack of knowledge regarding diagnosis, treatment and interaction of drugs leads to resistance, threatening the effectiveness of successful treatment of infections (Gebresillassie et al, 2016:126-132; Lin et al., 2016:455). Thus, WHO has developed guidelines on co-trimoxazole preventive therapy for HIV-related infections in children, adolescents and adults (Suthar et al., 2015). Primary prophylaxis with co-trimoxazole reduces other HIV-related opportunistic incidences; in addition to *Pneumocystis jirovecii* pneumonia, it prevents other bacterial, fungal, and protozoan infections (Mekonnen & Addis, 2020:882). It is indicated for all PLWHIV with immune suppression of CD4 cells less than 200 cell/mm^3 and clinical stage 3 and 4 (Ford et al., 2017:123; Foundation for Professional Development, 2017:117). Health professionals' practices, including those of nurses, have been found to be in line with WHO guidelines; however, some did not consider contraindication and appropriate discontinuation as per the guidelines, therefore, it is important for health professionals to improve the outcome of the therapy by having relevant knowledge and documenting all the interventions done at each visit (Gebresillassie et al., 2016:126).

Nurses in South Africa are involved in monitoring the presence of opportunistic diseases such as TB, and checking the drug's effects and progress of HIV by monitoring the CD4 cell count and viral load in the blood regularly (Galagan et al., 2017). In a study conducted in South Africa, nurses displayed a low level of confidence in areas such as TB screening

and the initiation of opportunistic disease prophylaxis in adults. While doctors were initiating more HIV/TB patients, nurses showed improvement and confidence in initiating treatment in pregnant women and babies (Green et al., 2014). Attaining high levels of monitoring will enhance management of PLWHIV, and pre-service training is expected to ensure this.

2.8 HIV management of PLWHIV by nurses

The management of PLWHIV includes initiation of treatment for PLWHIV, palliative care for PLWHIV management of opportunistic diseases, and compliance with treatment of PLWHIV.PLWHIV. Training of nurses has a positive effect, and as the evaluation of nurses on site showed, HIV and TB integration management increased significantly after an advanced TB/HIV course (Galagan et al., 2017:248).

2.8.1 Initiation of treatment

Highly active antiretroviral therapy consists of a regimen including three or more agents capable of suppressing replication of the virus (Hu et al., 2017:115). Currently, a fixed dose combination is preferred, and consists of tenofovir, emtricitabine and efavirenz. it is required of healthcare workers to conduct adherence counselling before initiation of ART (Foundation for Professional Development, 2017:268).

In September 2016, new eligibility criteria were announced by the minister of health: all HIV-positive children, adolescents and adults could start on ART regardless of their CD4 cell count; however, priority should be given to people with a lower than 350 CD4 cell count (Department of Health, 2016a:1). Early initiation of ART reduces both the mortality and morbidity rates (Lundgren et al., 2018:162).

The delay in the initiation of ART is not because the patients had high CD4 cell counts; it is often due to a low staff-to-patient ratio. This staff-to-patient ratio results in an increased workload, with a resultant delayed ART initiation (Maughan-Brown et al., 2018:765). Nurses can counteract this situation through empowering themselves with HIV knowledge and new strategies on how to integrate HIV care in other illness management, thus creating more time to focus on PLWHIV.PLWHIV. Nurses are required to initiate ART and to monitor the drug's effects and side effects; however, it is suspected that they have

limited knowledge (Ruud et al., 2014:352). Studies have shown that gaps exist in nurses' training, competency and practice in nurse-initiated and managed antiretroviral treatment, particularly in initiation of treatment and management of ARV. Some nurses had never monitored and supported adherence to ARV or managed side effects (Smith et al., 2016:325).

Gaps in the treatment of HIV were also noted by Abolfotouh et al. (2013:563), documenting that students in Saudi Arabia displayed average knowledge with regard to aspects of HIV, but scored lowest on treatment and control of HIV. Furthermore, they had negative attitudes towards caring for people with HIV. Student nurses should be in the vanguard of eradicating HIV infection in South Africa. They should have good knowledge regarding HIV treatment and willingness to care for people living with HIV (Haskins et al., 2014:32).

2.8.2 Management of HIV opportunistic diseases

Although the incidence and prevalence of opportunistic diseases, especially in children, have reduced owing to the availability of ART in lower- and middle-income countries, the high prevalence of opportunistic diseases still requires adequate management (Lawler & Naby, 2020:165). The most common opportunistic diseases in sub- Saharan Africa are bacterial, fungal, and viral parasitic infections (Lin et al., 2019; Lawler & Naby, 2020:165). These opportunistic diseases cause high mortality and morbidity; hence, it is important for nurses to play their role in preventing them by identifying at-risk patients, and by screening and vaccination of patients (Martin & Bryant, 2019:198).

Nursing students from European countries such as Finland and Estonia had a better understanding of and confidence in providing HIV care in totality than those from developing countries such as Ghana, Nepal, and Nigeria (Cheung & Rana, 2019:22). Although most of the healthcare providers reported to have examined the mouths of children at risk of developing necrotic stomatitis, very low competency management of necrotic stomatitis in HIV was noted (Brattström-Stolt et al., 2019:290). Thus, Ngcobo and Mchunu (2019:1) recommend that training can improve both students' and professionals' knowledge of management of HIV and AIDS in general.

2.8.3 Palliative care

Despite current HIV management practices, in 2017, AIDS-related mortality was recorded at 110 000 people (UNAIDS, 2018); this is an indication that there are still PLWHIV who experience illness progression and need palliative care. Palliative care requires a holistic approach, encompassing the physical, emotional, social, and spiritual needs of the person with an incurable disease. Although the care does not aim to cure, it controls the symptoms and maintains quality of life. Nurses are expected to monitor progression and the effects of drugs, and to educate the caregiver and family about home-based care needs for the specific patient (Foundation for Professional Development, 2017:76-77). It is paramount to include the patients in the care, as often they do not desire invasive intervention; therefore, it is important to respect their wishes and dietary preferences where resources permit, and keep them pain free at all times, as their involvement impacts ART adherence (Genberg et al., 2017:2452).

To provide quality care to palliative-care patients with chronic illness, nurses require knowledge, the right attitude and good practice (Kassa et al., 2014). However, nurses remain willing to go above and beyond the call of duty in caring for the terminally ill patient despite the psychological and physical difficulties of providing such care (Bam & Naidoo, 2014:7). Experienced personnel are more willing to provide care to PLWHIV as opposed to newly qualified nurses; therefore, intensive training and counselling are recommended prior to graduation for neophyte nurses to be able to provide palliative care to PLWHIV (Bam & Naidoo, 2014:7). Similarly, Knebel et al. (2008) note the importance of nursing students' familiarity with HIV control programmes and readiness to work with multi-disciplinary teams in order to manage PLWHIV holistically.

2.8.4 Compliance with treatment

At least 90% adherence to HIV treatment is required to suppress the virus sufficiently, prevent mutation of the virus, and the development of drug resistance (Van Dyk, 2013:121). South Africa was reported to be running an ART programme covering 80% of the population living with HIV and on ART in 2016, although the level of adherence is seldom achieved owing to multiple factors (Azia et al., 2016). Psychosocial aspects that

militate against PLWHIV from adhering to the treatment are treatment fatigue, forgetfulness, bad planning, running out of ARVs, depression, alcohol abuse, poor relationship between patient and healthcare worker, transport difficulties in reaching the clinic, not having food to eat prior to treatment, side effects, unavailability of medication at the clinic, stigma prompting them to hide medication, cultural aspects, and taking traditional medication without informing healthcare workers (Coetzee et al., 2015:315; Azia et al., 2016; Adeniyi et al., 2018).

The healthcare provider can improve adherence by evaluating the patient's ability and intention to adhere, by simplifying the treatment regimen, by identifying relevant challenges and resolving them, by making patients aware of potential side effects, by encouraging them to find a treatment supporter, and by addressing the issue of traditional medication without disrespecting them (Van Dyk, 2013:122).

This was noted in a study done in Brazil, indicating that nurses and other healthcare professionals had used information technology successfully to deliver messages to PLWHIV.PLWHIV. This was found to be very effective in treatment adherence (De Lima et al., 2016:54), A similar strategy was used (SMS text messaging) and provided similar outcomes in a study by Dekoekkoek et al. (2015:2722).

2.9 Summary of the chapter

Nurses are one of the major role players in HIV care globally; however, the care they provide has gaps, as reported. This chapter provided an overview of the four aspects of HIV care which the study focused on to determine the readiness of final-year students to provide such care. Students' readiness is determined by these aspects.

The first aspect was HIV prevention, which includes HIV willingness, confidence, knowledge counselling and testing, prevention of mother-to-child transmission, pre-exposure prophylaxis, post-exposure prophylaxis, voluntary medical circumcision, behavioural interventions, and challenges of implementing HIV prevention strategies. The second aspect the researcher explored was the promotion of health of PLWHIV, which included nutrition, life style changes, and reproductive health among PLWHIV.PLWHIV. The third aspect was the evaluation of the health status of PLWHIV, that is, their

attendance at health facilities after diagnosis, monitoring of HIV, and monitoring opportunistic diseases. The fourth aspect was HIV management, involving initiation of treatment, management of HIV opportunistic diseases, palliative care, and compliance with treatment. These four aspects of HIV summarise what students will be evaluated on regarding HIV care, using the methodology described in the next chapter.

Chapter 3 – Research design and methodology

3.1 Introduction

Research methodology entails the process of the research and an explanation of how the researcher executed the research project. In the social sciences there are two main research approaches: the quantitative and qualitative approach (Brynard & Hanekom, 2006:37). This section presents the research approach, design and methods applied to achieve the purpose of this study. The purpose of this study was to determine the readiness to provide HIV care of final-year nursing students at a university in the Western Cape by using a quantitative approach, and in this manner, the set objectives were met.

3.2 Research paradigm

A research paradigm refers to the philosophical framework that guides the research, based on a general worldview or set of beliefs (Kivunja & Kuyini, 2017:26). The main paradigms include positivism, post-positivism, interpretivism, pragmatism, and the critical paradigm. Positivism is one of the paradigms, where the research is based on experimentation, observation, and employs scientific methods in order to define the worldview. Within the positivist paradigm, there is the belief that there is truth that science can observe, measure and describe (Young & Ryan, 2020:695). On the other hand, post-positivism advocates imperfect reality, understanding that truth is not probable but incomplete. It can observe the truth without experimentation, but reality is there to be studied and understood (Kivunja & Kuyini, 2017:30; Young & Ryan, 2020:695).

Another paradigm is the interpretivist paradigm that acknowledges human experience/ lived experience, and cultural influence through talking, understanding and interpreting what the subject thinks about the context (Kelly et al., 2018:9).

There is also the critical paradigm that addresses political, social and economic issues which result in oppression, conflict, struggle, and power structures (Kivunja & Kuyini, 2017:30). Lastly, the pragmatic paradigm is seen as the paradigm that bridges the gap between the other paradigms. It is viewed as an action-oriented paradigm; it believes that truth cannot be concluded based on one scientific method, nor is it possible to determine

social reality under an interpretivist paradigm (Kivunja & Kuyini, 2017:30; Kelly et al., 2018:13; Kaushik & Walsh, 2019). The pragmatic paradigm posits that human action is not separate from previous experiences and their related beliefs, affirming that human thoughts are linked to action (Kaushik & Walsh, 2019).

An understanding of the assumptions of the current quantitative study was drawn from one of the concepts of philosophical paradigms in medical education research, and post-positivism was considered applicable to this study (Bergman et al., 2012:545). Therefore, this study was done under the assumption of post-positivism, whereby the evidence has one truth but cannot be fully observed (Frambach et al., 2013:552).

The results of this study were calculated based on the willingness, confidence and knowledge aspects in all four HIV care aspects. This does not guarantee that indeed students are willing or confident, because confirmation or observation of students displaying willingness and confidence in a clinical situation was not done. However, the knowledge questions gave a true reflection of what they know and do not know about HIV care aspects (Frambach et al., 2013:552). Furthermore, the post-positivist paradigm guides the understanding that enquiry is done with a series of logical steps (Kaushik & Walsh, 2019), and this guided the decision to adopt a quantitative approach for this study.

3.3 Research approach

Fitting with the post-positivist paradigm that guided this study, a quantitative research approach was applied. The quantitative approach is a specific, well-structured, tested for validity and reliability, defined and recognised research approach; hence, it was chosen and used in this study, allowing the researcher to use numbers to observe, describe, and explain the phenomenon of interest (Brynard & Hanekom, 2006:37). Some of the advantages are that a quantitative study allows large amounts of data to be collected and the same data can be standardised (Du Plooy-Cilliers et al., 2014:160).

Furthermore, because of its nature, it encourages respondents to respond anonymously, which is advantageous if they are required to respond to sensitive issues. Apart from being inexpensive, it is less time consuming than most other methods (Du Plooy-Cilliers et al., 2014:160).

Also, the researcher used the quantitative approach because the study aimed at measuring the level of readiness in the provision of HIV care among final-year students in one of the education institutions in the Western Cape. Quantifiable data were collected and statistical and computational techniques used to gather and analyse the data in this approach.

3.4 Research design

A cross-sectional survey design was used for this research study. Cross-sectional studies measure the prevalence of events of interest in a population at any given point in time over a short period (Gerrish & Lacey, 2010:223). No repeated data collection on the same group of respondents was done, and one handout of the questionnaire was provided to each student and collected after completion, as noted by Du Plooy-Cilliers et al. (2014:149). A cross-sectional study is designed to obtain information on variables in different contexts, but at the same time. This type of study is also conducted when there are constraints such as time and resources (Gerrish & Lacey, 2010:223). The survey design allowed collection of data from the sample included in this study.

3.5 Research setting

This study was conducted at a nursing training institution in the Western Cape. It is a public institution. The institution has four campuses, and the study was done at one of the urban campuses (156 students), as the other two rural campuses have a very small number of final-year nursing students (50). The training institution is registered with the SANC for the registered professional nursing programme. The training institution where the study was done registers large numbers of nursing students in the Western Cape annually for a variety of programmes, from undergraduate to post-basic qualifications. Permission to access students from the institution was obtained prior to commencement of the study. The letter of permission is attached in Appendix E.

3.6 Population

A population can be defined as including all people or items with the characteristic the researcher aims to understand (Gerrish & Lacey, 2010:538). The population can be human beings, institutions, social activities, cultural objects and inventories which serve

the purpose of the research. The population for this study was the group of people who possessed the same attributes the researcher was interested in. For the purpose of this research, the population comprised nursing students completing their final year. The target population comprised final-year nursing students at the urban campus at the institution where the study was conducted. There were 156 final-year nursing students at the specified campus. The population included both male and female students, of whom the majority were female.

For the purpose of this study, nursing students in their final year of the nursing qualification (R425) were used as target group, as they are expected to be knowledgeable and skilled in caring for PLWHIV by virtue of being in their final year of training. Upon completion of their fourth year, they will be registered with the SANC as community service nurses. On completion of their community service, they will be registered nurses in general nursing, psychiatric nursing, community nursing and midwifery.

3.7 Sample, sampling technique and sample size

A sample is a subset of the population drawn for the purpose of the research. A sample may be made up of individuals, clinical materials, or events (Gerrish & Lacey, 2010: 532). Brynard and Hanekom (2006:54-55) define sampling as a technique used to select a small group to represent a larger group with the same characteristics. In this study, because of the relatively small number of the target population, the researcher planned to use all-inclusive sampling, recruiting all 156 students who constituted the study population.

Of the recruited students, 30 were used as part of the pre-testing process of the instrument and did not form part of the sample, leaving an available sample size of 126 final-year nursing students. Of these, only 103 students agreed to participate in the study, with 23 students indicating they were not interested in the study. Therefore, an 81% response rate was obtained and this was deemed acceptable, as Fincham (2008: 43) notes that an 80% percent response rate is an acceptable representation for survey studies.

3.8 Recruitment and data-collection process

Data collection is one of the important aspects of research; however, the researcher has to be careful, because if data is collected incorrectly, it will produce invalid findings. The researcher has to decide where the research will take place as well as the tool to be used to collect the data (Du Plooy-Cilliers et al., 2014:148).

Data was collected over a period of six months owing to unforeseen circumstances such as strikes and students not being in block at the same time. Students' availability on campus depends on the specific block and clinical placement schedule. The researcher targeted the period when students were in block or writing examinations, as that provided an opportunity to have access to all final-year nursing students at the institution.

The researcher contacted the institution to establish the availability of students: when attending classes or writing examinations. The researcher requested permission from the lecturer to have about 15 to 20 minutes before the end of the class to be able to inform the students about the study and invite them to participate. Students were invited to participate in the study at each encounter. The first encounter with the students was in class. During the recruitment, the lecturer left the class to ensure students were able to make their decision freely with no indirect influence from the lecturer's presence. Respondents who agreed to participate were given the coded questionnaire and asked to remain in the classroom during the completion of the questionnaire. Those not interested in participating were excused from the study with no judgement. During the rest of the period of data collection, students were approached individually as they walked out of the examination room. This approach was chosen to avoid disturbing the students while writing examinations. A one-on-one approach was used, where students were recruited individually and given an opportunity to participate or not. The participants, after signing consent, completed the questionnaire at the prepared station.

A self-administered questionnaire was presented to the respondents to collect the data; however, prior to the collection of the data, clarity was provided to each participant regarding the voluntary nature of the study and written consent was given by the respondents who signed prior to commencement of data collection. Du Plooy-Cilliers et al. (2014:152) affirm the importance of explaining the aim of the research to respondents

and assuring them of confidentiality and anonymity, thus allowing informed decisions in future.

The coding of the questionnaires allowed omission of any identifying data that could link the questionnaire to an individual respondent, thus ensuring anonymity. The researcher was available to answer any respondents' questions during the completion of the questionnaire. It took about 20 to 30 minutes to complete the questionnaire.

The first data collection was done in the nursing classes on the main campus. The second encounter was in the nursing examination room on the main campus. The last encounter was at a satellite campus during the examination period. There was more than one final-year nursing class in the chosen setting; hence it was not possible for the researcher to access all the students at the same time.

All the questionnaires distributed to the students were returned to the researcher on the same day. As the researcher is not affiliated with the institution, respondents were able to decide to participate without coercion. On completion, the consent documents were separated from the questionnaires to maintain anonymity and confidentiality. The researcher extended her appreciation to the students and lecturers who organised the visit and assisted with administrative issues for data collection (Hunter et al., 2018: 343).

3.9 Instrument

For the purpose of this research, a questionnaire was used to establish the readiness of final-year nursing students with regard to HIV care. A questionnaire is a quick, inexpensive method of gathering standardised data that is convenient to both researcher and respondents; it allows the collection of data in a standard manner and makes inference to a wider population when the data is collected from an appropriate sample of the population (Gerrish & Lacey, 2010:369). The design of the questionnaire used in this study followed four stages documented by Gerrish and Lacey (2010: 369):

- Constructing information to include in the questionnaire.
- Formulating the layout and flow of questions to be asked.
- Choosing the types of questions to be asked and formulating the sentences.

- Consultation with the statistician to establish accuracy, clarity, appropriateness and relevance to the research objectives as well as the feasibility of data analysis (Gerrish & Lacey, 2010:369).

The researcher developed a questionnaire from the information gathered during the literature review, and from the chosen framework and her nursing experience as a clinical nurse. A self-administered questionnaire (Appendix C) was used to collect the data and respondents were provided with standardised instructions on how to complete the questionnaire.

The questions were closed-ended, using a 5-point Likert scale with options of 'strongly disagree', 'disagree', 'uncertain', 'agree' and 'strongly agree'. Respondents were asked to agree or disagree with a series of statements in order to measure their knowledge, willingness, and confidence with regard to the various aspects of HIV care (Du Plooy-Cilliers et al., 2014:159). In this study, the questionnaire was intended to measure the aspects defined as being part of readiness in the study, namely, knowledge, willingness, and confidence of the nursing students in their final year of the nursing programme (R425) at a nursing education institution in the Western Cape, with regard to the provision of HIV care. The questionnaire was divided into two parts to measure readiness with regard to the four HIV aspects identified in the framework. The first part comprised questions relating to demographic characteristics, and provided a description of the respondents, while the second part had questions covering the four HIV care aspects as indicated in the framework applied in this study: measuring readiness related to prevention of HIV; promotion of health; evaluation of health status of people living with HIV; and management of people living with HIV. The questionnaire had nine questions for each aspect of HIV care. The total number of questions was 36. As this was not an existing instrument, a pre-test was conducted, with a test and retest of the questionnaire to establish reliability.

3.10 Pre-test of the instrument

Once ethics clearance and permission to conduct the research were obtained, a pre-test of the instrument was done to establish the validity and reliability of the instrument. To allow for statistical analysis and as recommended by Johanson and Brooks (2010: 399),

the pre-test was done on 30 conveniently selected final-year nursing students who were part of the population; however, these respondents were not included in the sample of the full study. The pre-test provided the researcher with an opportunity to modify the measurement instrument in respect of all identified discrepancies, and test for reliability of the instrument. A few relevant adjustments such as spelling errors and rephrasing of the questions to make them clearer were made based on the feedback from the pre-test participants, and the determination of the validity and reliability of the data was concluded (Du Plooy-Cilliers et al., 2014:257).

3.11 Data analysis

Using the IBM® SPSS® Statistics, Version 24 software, the collected data was captured and statistically analysed with the assistance of a statistician. Data was coded and recoded to facilitate the analysis. For example, data collected about the age of respondents was recorded into interval data.

A score was allocated for each item on Part 2 of the questionnaire, and descriptive statistics were conducted. Demographic variables such as gender, marital status and previous exposure to HIV care were described by frequency of distribution. For the age variable, the median, mean, range, and standard deviation were established.

For the readiness aspects, a score was calculated and converted to percentages, and median, mean, range, and standard deviation were established. During data analysis the ‘strongly agree’ was fused with ‘agree’ to form the ‘agree’ option; while ‘uncertain’, ‘disagree’ and ‘strongly disagree’ options were also fused to form the ‘disagree’ option.

In questions where disagreeing was the accurate response (for example, Questions 8 and 9 of Part 2 of the tool), the ‘uncertain’ option was combined with ‘agree’ and ‘strongly agree’. For each of the four HIV care aspects, there were nine questions, in total 36 questions.

Scores were derived by calculating the preferred answers. Preferred answers were given 1 point while the other answers were given 0 points; the total number of preferred answers was added to establish the total score for each question. Since there were three questions per each readiness aspect (willingness, confidence, and knowledge) this amounted to

nine questions per each HIV care aspect (prevention, promotion of health, monitoring of health status, and HIV management of PLWH).

The average of all nine questions in all HIV care aspects was established by adding all nine questions' scores and dividing by 9. The scores between willingness, confidence and knowledge were also compared. Sum scores between different aspects of HIV care were also compared (between prevention of HIV, promotion of health, monitoring of health, and HIV management).

After establishing each HIV aspect score, scores were added to find the total level of readiness. Level of readiness was divided into three categories: low, moderate, and high. Thirty-six questions were divided by 3, since the level of readiness was measured in three categories (low, moderate, and high).

Scores between 0 and 24 were labelled as low level of readiness; scores between 25 and 28 were labelled as medium level of readiness; and between 29 and 36 were labelled as high level of readiness.

All the answers were converted to percentages (ordinal data). A score below 25 would be up to 69%, indicating a low level of readiness, a score between 25 and 28 would be between 70% and 79%, indicating a moderate level of readiness, and a score from 29 to 36 would be between 80% and 100%, indicating a high level of readiness (McDonald & Ho, 2002:64).

Similar percentage values were used to establish the levels for individual aspects investigated in the study. This allowed identification of the percentage of final-year nursing students with different levels of readiness for each of the four HIV care aspects covered by the framework. Furthermore, the readiness scores were compared for different demographic aspects to establish any significant differences.

3.12 Academic rigour

Measurement of certain characteristics of the respondents should be an area of concern rather than the individuals themselves, and that is why criteria were applied in the research to verify the validity and reliability of the method of data collection (Brynard & Hanekom, 2006:47). The validity and reliability of the data-measuring instrument are

essential in any scientific study, and the application of the validity and reliability in this study is as follows:

3.12.1 Validity

Validity is the potential of the instrument used to collect the data to measure what it is expected to measure, and it is the extent to which the instrument selected reflects the true reflection of the real situation (Brynard & Hanekom, 2006:47; Du Plooy-Cilliers et al., 2014:256). The internal validity measure of the design answers the research question; hence, external validity focuses on the potential of finding a specific sample to be generalised to a larger population and other settings (Du Plooy-Cilliers et al., 2014: 256). The all-inclusive sampling technique improved the validity of the study, as the number of participants was increased (Frambach et al., 2013:552). The different types of validity include content validity, construct validity, face validity, and criterion validity (Brink et al., 2012:166; Heale & Twycross, 2015:66). Construct validity establishes if the intended construct is measured, while criterion validity establishes how the instrument used for data collection relates to other instruments measuring the same variable (Heale & Twycross, 2015:66). On the other hand, face and content validity establish if the instrument measures what it is meant to measure comprehensively (Heale & Twycross, 2015:66). Among the types of validity, only two validity types were applied in this study, namely content and face validity.

3.12.1.1 Content validity

Content validity is concerned with the correctness and appropriateness of the questions in the questionnaire, ensuring all aspects of the phenomenon being investigated are covered in the data-collection tool (Brink et al., 2012:166). By testing the appropriateness of the questions, repetition of the same question more than once can be avoided and can determine whether the questions are relevant to the research question and research objectives (Brynard & Hanekom, 2006:47). The researcher consulted a nurse expert and a communicable disease specialist to confirm the validity of the content in the questionnaire, in relation to the study's objectives and framework. The content validity of the content of the instrument is illustrated in Table 3-1 overleaf.

Table 3-1: Content validity

Objectives	Aspect of the Framework	Questionnaire
1. To determine the readiness of final-year nursing students in preventing people from acquiring an HIV infection	**HIV Prevention**	**Willingness – 1, 2, 3** **Confidence – 4, 5, 6** **Knowledge – 7, 8, 9**
2. To determine the readiness of final-year nursing students in promoting the health of PLWHIV.	**Promotion of health of PLWHIV**	**Willingness –10, 11, 12** **Confidence – 13, 14, 15** **Knowledge – 16, 17, 18**
3. To determine the readiness of final-year nursing students in evaluating the health status of PLWHIV.	**Evaluation of health status for PLWHIV**	**Willingness – 19, 20, 21** **Confidence – 22, 23, 24** **Knowledge – 25, 26, 27**
4. To determine the readiness of final-year nursing students in providing HIV management to PLWHIV	**HIV management**	**Willingness – 28, 29, 30** **Confidence – 31, 32, 33** **Knowledge – 34, 35, 36**

3.12.1.2 Face validity

Face validity is concerned with the appearance of the instrument to the respondents based on the judgement of the researcher and respondents, as it can seem too simple or too difficult, thus rendering respondents reluctant to complete it (Brynard & Hanekom, 2006:48). The questionnaire was presented to nursing experts and doctors to establish the validity of the instrument so that it was appropriate and served its purpose in measuring what it was supposed to measure. Feedback received from HIV experts about changes in current HIV treatment requirements and which opportunistic diseases are

currently considered the deadliest, was incorporated in the instrument before commencing with the pre-test.

3.12.2 Reliability

The reliability of an instrument refers to establishing whether the same results are obtained when using the same instrument at different times by different researchers. This refers to the credibility and consistency of the outcome if the same instrument is used on different respondents with the same characteristics, and still survives all the scrutiny (Du Plooy-Cilliers et al., 2014:254). The instrument was found to be reliable with an overall Cronbach's alpha of 0.9. The researcher also used the statistician's expertise in testing for reliability (Du Plooy-Cilliers et al., 2014:254). The pre-test was done on 30 students from the same nursing training institution. The final reliability scores for each aspect of HIV care as assessed in this study were established, and there was evidence of reliability, as the internal consistency scores were above 0.8 for each aspect as illustrated in Table 3-2. As noted by Souza et al. (2017:651), a Cronbach's alpha value of 0.7 is considered acceptable.

Table 3-2: Reliability test

HIV care aspect	Cronbach's alpha
HIV prevention	0.87
Health promotion for PLWH	0.86
Health status evaluation for PLWH	0.85
HIV management	0.84

3.13 Ethical considerations

Ethics during research focuses on the integrity of the researcher when conducting a study; the researcher needs to adhere to all professional standards and principles of ethics. The researcher needs to be trustworthy and respectful (Du Plooy-Cilliers et al., 2014:263). Ethics regulates the researcher's code of conduct during the process of research as it sets acceptable attitudes and behaviour (Du Plooy-Cilliers et al., 2014:

263). Respondents need to feel safe, and should trust the researcher without feeling exploited or misled (Du Plooy-Cilliers et al., 2014:263; Hunter et al., 2018:343).

Ethics clearance and permission to access respondents were obtained before collection of data was initiated; furthermore, arrangements with the nursing institution were made prior to finalising dates for data collection, as attached in Appendix E. The requirements and nature of the study were discussed with the administrator of the nursing institution. Ethics clearance was obtained and renewed annually for the duration of the study. The ethics clearance certificate is attached in Appendix F. In conducting this study, the researcher ensured that the participants' rights were respected as discussed in the following sections. This was important for adherence to the various ethical principles that govern research.

3.13.1 Right to self-determination and voluntary consent

All respondents should decide voluntarily whether they wish to participate in the research. They should not be coerced or intimidated (Polit & Beck, 2008:17). The respondents were not forced to participate in the study. The researcher obtained voluntary consent, and if any respondents decided to withdraw from the study, she accepted and respected their decision without any negative implications; however, no one requested to discontinue participation, and the 23 who declined to participate in the study were not prejudiced in any way. The provision of the information document that provided comprehensive information about the study (attached in Appendix A) allowed respondents to make an informed decision about their participation.

Bless et al. (2012:142) state that respondents have the right to know what the research is about, how it will affect them, and the risks and benefits of participation; and they have the right to decline participation. In this regard, in addition to an oral explanation, an information document explaining the study was given to all respondents.

The respondents were informed that they had the right to discontinue their participation without the need to offer an explanation and this would incur no negative effects. The respondents were informed that stopping participation would not prejudice their receiving

services, and that participation in the study was not linked to their academic activities (Bless et al., 2012:143).

Voluntary consent is obtained once the participant has demonstrated a clear understanding of the essential information provided in the informed consent form. Since all final-year nursing students were over the age of 18, consent was in the form of a written document (attached in Appendix B). As the respondents were literate, recordings were not necessary (Brynard & Hanekom, 2006:86).

3.13.2 Right to justice and fair treatment

According to Brink et al. (2012:36), all respondents have the right to fair selection and treatment. Bless et al. (2012:142) further state that respondents should not be discriminated against on the basis of race, gender, disability, income, or any other characteristic in research. In this study, through the use of an all-inclusive sampling technique, every final-year nursing student was given an equal chance of participation, regardless of race, gender, disability, or socio-economic status.

3.13.3 Right to confidentiality and privacy

Bless et al. (2012:142) state that the principle of fidelity implies faithfulness and keeping promises on agreements. Information provided by respondents was protected and unavailable to anyone other than the research team: the researcher, supervisor, and statistician. The researcher informed the respondents how their identities would be protected and how the results would be used (Du Plooy-Cilliers et al., 2014:264). Questionnaires did not furnish any names; however, they did give some personal characteristics such as gender and age. Codes were used in the study to ensure the anonymity of respondents. The researcher guaranteed that personal information provided by the respondents would not be shared with anyone other than the research team. To protect the training institution, no identifiers were noted. On publication of the research, no identification of either the setting or the respondents will be made, to maintain anonymity and confidentiality. Privacy was ensured in the completion of the questionnaires; as designated places were used for data collection.

3.13.4 Beneficence and non-maleficence

The benefits of the study are anticipated to be greater than any harm, and the benefits of the findings of the study should exceed the harm (Ong-Flaherty et al., 2016). The outcomes of the study might assist training institutions to fill any identified gaps to optimise the quality of care for people living with HIV. In this study, the researcher avoided any harm and reduced any risk to respondents by constructing a questionnaire that was not personal, but tested willingness, confidence and knowledge. The respondents were not exposed to any physical or psychological harm or victimisation. There was no anticipation of any potential harm, and the researcher assured the respondents that no harm would come to them through their involvement in this study (Jafari et al., 2019). Should the respondents experience any discomfort, the researcher intended to address such discomfort and provide support by referring them to the nursing training institution student support centre (student health centre). No discomfort was reported during the study and no referrals were made (McDermott-Levy et al., 2018:473). A letter of support from the student counselling department is attached in Appendix D.

3.13.5 Treatment of data

Abuse of data has become a critical issue, and scientists are working on developing a code of conduct with regard to the management of data (Brynard & Hanekom, 2006: 85). The researcher promised to respect the findings and no alterations were made to the data. There was no misuse of the information by the researcher. No distortion or falsifying of information was done. The data was kept in a locked cupboard accessible to the researcher only, and all electronic data was password protected. Data will be destroyed five years after completion of the study.

3.13.6 Dissemination

On completion, the report will be handed to the authorities at the nursing institution, and permission will be requested to present the findings to the nursing students. Furthermore, permission to post an abstract of the report on the social network of the institution was requested. Work from this study will be published in peer-reviewed journals and presented at conferences.

3.14 Limitations of the study

Limitations refer to all the constraints in the study which are beyond the researcher's control (Du Plooy-Cilliers et al., 2014:275). As the study was conducted only at one institution, findings of the study could not be generalised to other nursing training institutions but are limited to the selected nursing training institution in the Western Cape. Based on the delimitation from the research approach, the researcher used a quantitative approach and no qualitative information was included in the study; hence, the researcher was not able to provide a narrative of other associated factors that may be related to the preparedness of final-year nursing students. However, this limitation is minimal, as the purpose of the study was related to establishing their readiness only, and not any other associated factors (Du Plooy-Cilliers et al., 2014:275).

Collecting data during examinations also had a negative impact on the final sample size because not all students were willing to participate, mainly because they were exhausted or disappointed with the examination they had just completed. Greater participation would have ensured that the obtained sample corresponded to the intended sample size. Of the 126 population, only 103 students managed to complete and return the questionnaires. Student protests also made data collection take longer, and this could have influenced the number of respondents who participated.

3.15 Summary of the chapter

This quantitative study was conducted to determine readiness with regard to HIV care among nursing students. The study was done under the assumption of post-positivism, whereby the evidence has one truth but cannot be fully observed, as the students had to indicate if they were willing, confident and had knowledge with regard to HIV care; however, the study did not test the willingness and confidence of the students. Knowledge questions were, however, able to test their actual knowledge.

The study was done using a cross-sectional design to measure the prevalence of interest in final-year nursing students at one Western Cape nursing training institution. These students will be registered as registered as professional nurses (general nursing,

psychiatric nursing, community nursing, and midwifery) on completion of their community service.

An 81% response rate was obtained as 103 out of 126 recruited students participated in the study. Students completed a self-administrated questionnaire after signing consent, which acknowledged the importance of ethics and good practice in the study.

IBM® SPSS® Statistics, Version 24 software was used to capture and analyse the collected data with the assistance of a statistician. Data was coded and recoded to facilitate the analysis. A score below 25 was up to 69%, indicating a low level of readiness, a score between 25 and 28 was between 70% and 79%, indicating a moderate level of readiness, and a score from 29 to 36 was between 80% and 100%, indicating a high level of readiness (McDonald & Ho, 2002:64). The selected methodology managed to achieve the objectives of the study as illustrated in the next chapter.

Chapter 4 – Presentation of research results

4.1 Introduction

This chapter presents the results of the data collected among final-year nursing students at a Western Cape nursing institution. The aim of the study was to determine the readiness of final-year nursing students in the provision of HIV care. Tables, charts and description are used to present the results. Demographic results from the first section of the questionnaire illustrate the age groups of the respondents, their gender, marital status, previous healthcare experience, history of someone close to them living with HIV, and experience in nursing a person living with HIV.

The second section of the chapter presents the readiness of the students with regard to the provision of HIV care from information obtained from the second section of the questionnaire. In this study, based on the adopted framework, HIV care comprises four aspects: prevention of HIV, promotion of health of people living with HIV, evaluation of health status of people living with HIV, and HIV management (Knebel et al, 2008). The second section of the questionnaire was divided into sub-sections of the HIV care aspects mentioned above. Each sub-section is divided into the willingness, confidence, and knowledge of final-year students in the provision of care.

The level of readiness criterion can be categorised into five groups as previously indicated by McDonald and Ho (2002:64). The groups are ‘very low’, for a score less than 60%; ‘low’, for a score between 60% and 69.99%; ‘moderate’, for a score between 70% and 79.99%; ‘high’, for a score between 80% and 89.99%, and ‘very high’, for a score of 90% and above (McDonald & Ho, 2002:64). In this study, the categories used by McDonald and Ho (2002:64) were slightly adjusted to reduce the categories to only three. ‘Very low’ and ‘low’ were combined to form a new criterion, ‘low’, and ‘high’ and ‘very high’ were also combined.

Level of readiness was divided into three categories: ‘low’ for a score less than 25, implied that any respondent scoring less than 25 out of 36 questions was regarded as having a low level of readiness; ‘moderate’ for a score between 25 and 28; and ‘high’ for a score from 29 to 36. Expressed in percentages, these are: a score less than 70% implies a low

level of readiness; a score between 70% and 79% is regarded as moderate; and a score between 80% and 100% is a high level of readiness.

4.2 Demographics of respondents

As indicated in the previous chapter, a total population sampling technique was applied to recruit all 156 final-year nursing students. After the pilot test had been conducted with 30 respondents, there were 126 remaining for participation in the study. A response rate of 81% was achieved, with 103 respondents who completed the questionnaires.

4.2.1 Age and gender

In this study, 96 (93.2%; *N*=103) respondents indicated their age, while 7 (6.8%) respondents did not disclose their age. The majority (83.3%, *n*=80; *N*=96) of respondents were below the age of 30 years, compared with 16.7% n=6 who were above 30 years. The average age of the 96 respondents was 26 years, with a median of 24 years and mode of 23 years. The youngest participant was 21 years old, while the oldest was 45 years old.

As shown in Figure 4-1, the majority of respondents were young adults, and most of them (56.3%; *n*=54; *N*=96) were in the 20 to 24 age group; 27.1% (*n*=26) were in the 25 to 29 age group; 6.3% (*n*=6) were in the 30 to 34 age group; and only 10.4% (*n*=10) were older than 35 years of age.

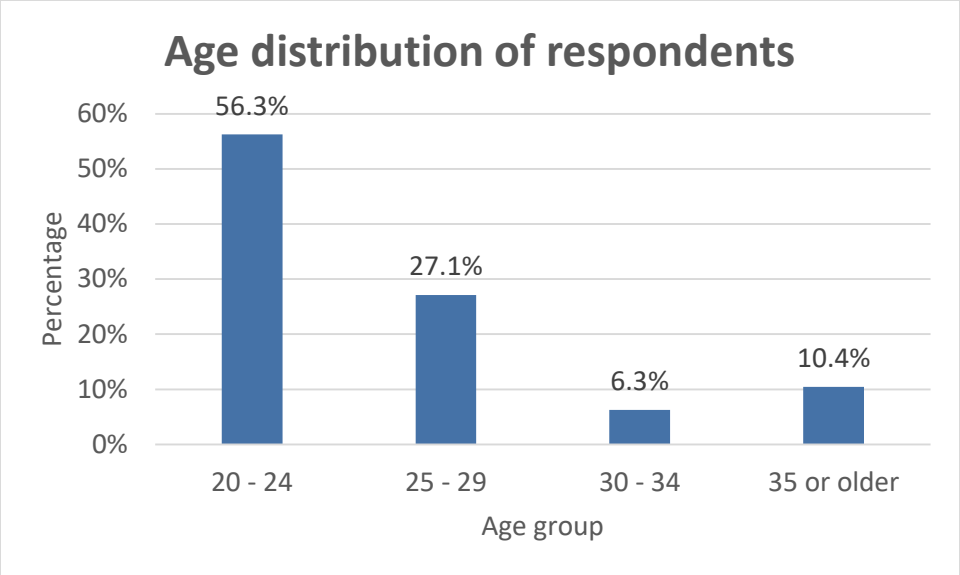

Figure 4-1: Age distribution of respondents

Similar to the phenomenon of nursing being a predominantly female profession, in this study, of the 103 respondents, 89.3% (*n*=92) of respondents were female and only 10.7% (*n*=11) of the respondents were male, as illustrated in Figure 4-2.

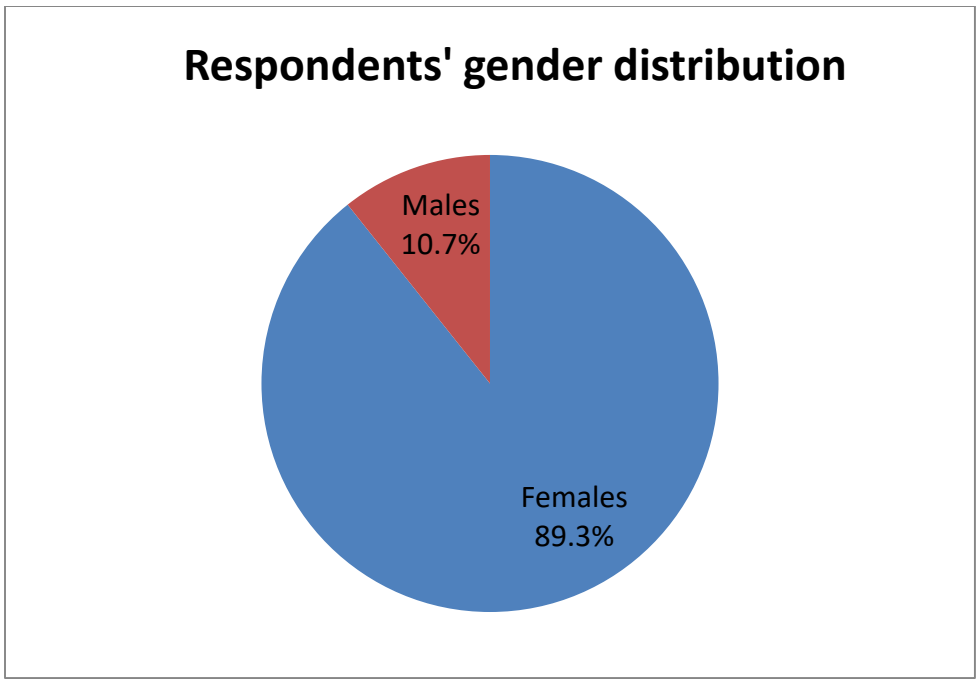

Figure 4-2: Respondents' gender distribution

4.2.2 Marital status

Of the 103 respondents, the majority of the respondents were single, at 84.5% (*n*=87), and 12.6% (*n*=13) of respondents were married, while only 1.9% (*n*=2) indicated being divorced. Only 1.0% (*n*=1) indicated being in a stable relationship, considered as single for the purpose of the study, resulting in 85.4% (*n*=88) respondents classified as single, as shown in Figure 4-3.

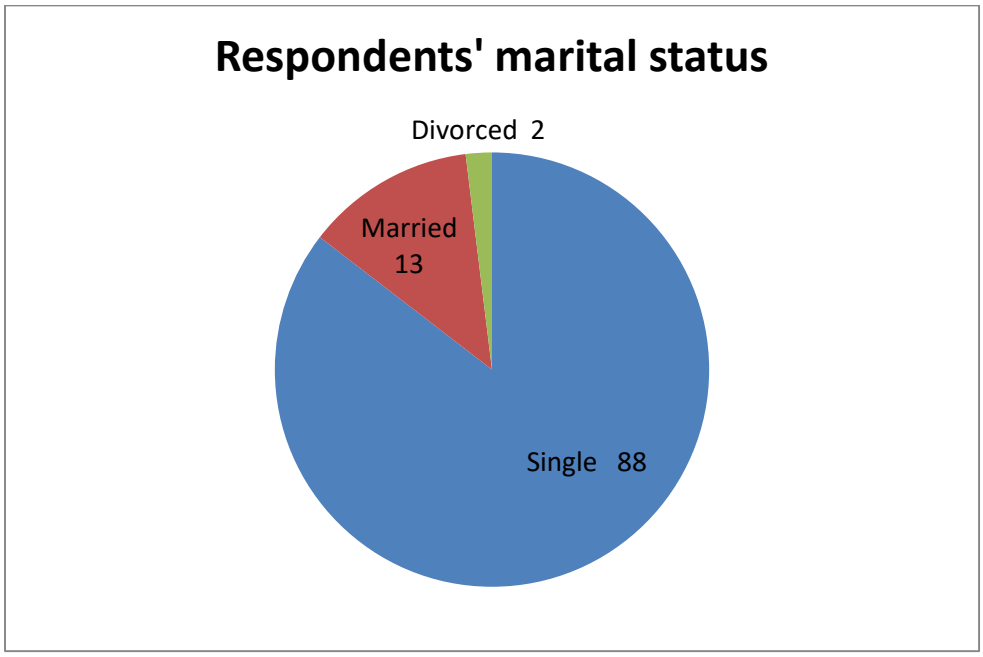

Figure 4-3: Respondents' marital status

4.2.3 Previous healthcare work-related experience of respondents

Figure 4-4 overleaf indicates the respondents' previous healthcare work-related experience prior to the current nursing course, with 16 (15.5%) indicating that they had previous work-related experience in healthcare prior to the current nursing course. Of the 16 respondents, 4 were caregivers, 3 were auxiliary nurses, 5 had been previous nursing students, and 1 was an operating theatre practitioner, while 3 (2.9%) didn't indicate where they had obtained their previous experience in healthcare. In this study, 87 respondents (84.5%) indicated that they did not have previous healthcare work-related experience

prior to the nursing course. All the respondents in the study indicated that they had provided nursing care to a person living with HIV at a health facility during the course.

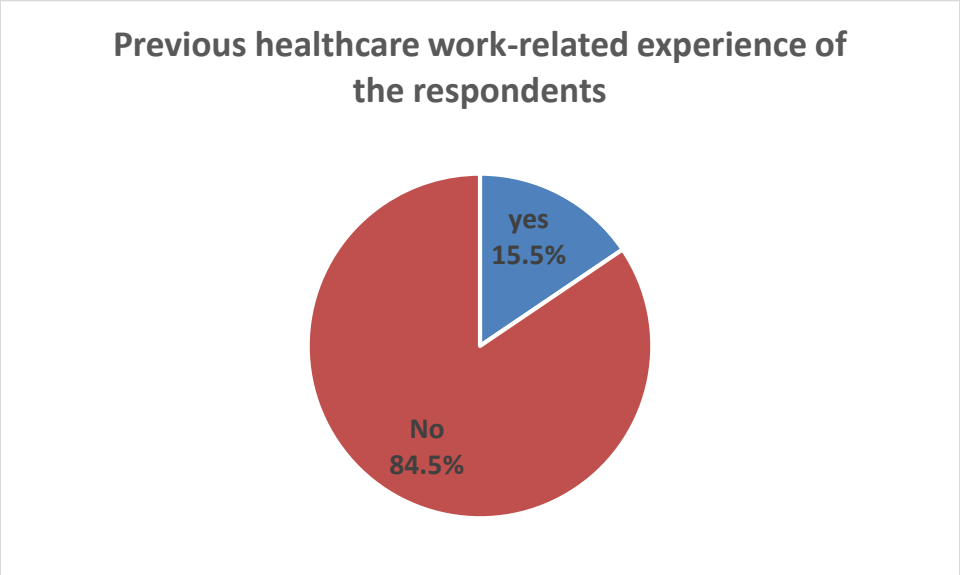

Figure 4-4: Previous healthcare work-related experience of the respondents

4.2.4 History of a family member or co-worker living with HIV

The respondents were asked if they have a family member or co-workers living with HIV. The majority of the students (*n*=61; 59.2%) indicated that they do not have a family member or co-worker living with HIV, and 42 (40.8%) of the respondents agreed with having a family member or co-worker living with HIV (Table 4-1).

Table 4-1: History of a family member or co-worker having HIV

Have family member or co-worker living with HIV	**Total**	**Percentage %**
Yes	42	40.8
No	61	59.2

4.3 Readiness to provide HIV care

The respondents were questioned to determine their readiness for the provision of HIV care. HIV care readiness questions were divided into four objectives:

- To determine the level of readiness, for HIV prevention, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for health promotion for PLWHIV, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for the evaluation of the health status in PLWHIV, among final-year nursing students from one university in the Western Cape.
- To determine the level of readiness, for provision of HIV management, among final-year nursing students from one university in the Western Cape.

Each objective was sub-divided into three segments: willingness questions, confidence questions, and knowledge questions, which intended to determine the level of readiness with regard to HIV care. Readiness implies being willing and confident to provide HIV care as well as having accurate and updated HIV care-related knowledge. The results are illustrated and presented below.

Readiness for the provision of HIV care among final-year nursing students from one university in the Western Cape was found to be moderate (73%). The students displayed moderate readiness in all aspects of HIV care (prevention of HIV infection, promotion of health of PLWHIV, evaluation of health status of PLWHIV, and in HIV management).

All the respondents' answers were evaluated to ascertain how many of the 103 respondents provided the correct answer to each question asked in order to obtain the score to calculate the level of readiness. As indicated in the data analysis section, 'strongly agree' was fused with 'agree' to form the 'agree' option; while 'uncertain', 'disagree' and 'strongly disagree' were also combined to form the 'disagree' option. In questions where 'disagree' was the accurate response (for example, Question 8 and 9 of Part 2 of the tool), the 'uncertain' option was combined with 'agree' and 'strongly agree'. Questions were divided into different aspects of HIV care (HIV prevention, health

promotion for PLWHIV, evaluation of health status for PLWHIV, and HIV management). Each aspect of HIV care had nine questions. Questions were also subdivided for the readiness aspect, which includes willingness, confidence, and knowledge. For example, for HIV prevention as the first aspect of HIV care, Questions 1 to 3 are willingness, Questions 4 to 6 are confidence, and Questions 7 to 9 are knowledge questions. The percentages of each preferred answer from the first three questions were added and the sum was divided by 3 to obtain the percentage for the willingness aspect, as for the other readiness aspects of each HIV care aspect. After obtaining all the scores for each aspect of readiness, the scores were added and the sum was divided by 3. Then all the percentages of HIV care were added to determine the overall level of readiness of the students.

The overall readiness score for the study was 73.9% with a minimum score of 11%, and a maximum score of 94%. Of the four aspects of HIV care, health promotion had the highest average score of 79.5%, followed by HIV prevention, with an average score of 73.2%. The evaluation of the health status of PLWHIV and HIV management aspects were 71.8% and 71.6%, respectively. In examining the concept of readiness as used in this study, willingness had a higher average score (84.2%), followed by confidence with a score of 78.6%, while the knowledge average score was the lowest at 59%, as illustrated in Table 4-2.

Table 4-2: Overall respondents' readiness level in each HIV care aspect

HIV aspects	Willingness level	Confidence level	Knowledge level	Overall percentage per HIV care aspects	Overall readiness level
1. HIV prevention	88.3% High	84.3% High	47.1% Low	73.2% Moderate	**73.9% Moderate**
2. Health promotion for PLWH	86.1% High	80.9% High	69.9% Low	79.5% Moderate	
3. Evaluation of health status for PLWH	85.8% High	79% High	50.8% Low	71.8% Moderate	
4. HIV management	77.1% Moderate	69.6% Moderate	68.7% Low	71.6% Moderate	
Overall level	**84.2% High**	**78.6 % Moderate**	**59% Low**		

4.3.1 Respondents readiness for provision of HIV preventive care

As illustrated in Table 4-2, the level of readiness for HIV prevention among final-year nursing students from one university in the Western Cape was found to be moderate at 73.2%. This entailed their willingness to provide HIV preventive care, confidence to provide HIV preventive care and knowledge about HIV prevention and care.

The respondents seem to have a high level of willingness (88.3%) in providing HIV preventive care; the score drops slightly for confidence (84.1%) in providing HIV prevention, and drops remarkably in knowledge (47.5%) regarding HIV prevention and care.

4.3.1.1 Respondents willing to provide preventive HIV care

From this study, the overall level of readiness with regard to willingness to provide preventive HIV care was high, with 88.3% as shown in Table 4-2, compared with unwillingness to provide preventive HIV care. Table 4-3 indicates further details on HIV prevention. Although the level of willingness was high, more respondents (93%) were willing to conduct HIV tests; however, the number was lower (87.4%) for those respondents willing to conduct HIV pre-test counselling, and much lower (84.5%) for

those willing to conduct HIV post-test counselling, highlighting some differences in willingness for various activities.

Table 4-3: Respondents' willingness to provide HIV prevention

HIV prevention	**HIV aspects**	**Agree**		**Disagree**	
		Total	**%**	**Total**	**%**
Willingness to conduct:	1. HIV pre-test counselling	90	87.4%	13	12.6%
	2. HIV test	96	93%	7	6.8%
	3. HIV post-test counselling	87	84.5%	16	15.5%

4.3.1.2 Respondents confident to provide preventive HIV care

In this study, the number of students confident in providing preventive HIV care was high (84.3%), compared with those not confident to provide preventive HIV care, as indicated in Table 4-2.

Respondents showed the same trend as in willingness. There were more students confident to conduct testing than pre-testing and post-test counselling. Slightly more respondents (87.4%) (Table 4-3) were willing to conduct pre-test counselling; however, their level of confidence in conducting pre-test counselling dropped to 81.6% as illustrated in Table 4-4.

Table 4-4: Respondents confident in providing HIV prevention

HIV prevention	**HIV aspects**	**Agree**		**Disagree**	
		Total	%	Total	%
Confident to:	4. Perform HIV pre-test counselling	84	81.6 %	19	18.4
	5. Conduct HIV testing	97	94.2 %	5	4.9
	6. Perform HIV post-counselling	79	76.7 %	24	23.3

4.3.1.3 Respondents' knowledge of HIV preventive care

In this study, respondents demonstrated an overall low level of knowledge (47.1%) in HIV prevention as illustrated in Table 4-5. Some displayed accurate and some inaccurate knowledge in different aspects of HIV preventive care. In Table 4-5, most of the respondents (*n*=96, 94.1%) knew that a repeat test is needed when a client tests negative and is still sexually active, compared with those who did not know. Only a few (*n*=10; 9.8%) had accurate knowledge, and knew that a rapid test does not detect the presence of HIV; the majority (*n*=92, 88.3%) agreed that the rapid test detects the presence of the HIV in the body, while it detects the presence of HIV antibodies (Adams et al., 2017:90).

As long as the HIV-exposed infant is breastfeeding, the mother and infant should be on ART. The study revealed that more respondents did not know they had to continue with ART for as long as the infant was breastfeeding, with only 37.9% (*n*=39) indicating that they should continue ART, even if the infant's PCR results were negative. The results suggest that the respondents may be more familiar with adult preventive measures than children or infants' prevention of HIV transmission.

The respondents are more willing and confident to conduct HIV preventive measures; however, their knowledge with regard to how to prevent HIV was very low.

Table 4-5: Respondents' knowledge of HIV preventive care

HIV prevention	HIV aspects	Agree		Disagree		Missing
		Total	%	Total	%	%
Knowledge	7. If a client tests negative and is still sexually active, I will repeat the HIV test after 3 months.	96	94.1%	7	6.8%	
	8. HIV rapid test detects the presence of HIV in the body*.	92	88.3%	10	10.7%	1 (1.0%)
	9. For breast-feeding infants, if PCR test is negative, I will stop ART*.	64	62.1%	39	37.9%	

* Indicates questions where the accurate answer is 'disagree'.

4.3.2 Respondent's readiness with regard to promotion of health in people living with HIV

The level of readiness for the promotion of health of PLWHIV among final-year nursing students from one university in the Western Cape was found to be moderate, at 79.5%, as indicated in Table 4-6.

The readiness of respondents with regard to promotion of health of PLWHIV included willingness to promote health, confidence to promote health, and knowledge about health promotion. Although 86% of respondents were willing, their level of confidence dropped to 80.9%, and was remarkably low in knowledge to promote health (53.1%) as illustrated in Table 4-6.

4.3.2.1 Respondents willing to promote the health of PLWHIV

In Table 4-6, the overall score for those respondents willing to promote the health of PLWHIV was high (86%), compared with those who indicated unwillingness (14%) to promote the health of PLWHIV.

Promotion of health requires willingness to improve the nutritional status of PLWHIV, ensuring that PLWHIV live positive and healthy lives, and providing health education on how to prevent opportunistic diseases to PLWHIV.

As illustrated in Table 4.6, although the majority indicated willingness in respect of the aspects, more respondents were willing to provide health education on how to prevent opportunistic diseases to PLWHIV (*n*=95, 92.2%) and conduct counselling for positive and healthy living to PLWHIV (*n*=92, 89.3%), compared with those willing to conduct the nutritional programme itself for PLWHIV (*n*=79, 76.7%).

Table 4-6: Respondents willing to promote the health of PLWHIV

Promotion of health of PLWHIV	**HIV aspects**	**Agree**		**Disagree**	
		Total	**%**	**Total**	**%**
Willingness to	10. Conduct nutritional programme for PLWHIV	79	76.7%	24	23.3%
	11. Conduct counselling for positive and healthy living to PLWHIV	92	89.3%	11	10.7%
	12. Provide health education on how to prevent opportunistic diseases to PLWHIV	95	92.2%	8	7.8%

4.3.2.2 Respondents confident to promote the health of PLWHIV

The overall level of confidence in promoting health for PLWHIV was high, as 80.9% of respondents were confident in providing health promotion for PLWHIV, compared with 9.1% of respondents not confident in providing such a service, as illustrated in Table 4-7.

Promotion of health includes having confidence to improve the nutritional status of PLWHIV, ensuring that PLWHIV live positive and healthy lives, and providing health education on how to prevent opportunistic diseases to PLWHIV.

As indicated in Table 4-7, more respondents (85.4%) were confident in preventing opportunistic diseases in PLWHIV, compared with conducting a nutritional programme for PLWHIV (77.7%) and conducting counselling for positive and healthy living for PLWHIV (79.6%).

Table 4-7: Respondents confident to promote health of PLWH

Promotion of health of PLWHIV	**HIV aspects**	**Agree**		**Disagree**	
		Total	%	Total	%
Confident	13. In conducting a nutritional programme for PLWHIV	80	77.7%	23	22.3%
	14. In conducting counselling for positive and healthy living for PLWHIV	82	79.6%	21	20.4%
	15. In preventing opportunistic diseases in PLWHIV	88	85.4%	15	14.6%

4.3.2.3 Respondents' knowledge of promotion of health of PLWHIV

Table 4-8 indicates that knowledge with regard to the promotion of health of PLWHIV is low, scoring 69.9%. PLWHIV need to be encouraged to use protection, even if their partners are HIV positive, to prevent different sub-type infections. The respondents were aware of this aspect, as the majority agreed that PLWHIV should be encouraged to use protection, compared with those who indicated a lack of knowledge.

Only 48.5% respondents know that cotrimoxazole is given to prevent opportunistic diseases from Stage 2 to Stage 4, compared with those who did not know (51.5%), as indicated in Table 4-8. Respondents' level of knowledge with regard to the promotion of health of PLWHIV is low (53.1%). Respondents were knowledgeable with regard to health

promotion, including nutritional needs, safe sexual practices and HIV opportunistic disease prophylaxis.

Table 4-8: Respondents' knowledge of promotion of health of PLWH

Promotion of health of PLWHIV	**HIV aspects**	**Agree**		**Disagree**		**Missing**
		Total	%	Total	%	Total
Knowledge	16. Nutritional supplements are given to all PLWHIV regardless of affordability	87	84.3%	16	15.7%	
	17. Clients should be encouraged to use protection, even when the partner is HIV positive	98	95.1%	4	3.9%	1 (1.0)
	18. Cotrimoxazole is given to prevent opportunistic diseases from Stage 2 to Stage 4	50	48.5%	53	51.5%	

4.3.3 Respondents' readiness in the provision of health status evaluation for people living with HIV

Table 4.3 illustrates overall level of readiness in evaluating the health status of PLWHIV. This was found to be moderate (71.8%). Willingness was high, and 85.8% of respondents were willing to evaluate the health status of PLWH; however, the number dropped by 6% for confidence to evaluate the health of PLWHIV, down to 79%, and a drop was observed again in level of knowledge (50.8%) to evaluate the health of PLWHIV.

4.3.3.1 Respondents willing to evaluate the health status of PLWHIV

Table 4-9 shows that level of willingness of respondents with regard to evaluation of the health status of PLWHIV was high (85.7%). The respondents were highly willing to assess clinical stages and opportunistic diseases, and monitor progression of disease, compared with those unwilling (14.3%).

Evaluation of the health status of PLWHIV requires willingness to assess the clinical stages of HIV infection of all PLWHIV who come to consult, assess opportunistic diseases during each follow up of PLWHIV, and draw bloods to monitor the progression of HIV infection in the body. In this study, the respondents were more willing (92.3%) to draw bloods for biological monitoring to determine the progression of the virus, compared with assessing the clinical stages of HIV infection and assessing opportunistic diseases during each follow up (84.5%), as well as assessing clinical stages to identify the progression of the disease (80.6%).

Table 4-9: Respondents' willingness to evaluate the health status of PLWH

Evaluation of health status of PLWH	**HIV aspects**	**Agree**		**Disagree**	
		Total	**%**	**Total**	**%**
Willingness to	19. Assess clinical stages of HIV infection of all PLWHIV who come to consult	83	80.6%	20	19.4%
	20. Assess opportunistic diseases during each follow-up of PLWHIV	87	84.5%	15	15.5%
	21. Draw bloods to monitor the progression of HIV infection in the body	95	92.3%	8	7.7%

4.3.3.2 Respondents confident in evaluating the health status of PLWHIV

As seen in Table 4-10, the level of confidence with regard to evaluation of health status of PLWHIV was moderate (79%), compared with those not confident (21.0%) to evaluate

the health status of PLWHIV. The level of willingness to evaluate the health status of PLWHIV was higher, at 85.7%, than the confidence to evaluate the health status.

Evaluation of the health status of PLWHIV requires confidence in assessing the clinical stages of HIV infection of all the PLWHIV who consult, assessing opportunistic diseases during each follow-up of PLWHIV, and drawing bloods to monitor the progression of HIV infection in the body.

This study revealed that respondents were more confident in assessing HIV infection progression in the blood by means of drawing blood for analysis, at 86.4%, compared with assessing opportunistic diseases among PLWHIV in order to provide the relevant treatment, as only 79.6% claimed to have confidence in that aspect. The numbers reduced further by 8.7% in identifying HIV clinical stages according to WHO, as there were only 70.9% respondents who indicated that they were confident to identify the clinical stages of HIV, as illustrated in Table 4-10.

The decline in confidence to evaluate the health status of PLWHIV is notable, compared with willingness. This is a repetitive trend, as it also appears in HIV prevention and promotion aspects of HIV care.

Table 4-10: Respondents' confidence in evaluating the health status of PLWHIV

Evaluation of health status of PLWH	**HIV aspects**	**Agree**		**Disagree**	
		Total	**%**	**Total**	**%**
Confident in	22. Identifying clinical stages of HIV infection in PLWHIV who come to consult	73	70.9%	30	29.1%
	23. Assessing opportunistic diseases	82	79.6%	21	20.4%
	24. Drawing bloods for biological monitoring	89	86.4%	14	13.6%

4.3.3.3 Respondents' knowledge in evaluating the health status of PLWHIV

Table 4-11 shows that there are more gaps in knowledge with regard to evaluation of the health status of PLWHIV, as the overall readiness is low (50.8%) compared with willingness and confidence in evaluating the health status of PLWHIV. More respondents were willing to evaluate the health status of PLWHIV and had confidence in doing so; however, they appeared to lack knowledge.

The evaluation of the health status of PLWHIV requires the respondents to know the symptoms of the clinical stages of HIV infection, types of common opportunistic diseases associated with HIV infection, and the kind of biological monitoring done for PLWHIV on ART.

In Table 4-11, the results suggest that only 58.3% of respondents knew that Karposi's sarcoma is one of symptoms of clinical Stage 4 of HIV infection, compared with 41.7% who did not know that this symptom indicates clinical Stage 4, according to WHO. Only 7.8% (*n*=8) knew that cryptococcal meningitis, heart attack and diarrhoea are not common opportunistic diseases among PLWHIV, as heart attack is not classified as one of the common opportunistic diseases affecting PLWHIV; however, the majority of respondents (92.2%) believed heart attack to be a common opportunistic disease.

Most of the respondents (85.4%) were aware that biological monitoring of PLWHIV on ART includes viral load, CD4 count, renal function, liver function, and haemoglobin differentiation, compared with overall knowledge of HIV clinical stages and opportunistic diseases.

Table 4-11: Respondents' knowledge in evaluating the health status of PLWH

Evaluation of health status of PLWH	**HIV aspects**	**Agree**		**Disagree**		**Missing**
		Total	%	Total	%	%
Knowledge	25. Karposi's sarcoma is one of the symptoms of clinical Stage 4 of HIV infection	60	58.3%	43	41.7%	

Evaluation of health status of PLWH	HIV aspects	Agree		Disagree		Missing
		Total	%	Total	%	%
	26. Cryptococcal meningitis, heart attack, diarrhoea, are all common opportunistic diseases	94	91.3%	8	7.8%	1 (1.0%)
	27.Some biological monitoring of PLWHIV on ART includes viral load, CD4 count, renal function, liver function, haemoglobin differentiation	88	85.4%	14	13.7	1 (1.0%)

4.3.4 Respondents' readiness in provision of HIV management to people living with HIV

Overall readiness in the provision of HIV management was moderate, with 71.6%. Overall willingness to provide HIV management still appeared to be moderate at 77.1%, compared with their confidence, 69.6%, and substantially lower level of knowledge, 68.7%, with regard to HIV management of PLWHIV as illustrated in Table 4-12.

4.3.4.1 Respondents willing to provide HIV management of PLWHIV

HIV management requires respondents to be willing to initiate ART, to treat opportunistic diseases, and provide HIV palliative care to PLWHIV. The study results indicated that the majority of respondents were more willing to provide HIV palliative care than initiating ART and treating opportunistic diseases.

Willingness with regard to HIV management was moderate (71.6%), compared with 23.4% not willing to manage PLWHIV. The respondents showed more willingness in aspects such as providing HIV palliative care (82.5%), followed by treating opportunistic diseases (80.6%); however, they were less willing to initiate ART, as only 68% were willing to do so. Of the participants, 32% were unwilling to initiate ART, as indicated in Table 4-12.

Table 4-12: Respondents willing to provide HIV management of PLWH

HIV management	**HIV aspects**	**Agree**		**Disagree**		**Missing**
		Total	%	Total	%	
Willingness to	28. Initiate ART	70	68%	33	32%	
	29.Treat opportunistic diseases	83	80.6%	20	19.4%	
	30. Provide HIV palliative care	85	82.5%	17	16.7%	1 (1.0%)

4.3.4.2 Respondents confident in providing HIV management of PLWHIV

As shown in Table 4-13, the level of confidence with regard to HIV management was moderate (69.6%). HIV management requires respondents to be confident to initiate ART, to treat opportunistic diseases, and provide HIV palliative care to PLWHIV.

Table 4-13 shows that 82.6% of respondents indicated being confident to care for PLWHIV during their palliative stage, followed by a noteworthy drop to 68% in confidence in treating for opportunistic diseases, and a further drop to 57.3% in confidence in choosing the correct ART regimen for PLWHIV. Thus 44 % of respondents were not confident to choose the correct ART regimen for PLWHIV. Although 70.9% of respondents were confident in identifying the stages of progression of the disease and 79.6% were confident in the evaluation of opportunistic infections, only 68% were confident to manage HIV.

There was a noteworthy drop in level of confidence compared with level of willingness of respondents with regard to initiating ART, with respondents still showing confidence in providing HIV palliative care and treating opportunistic diseases.

Table 4-13: Respondents confident in providing HIV management of PLWH

HIV Management	HIV aspects	Agree		Disagree		Missing
		Total	%	Total	%	Total (%)
Confident in	31. Choosing correct ART regimen for PLWH	59	57.3%	44	42.7%	
	32. Treating opportunistic diseases	70	68%	32	31.4%	1(1.0%)
	33. Caring for PLWHIV during palliative stage	85	82.6%	17	16.7%	1(1.0%)

4.3.4.3 Respondents' knowledge of providing HIV management of PLWHIV

The overall level of knowledge with regard to HIV management was 68.7%, as illustrated in Table 4-14. HIV management requires respondents to know aspects related to initiation of ART and how to treat opportunistic diseases, as well as how to provide HIV palliative care to PLWHIV. Tenofovir, emtricitabine and efavirenz are all first- line regimens of ART offered in South Africa.

The study revealed that more respondents (77.7%) knew the first-line regimen of ART, compared with those who did not know; however, only 41.2% knew that Rifafour® is not a treatment for meningitis, as it is used to treat tuberculosis. Most of the respondents (85.4%) indicated that apart from being willing, they also knew how to provide HIV palliative care, as they understood that comfort, oxygenation, keeping PLWHIV pain free, and providing basic nursing care all constitute palliative care.

Table 4-14: Respondents' knowledge of providing HIV management of PLWH

HIV management	**HIV aspects**	**Agree**		**Disagree**		**Missing**
		Total	%	Total	%	%
Knowledge of	34. Tenofovir, emtricitabine and efavirenz are all first-line regimens of ART	80	77.7%	21	20.8%	2 (1.9 %)
	35. Rifafour® is a treatment for meningitis in PLWHIV	60	59.2%	42	41.2%	1 (1.0)
	36. Making PLWHIV comfortable, oxygenation, keeping them pain free, and providing basic nursing care all constitute palliative care	88	85.4%	13	12.9%	2 (1.9%)

4.4 Summary of the chapter

The findings presented in this chapter provided information to answer the research question by presenting the readiness levels in respect of the four aspects of HIV care as informed by the framework applied in this study. The findings included the various parts of the concept of readiness as applied in the study, namely willingness, confidence, and knowledge. The readiness of respondents entailed willingness to provide HIV care, confidence to provide HIV care, and knowledge of HIV care-related aspects as identified in the framework used in the study. The aspects of HIV care were HIV prevention, provision of health promotion for PLWHIV, provision of evaluation of health status for PLWHIV, as well as HIV management of PLWHIV. Most respondents were highly willing (88.3%) to provide HIV preventive care, followed by provision of health promotion at 86.1%, then by evaluation of health status at 85.8%, and lastly, they were moderately (77.1 %.) willing to manage HIV.

The same picture repeats itself in those highly confident (84.3%) to provide HIV care: respondents are highly confident in the prevention of HIV, followed by health promotion

for PLWHIV (80.9%), then evaluation of the health status of PLWHIV (79%), but only moderately confident (69.6%) to manage HIV.

Respondents have very low levels of knowledge of all aspects of HIV care. The lowest level of knowledge was in HIV prevention (47.1%), followed by evaluation of health status of PLWHIV (50.8%), then HIV management (68.7%), and lastly health promotion of PLWHIV (69.9%).

Of all the components of HIV care, there was a high level of willingness at 84.2%, with a drop to a moderate level of confidence (78.6%), and a considerable drop in knowledge, which scored low at only 59%. Further discussion and interpretation of the results follow in Chapter 5.

Chapter 5 – Discussion

5.1 Introduction

This chapter presents an interpretation and discussion of the demographics of the respondents and their readiness for HIV care under the four aspects of HIV care from the framework used in this study. The HIV care aspects are HIV prevention, evaluation of the health status of PLWHIV, promotion of health of PLWHIV, and HIV management. The study was conducted among final-year nursing students from one nursing institution in the Western Cape. Readiness is discussed under the following topics: willingness of students to provide HIV care, confidence to provide HIV care, and adequate knowledge to provide HIV care.

5.2 Demographics

One hundred and twenty-six students were recruited, but only 103 accepted, hence 103 questionnaires were distributed; all questionnaires were returned and none discarded. This provided a response rate of 81.7%. The response rate was acceptable for the study, as literature has indicated that a response rate of 80% is acceptable in a quantitative study (Fincham, 2008:43). Besides the 23 recruited students who declined to participate in the study, another 30 students were not included as they had participated in the pre-testing of the instrument. The majority of the respondents were female (89.3%) and only 10.7% were male. It is well known that nursing is a female- dominated career worldwide; statistics recently published in South Africa indicated that of 4471 nursing students, only 1080 (24%) were male, while 3388 (76%) were female (SANC, 2019). Although women were the majority in the study, reflecting the national statistics, it should be noted that in this study, the percentage of men is much lower than that of the nursing student population in South Africa.

Seven respondents did not provide information about their age. Of the respondents, majority are below the age of 35 years and less than quarter are above the age of 35 years. The average age of the respondents was 26 years, which is very similar to the average age of student nurses who completed a similar programme under regulation R425 in the whole country (SANC, 2019). This highlights that the majority of respondents

are young, and have long career lives ahead of them, which is important in the endeavour to reduce the shortage of nurses and facilitate workplace transition (Price & Reichert, 2017:1). The students have a good opportunity to gain more experience, skills and knowledge about HIV care during their careers. This will bridge the gap in the statistics of registered professional nurses who are mostly between 50 and 59 of age, contributing to about 29% of the total population of the registered professional nurses in South Africa (SANC, 2017).

The majority of respondents did not have previous healthcare experience prior to the nursing course; therefore, the experience they have is through nursing course clinical placement. As the majority of the respondents are young, that fits their lack of experience prior to the current course, as only less than a quarter of respondents had obtained healthcare experience from previous employment in healthcare facilities as caregivers, auxiliary nurses, and theatre practitioners.

Just less than half of respondents indicated that they had a family member or co-worker living with HIV. Not having anyone close living with HIV can make it difficult to relate to the condition, whereas having a family member living with HIV can make a person understand the condition better, improve attitudes towards people living with HIV. As noted by Bektaş and Kulakaç (2007:893), knowing someone with HIV was found to increase knowledge and willingness to care for people living with HIV.

All the respondents noted that they had nursed a person living with HIV previously as part of their training. The respondents are fourth-year nursing students; they do practical training in different healthcare settings, where they gain experience of nursing care. In South Africa, it has been noted that half the patients admitted to hospital are living with HIV and the majority of patients who die are HIV positive (Long et al., 2016). This explains the results of this study where all the respondents had the opportunity to nurse someone living with HIV. The large number of PLWHIV seeking care in healthcare institutions provides nursing students with an opportunity to gain competencies in caring for PLWHIV, which could increase their readiness.

5.3 Readiness to provide HIV care

Almost three quarters of respondents indicated a readiness for provision of HIV care. Respondents' readiness with regard to HIV prevention and health promotion for PLWHIV is on the same level, while the evaluation of health status of PLWHIV and HIV management scored the same as well.

5.3.1 Respondents' readiness in HIV prevention

In this study, HIV prevention included HIV counselling, testing, PEP, PrEP, PMTCT, prevention of STIs and health education. It was therefore important to establish final-year nursing students' readiness with regard to HIV prevention.

Almost three quarter of respondents indicated a readiness for prevention of HIV.. Respondents are highly willing and highly confident but lack knowledge to support the provision of HIV care. These results contradict a study done in Johannesburg, indicating that more than three quarter of nurses (79%) were knowledgeable about HIV prevention, but only little above half of those nurses (59%) were willing to promote female condom use (Petkova et al., 2018). In the above study, the nurses were knowledgeable but less willing, whereas in the current study, the students are highly willing but have low levels of knowledge with regard to the prevention of HIV.

Final-year nursing students are future healthcare workers; therefore, having 12.6% of respondents unwilling to provide HIV prevention-related care and being unsure whether they are willing or not, do not bode well. In a study done at the University of Surabaya in Indonesia, first-year students showed that lack of knowledge had some slight effect on unwillingness (Sari & Parut, 2017:201). The respondents will be professional nurses who are expected to render competent, comprehensive and quality nursing care to PLWHIV at the end of the course (Department of Health, 2013:4). When nurses are committed and willing, quality of care improves and patients are satisfied with the service provided (Sepahvand et al., 2019:303).

Sub-Saharan Africa has committed to initiate HIV counselling and testing. Healthcare providers, including nurses, offer routine HIV counselling and testing whenever they encounter clients consulting for any reason (Roura et al., 2013:617). This widespread

adoption provides nurses with an opportunity to identify HIV-positive individuals already in contact with health services, and who should therefore be treated as per protocol (Roura et al., 2013:617).

In this study, findings also indicate that majority of respondents are willing to conduct HIV testing (93%), this results are far better compared with a study done in Indian dentists, where only less than a half were(42%) willing to conduct HIV testing (Ngaihte et al., 2017); however, the current study's results are similar to a study done in India on Vietnamese dentists where willingness scored 90%and another study in India where nursing students scored 93.3% in counselling and testing for HIV (Santella et al., 2016: 230, Pal et al, 2016:127).

Out of those willing to test there are few who are not willing to conduct the HIV pre-counselling and post counselling but will perform HIV testing regardless. That implies that some respondents are willing to do HIV testing without counselling. Issues such as use of condoms as a lifestyle modification needs to be emphasised during post-test counselling (Vermund & Hayes, 2013:169).According to the National HIV Testing Services Policy (Department of Health, 2016b:1), all healthcare providers have to comply with the guidelines on HIV counselling and testing, which include HIV prevention, treatment, care, and laboratory coordination to ensure quality assurance. The same requirement applies to final year nursing students who will join the team of healthcare workers the following year.

. At this stage, respondents are expected to be willing to provide preventive HIV care to clients living with HIV, because HIV counselling and testing is one of the basic preventative care, even the home-based care providers can do HIV counselling and testing as a preventive strategy to improve access to HIV treatment, care and support (Magasana et al., 2016:188). A study in India noted that unwillingness of nurses is driven by lack of adequate knowledge pertaining to HIV care, and suggested that professional training workshops can improve the level of willingness and knowledge, as well as the attitudes of nurses towards HIV care (Som et al., 2015:19).

Nurses can gain from up-to-date HIV information, training and coaching, as well as from group discussions, while experienced nurses can assist in HIV counselling by guiding

less experienced nurses as well as providing psychological support to one another (Mulaudzi et al., 2011:30).

South Africa needs to support the expansion of HIV-related services by encouraging PLWHIV to live healthy lives to prevent further infection and opportunistic diseases, PLWHIV as they often suffer from isolation, stigma and discrimination, impacting their quality of life (Andersson et al., 2019). Therefore, post-test counselling on social relationships and sexuality issues with PLWHIV is essential to unpack ways to ensure a good quality of life by discouraging unstable relationships and encouraging long-term partnerships that provide better social support and reduce levels of anxiety (Passos & Souza, 2015:809).

Majority of Respondents are confident with regard to HIV prevention , One of the studies done in Nigeria indicated that knowledge and confidence to conduct HIV testing among traditional birth attendants depended on training; those trained displayed better confidence in counselling and testing knowledge and practices (Osuji et al., 2015:1977).

Although there are majority of respondents who are confident to conduct HIV testing, pre and post-test counselling, there is almost quarter of respondents still not confident I performing those activities, these student are on the exit level of the course, soon to be health care workers. Counselling period is the best time to address the issues related to social aspects, relationships and sexuality, quality of life, and way forward (Passos & Souza, 2015:809).

Every healthcare worker is expected to test clients for HIV according to prescribed protocol in order to reach the global target 90/90/90(Rabkin et al., 2017:353). A study by Ignacio et al. (2014) indicated that only 23.5% of participants were comfortable with HIV testing; its lack was related to low levels of HIV testing in practice. However, in this study by Ignacio and colleagues, confidence was not tested; therefore it is not clear how students will perform if evaluated, because it has been proven that there is a relationship between practice and confidence. This was proven in a study on primary clinicians, those who did HIV care had increased confidence compared to those who didn’t not do HIV

care (Waldura et al., 2013:793). Final-year students still have an opportunity to improve confidence over years of practice under supervision of Nurses with NIMART.

If the HIV status is positive, the student or healthcare provider should be able to discuss the treatment options available to the PLWHIV, be able to refer the patient, or do further investigation to determine the disease stage, should be able to conduct sexual risk behaviour audits, and assist in managing future risk, such as encouraging partners to test, and use of condoms (Foundation for Professional Development, 2017:125).

A study done in Turkey indicated that knowledge about HIV increases as the years of study increase, from first year to last year (Kok et al., 2018:1697). In this study, the overall level of knowledge with regard to HIV prevention is still low, as the respondents scored an average of 47.5% in their last year of studies.

This study's results are worse than those found in a United Arab Emirates study on undergraduate nursing students who expressed low levels of knowledge, scoring 61%, although they both were done on undergraduates (Haroun et al., 2016).

Although the level of knowledge is high with regard to seroconversion and the window period, seven respondents did not know that HIV tests should be repeated after the window period. This will negatively impact society as people will live under the impression that they are HIV negative, and not seek medical assistance. Thus, they will infect others with HIV, because at this stage they are regarded to be highly infectious. A recent study was done in the province of KwaZulu-Natal with regard to an HIV and AIDS educational intervention programme. The aim of the study was to evaluate the educational intervention implemented to improve the knowledge of Bachelor of Nursing students at a KwaZulu-Natal university. The findings of the evaluation provided great improvement in the educational programme, with a lowest score of 78% in pre- and post-test counselling and highest score of 97% in HIV immunology knowledge (Ngcobo & Mchunu, 2019:1). Perhaps similar initiatives could be implemented to improve their knowledge before exiting the training institution.

Failure to explain to the client the importance of follow-up to re-check one's status is tantamount to negligence. It is therefore important to do non-targeted HIV screening;

however, a previous study indicated that nurses or healthcare providers used time constraints as an excuse to avoid non-targeted HIV screening (Ignacio et al., 2014:11). There are already reports that time constraints interfere with screening, coupled with lack of knowledge, more clients would lose the opportunity for such vital information about window period and necessity to come for another test (Ignacio et al., 2014:24, Stime et al., 2018:1).

Only 10.7% of respondents knew that the rapid HIV test does not detect the HIV virus in the blood. These results are extremely low, as they indicate that among the 93% respondents who are willing and 94.2% who indicated confidence in performing HIV tests, only 10.7% of respondents know that the rapid test detects only HIV antibodies, not the HIV, and 88.3% of respondents did not know that the HIV is detectable through tests such as polymerase chain reaction (PCR) tests, not through the rapid test. Unlike the findings of this study, a high knowledge level (85%) was reported in nursing students in Ghana, even though the use of students to perform HIV test and counselling was low (47%) (Sambah et al., 2018:453).

Nurses should be knowledgeable about prevention of mother-to-child transmission (PMTCT) from HIV-infected women (Vermund et al., 2013). PMTCT includes prevention of transmission from mother to child, and links HIV-infected infants to appropriate treatment and care (Ogbonna et al., 2016:167). In order to continue with the success of the PMTCT programme in South Africa, primary HIV prevention must be implemented effectively, especially on pregnant women and breastfeeding mothers (Mulenga & Naidoo, 2017:1). HIV PCR tests are done in the first four to six weeks of life in infants born from HIV-infected mothers. This intervention is shifted to primary care done by nurses; therefore, it is important that student nurses know what is expected of them on completion of the nursing course (CDC, 2015:1).

In this study, the results indicated inadequate knowledge with regard to PMTCT, as only little above quarter (37.9%) of respondents knew that as long as the infant is breastfeeding, the child should be on ART even if the PCR test is negative after six weeks especially if the mother's rival load is still high. Worse results were reported in a study done in Tshwane that indicated a 17.7% score on knowledge of PMTCT drug dosage

among nurses and doctors (Ogbonna et al., 2016). However, In Malawi, the level of knowledge with regard to PMTCT was reported to be average among nurses, where the majority were training to provide care to pregnant women (Mulenga & Naidoo, 2017:1).

If one stops ART while the infant is still breast feeding, reaction increases the chances of vertical transmission; hence WHO recommends that all infants still breastfeeding should continue with ART for as long as up to 12 weeks if the mother's HIV suppression has not been achieved (WHO, 2018:13). In this study, the level of knowledge with regard to HIV-exposed infant feeding and prophylaxis is very low, and the results are similar to those of a study in India that found only 50% of respondents knew about correct, exclusive breast feeding from one to six months of age. These results suggested that nurses did not have adequate knowledge to prevent mother-to-child transmission (Som et al., 2015:17).

This lack of knowledge can explain some of unwillingness and lack of confidence of respondents with regard to pre-test counselling and post-test counselling. These results corresponded with those of a study in the United Arab Emirates that indicated inadequate knowledge not only among nurses, but also among medical and dental students, who displayed a gap between knowledge regarding transmission and willingness to care for PLWHIV (Haroun et al., 2016).

It was therefore important to ascertain the level of readiness in HIV prevention to determine the readiness of final year-students at one nursing education institution in the Western Cape with regard to HIV care.

5.3.2 Respondents' readiness in provision of health promotion for PLWHIV

In this study, health promotion entailed counselling on healthy living and nutrition, and prevention of opportunistic infection. Hence the need to assess the readiness of final-year students at one Western Cape nursing training institution to provide health promotion for PLWHIV.

From this study, respondent's readiness with regard to provision of health promotion for people living with HIV was moderate, scoring an average of 79.5%, the highest score in the four aspects of HIV care as defined in this study. Similar to prevention of HIV, the respondents appear to be highly willing and confident, however, the level of knowledge

is low at 69.9%. Nurses are the largest group of healthcare workers responsible for continuous nursing care of both in-patients and out-patients (Som et al., 2015:18). Therefore, their willingness, confidence, and knowledge of HIV and HIV care, should be of a higher standard in order to provide quality care that is sustainable and less harmful to PLWHIV (Som et al., 2015:18). the promotion of health of PLWHIV has been noted to be higher (86%) among nurses in Australia, PLWHIV (Crock et al., 2017:644).

Besides HIV treatment and care, there are other important but challenging aspects, such as providing psychological support to PLWHIV, as PLWHIV have to contend with the condition and all the impacts of the condition; therefore, PLWHIV require instruction in positive living and the use of support groups (Amzel et al., 2013). Psychological support aids PLWHIV to live fulfilled lives, despite chronic illness. Any approach intending to provide support should address the challenges related to HIV, treatment access and retention of PLWHIV in care (Amzel et al., 2013). This implies that health caregivers should be able to provide these services to PLWHIV. One can expect final-year nursing students to know how to render services of this nature to PLWHIV.

Poor food security leads to malnutrition, one of the common complications of HIV infection caused by reduced intake of food which increases vulnerability to infection, poor health, and acceleration of HIV progression. It is important that PLWHIV obtain nutritional advice, evaluation and support as early as possible after diagnosis in order to maintain a healthy body weight. Healthcare providers should be willing to instruct PLWHIV on how they can safeguard their nutritional status (Foundation for Professional Development, 2017:244; Tshingani et al., 2017; Weldegebreal et al., 2018:63).

In this study, 76.7% of the respondents were willing to conduct the nutritional programme; however, the remaining 23.3% are unwilling or unsure. almost quarter of respondents not willing to conduct the nutritional supplements programme is a concern from the healthcare workers of tomorrow, as nutrition is considered a crucial component of total HIV care, particularly in areas with poor food security and a high incidence of malnutrition (Weldegebreal et al., 2018:63),

Majority of respondents (89.3%) are willing to conduct counselling for positive and healthy living to PLWHIV and provide health education on how to prevent opportunistic diseases.

The level of willingness is very high with regard to conducting counselling in positive and healthy living to PLWH; however, it is puzzling that respondents are willing to counsel on positive and healthy living and provide health education, but less willing to include nutrition in the same consultation as required for comprehensive management of HIV, as lack of healthy nutrition has been linked to the progression of HIV and HIV poor outcomes (Tesfaw et al., 2017:1).

In addition to nutrition, exercise is another activity that enhances the wellbeing of PLWHIV, and needs to be included in efforts to ensure promotion of good health. Exercise has been reported to reverse the side effects of antiretroviral drugs in the bones, as it has been shown that these drugs decrease bone mineral density (Ibeneme et al., 2019). Therefore, healthcare workers should be able pass this information to PLWHIV as part of counselling to encourage positive living post-diagnosis (Foundation for Professional Development, 2017:244).

Being HIV positive is no longer a life-threatening condition, but it has become a chronic condition with increased life expectancy, especially on treatment, with people living longer than 21 years (Marcus et al., 2020); hence, it is important to assess how people live after HIV diagnosis. Life expectancy among some populations seems to differ from others, because of use of substances, alcohol and opioids (Althoff et al., 2019:2097). Quality of life is a growing concern for people living with HIV, and these challenges require interventions ranging from social, psychological and physical wellbeing ones, which healthcare workers should address holistically (Passos & Souza, 2015:801).

The moderate level of confidence with regard to conducting the nutritional programme for PLWHIV is of concern, as this implies that not all PLWHIV will receive the nutritional health education they require. Malnutrition is a threat to PLWH; it puts them at risk of progressing to the AIDS stage sooner and developing opportunistic infections, with low adherence to ART (Odwee et al., 2020:122). A study in the Democratic Republic of the Congo indicated a greater body mass index (BMI) on patients initiated on supplements for six months, compared with those given only nutritional counselling (Tshingani et al., 2017). With about 22.3% of respondents not confident in giving nutritional advice, they might not be able to achieve the goal of improving the BMI of PLWHIV.

South Africa is affected by the HIV epidemic, and although there has been an increase in ARV coverage, there are still challenges that militate against the reduction of new incidences, such as poor nutrition. This calls for interventions such as a therapeutic programme offered to vulnerable groups, especially those with low socio-economic status. Nutritional supplements are provided to PLWHIV who cannot afford nutritious food; the aim of the programme is to correct nutritional deficiencies in vulnerable groups. It is crucial to improve the nutritional status of those with low BMI associated with malnutrition in order to suppress the virus and for them to be able to take treatment (Hansen et al., 2015:1). Poor food security was also reported in the Democratic Republic of Congo, and was a barrier to adherence to ART and good immunological response (Tshingani et al., 2017).

In this study, 65% of the respondents indicated that nutritional supplements are provided to everyone living with HIV. Only 15.7% of 103 respondents are aware that nutritional programmes are not provided to everyone living with HIV, but only to those who cannot afford nutritious food. This result indicates the lack knowledge with regard to economic factors and the feasibility of the programme, as well as current practice in the clinical setting. As a result, the programme is likely to fail, as resources will be depleted if offered to everyone living with HIV, regardless of their socio-economic status (Hansen et al., 2015:4).

For South Africa to overcome nutritional insecurity, it made provision for targeted supplementary feeding for PLWH; however, the budget is too small to cover the entire HIV-infected population, therefore appropriate monitoring and evaluation of the programme is important (Hansen et al., 2015:4). Challenges such as lack of knowledge of nutritional programme implementation will result in clients not reaping the benefits of the programme, adding to increased government expenditure and depletion of health funds (Hansen et al., 2015:5).

Health education on lifestyle modification such as condom use during sexual intercourse is very important in PLWHIV (Vermund et al., 2013). In this study, respondents' knowledge with regard to the use of protection, even if both partners are HIV positive, is

very high; however, there are still four respondents who do not know that PLWHIV should continue using protection even if the partner is HIV positive.

Opportunistic diseases are prevented by prophylaxis as well; one such prophylaxis is cotrimoxazole; however, in this study, only little above two quarters (48.6%) out of 103 respondents know that cotrimoxazole is given to prevent opportunistic disease in Stages 2 to 3 of HIV, according to WHO guidelines. This means that the majority of PLWHIV will not be assessed to determine the stage of disease in order to initiate the prophylaxis suitable for the specific stage and for opportunistic diseases which are prone to develop in PLWHIV. These results differ from those of a study done in India, where the knowledge level regarding the management of opportunistic diseases was at least moderate, scoring (71.66%), although the study was done among nurses who had completed their studies and who had experience of nursing PLWHIV (Pal et al., 20169:127). In this case the students are not yet experts, they still have opportunity to gain knowledge and experience as well as further training as Primary health care specialist with HIV course. However, it was important to explore the level of readiness of final-year nursing students with regard to health promotion of PLWHIV, which included willingness and confidence to promote nutritional status, thereby improving the quality of life of PLHW, as well as students' knowledge of promoting health and preventing opportunistic diseases.

5.3.3 Respondents' readiness for provision of health status evaluation for PLWHIV

Quality of life is influenced by factors beyond the physical and biological domains; other factors (such as health status, socio-demographics and lifestyle) are as important in establishing the quality of life of PLWHIV. Hence the study assessed readiness in all four aspects of HIV care, not one aspect only. Assessment of quality of life should be included in assessment of physical and clinical evaluation of PLWHIV (Passos & Souza, 2015:812).

Respondents' level of readiness with regard to provision of health status evaluation of PLWHIV is moderate, as little below three quarter of respondents indicated readiness to provision of health evaluation of PLWHIV. A picture similar to prevention and health promotion noted when more respondents are willing and confident but only Half 51.1%

of respondents are having adequate level of knowledge to support provision of health status evaluation. There is considerable inter-individual variation in the natural history of HIV infection; it has various stages which relate to different levels of immune functioning, viral replication, and clinical stages (Foundation for Professional Development, 2017:104). Respondents should therefore be willing to assess these disease stages and act accordingly to improve quality of life.

HIV infection is divided into several stages, predominantly on the basis of CD4 cell count, viral load and clinical symptoms. In this study, the respondents were asked if they were willing to assess the clinical stages of HIV infection when they consult PLWH; majority of respondents were willing to assess HIV clinical stages and the level of willingness was high in this regard; however, there are 19.4% who were not willing to do so. It is very important to assess the immunological status of PLWHIV and their needs as individuals, as the approach is not a blanket one (Aregay, 2020:1).

Respondents should be in position to assess if ART is able to suppress the viral load, assisting the body in the formation of a more effective immune response to HIV and slow the immunological and clinical progression of HIV (Foundation for Professional Development, 2017:104).

Clinical stages consist of the symptoms of opportunistic diseases grouped in different stages. In this study, 84.5% of respondents were highly willing to assess opportunistic diseases, but only 80.6% were willing to assess clinical stages. The healthcare provider should be able to link the opportunistic infection and the HIV clinical stage according to the symptoms the patient presents with. In that way the provider will be able to provide the appropriate prophylaxis based on the assessment. If PLWHIV present with an opportunistic disease and the healthcare provider fails to address it, it results in a weakened immune system and clinical progression, which may eventually lead to death.

HIV is one of the best measured chronic conditions; both viral load and CD4 cell count have become widely regarded as essential for management of PLWHIV, particularly for initiation and monitoring of the treatment (Foundation for Professional Development, 2017:76). If respondents are not willing to monitor drug effects and disease progression, it becomes a greater risk to PLWHIV, as nurses will continue providing patients with

treatment, but not assess if the treatment is effective, if there are side effects, or resistance (Zuo et al., 2019:225). ART drugs can cause severe toxicity and anaemia, hepatotoxicity, hyperlactataemia, hyperlipidaemia, lipodystrophy, hypersensitivity, pancreatitis, nephropathy, and peripheral neuropathy (WHO, 2020:2). A study done in South Africa emphasised the importance of knowing the side effects of ART, not only by healthcare workers but by PLWHIV as well, where the results indicated that the level of knowledge with regard to the side effects of ART increased from 49.9% to 95.7% after three months of reading written leaflets provided to them (Browne et al., 2019:469). The level of willingness with regard to drawing blood to monitor the disease progression is high, as only one person is strongly unwilling to draw blood to monitor the progression of HIV infection. It appears as if the respondents are willing to draw the bloods, but do not understand that the blood results form part of assessing the clinical stage and opportunistic disease monitoring, as fewer respondents are willing to assess clinical stages and opportunistic disease, compared with willingness to draw blood.

About 92.3% of respondents are willing to draw bloods for biological monitoring, but only 86.4% are confident they can draw blood for biological monitoring. Reduction of level of confidence is concerning, because if a professional lacks confidence to perform a task, it can lead to inconsistent practice (Parameshwaran et al., 2017)

The level of knowledge with regard to some of the symptoms of clinical stages is very low, only 58.3% know that Kaposi's sarcoma is one of the symptoms of clinical Stage 4, while 43% of respondents did not know. Inadequacies of knowledge in clinical staging have also been noted in other studies. For example, only 57% of nurses were competent in conducting HIV clinical staging among nurses in Kenya (Smith et al., 2016:325). There is a huge difference in knowledge level compared with nursing students from KwaZulu-Natal, as they scored 80% in HIV staging and monitoring of HIV progression (Ngcobo & Mchunu, 2019:1). HIV clinical staging assists the nurse practitioner to treat PLWHIV accordingly, as without knowing the stages, one can mistreat patients as there are certain treatments to be considered for different stages to support ART, for example, in HIV and TB, when to start treatment for patients (Suryana et al., 2020:18).

The study also proved that the respondents are willing and confident, but lack knowledge with regard to opportunistic diseases associated with HIV infection, as only eight respondents strongly disagreed that cryptococcal meningitis, heart attack, and diarrhoea are all common opportunistic diseases, because not all of the mentioned conditions are common opportunistic diseases in HIV infection.

The level of the knowledge with regard to opportunistic disease in PLWHIV is remarkably low. This result is concerning, as the majority (91%) of the respondents are not knowledgeable about the common opportunistic diseases associated with HIV infection. Low levels of competency were also reported among nurses in Kenya, where only 30% were competent to provide isoniazid prophylaxis, and only 45% competent to initiate TB treatment for prevention and management of opportunistic infection (Smith et al., 2016: 325). Similarly, another study also noted that about 49.6% of nurses did not know that TB is classified as one of the opportunistic diseases in WHO clinical Stage 2 (Serwaa, 2018:104).

If the nurse practitioner is aware of opportunistic diseases, she or he will be able to pay more attention to HIV infection progression and act accordingly from the root cause of the opportunistic disease, for example, oral and oesophageal candidiasis (Mensana et al., 2018:276).

The level of knowledge with regard to biological monitoring is high, as the majority of respondents are aware of biological monitoring; they know that blood collection is done for viral load, CD4 cell count, renal function, liver function, and haemoglobin differentiation. Some respondents (*n*=14) are not sure if the above-mentioned blood collection is done for biological monitoring of PLWHIV, and one respondent did not answer the question. Biological monitoring is a requirement for PLWHIV, according to WHO, to determine drug effects and side effects, disease progression, viral suppression, and organ failure. However, the results in this study were better than those of a study in Kenya, where only 60% of nurses were found to be competent in monitoring and supporting treatment adherence (Smith et al., 2016:325). Hence it was also important to ascertain the readiness of final-year students with regard to provision of health status evaluation for PLWHIV.

5.3.4 Respondents' readiness in provision of HIV management of PLWHIV

In this study, HIV management included provision of ART, nutrition, treatment of opportunistic infection, palliative care, and psychosocial care. From this study, almost three quarters of respondents are indicated readiness to provide HIV management ofPLWHIV PLWHIV all other aspects of HIV care scored a high level of willingness and confidence, except for HIV management. In all aspects of HIV care investigated in this study, knowledge scored lower than all other readiness aspects, although respondents' knowledge remained low, even in HIV management; however, the knowledge level scored higher in the provision of HIV management than in other HIV aspects, at 68.7%. Poor knowledge with regard to HIV management has been reported by other authors who noted about 80.1% of participants having poor knowledge, especially in PEP (Tshering et al., 2020).

Knowledge of opportunistic disease symptoms, cure, and treatment should be addressed to improve the negative image of HIV infection (Haroun et al., 2016). In this study, the respondents were asked questions to determine their readiness with regard to the provision of HIV management. The questions to determine willingness, confidence and knowledge regarding HIV management, as these three aspects summarise the readiness of the students in HIV management.

Out of 103 respondents, only 68% are willing to initiate ART; the level of willingness with regard to initiation of ART is low and the process is still burdensome to many countries, including South Africa and Swaziland (Rosen et al., 2016; Mavhandu-Mudzusi et al., 2017:552). A study done in Swaziland reported the need for support for nurses to initiate ART, suggesting that health policy developments can enhance nurses' roles (Mavhandu-Mudzusi et al., 2017:552). The test and treat initiative's aim to reduce morbidity and mortality is a collective approach and requires cooperation from all healthcare workers (Foundation for Professional Development, 2017:168).

The study indicates that majority (85.4%) of the respondents are knowledgeable about the biological monitoring required for PLWH; therefore. Student nurse needs be able to identify eligibility criteria for the initiation of highly active antiretroviral treatment/therapy (HAART) regimen, although this initiation of HAART is a function carried out by PHC

specialist Nurse with NIMART. PLWHIV could benefit more if all respondents are willing to carry out the strategies designed to combat HIV and opportunistic diseases, to improve immune system capabilities, and reduce the rate of mortality and morbidity (Ahmed et al., 2018:72). One previous study indicated an urgent need to improve the level of knowledge among nursing students in HIV care, as they will be the key role players in treatment in their future careers (Dharmalingam et al, 2015:26). Such roles span the continuum of illness and health, including palliative care.

Palliative care in this study means provision of comprehensive care by nurses that involves the psychosocial, physical, and spiritual wellbeing of an individual who is suffering from HIV-related illness, and provision of support to the family, from diagnosis to death (Bam & Naidoo, 2014:2). In this study, majority of respondents are willing to provide palliative care to PLWHIV at the end stage of the disease, but there is less than a quarter (16.7%) remaining respondents not willing to provide PLWHIV which similar to those found in nursing students in Cameroon, where about 23.8% are not willing to care for PLWHIV (Iwoi et al., 2017:1).

The purpose of palliative care is to enhance the patient's life in a supportive and therapeutic environment, so that the PLWHIV in the palliative stage can have less suffering and a better quality of life until death (Harding, 2018:e524). Such patients need nurses' support and care to transform their lives (Bam & Naidoo, 2014:6). A study done in KwaZulu-Natal outlined other factors which hinder the provision of quality palliative care, and these include being overwhelmed by the effects of HIV and AIDS. HIV is draining to nurses, as they have to provide holistic care to PLWHIV who are at the palliative stage (Bam & Naidoo, 2014:5).

Some of the mechanisms to cope with terminally ill patients are accepting death as a reality of life and appropriate training in palliative care; therefore, students' unwillingness could be due to these challenges. However, they could learn coping skills from palliative care training, and psychological and spiritual counselling are available for nurses who care for PLWHIV (Bam & Naidoo, 2014:5).

More than half respondents (68%) are willing to initiate ART, but only 57% of respondents are confident in choosing the correct ART regimen for PLWHIV. A low level of confidence

was also reported in nurses in both rural and urban areas of the Western Cape, as their mean score was 68.7%, scoring a minimum of 45% and a maximum of 85% (Solomons et al., 2019:1). A low level of confidence suggests that the implementation of treatment phase may be problematic..

This result is similar to the study done in one of the healthcare facilities in Cape Town that reported a 68.7% score for HIV management confidence among nurses prescribing ART (Solomons et al., 2019:1). Similar results were found in a study done in the Eastern Cape, where nurses are reported to be less confident in initiating ART, even after NIMART training courses (Mangi et al., 2019:86).

The number of respondents willing to provide palliative care is equal to the number of respondents who are confident in providing palliative care to PLWHIV however, there are about 12.9% who displayed a lack of knowledge with regard to palliative aspects: majority knows that comfort, oxygenation, analgesics, and basic nursing care are the most important aspects in palliative care. This result is consistent with the study done in one of the hospitals in Limpopo among nurses, where the medium level of HIV knowledge was found to be linked to negative attitudes towards caring for patients with HIV (Mulaudzi et al., 2011:30).

Student nurses can learn more from experienced nurses, as it has been proved that nurses who have ten years' experience and who are older have higher levels of knowledge of HIV and their attitude is better, compared with less experienced nurses. Previous studies supported positivity in caring for PLWH; however, they highlighted the fact that the burden caused by HIV on healthcare facilities requires extra allowance for caring for people living with HIV (Mulaudzi et al., 2011:30).

Improving coverage of ART in PLWHIV, especially in children, improves the health of children and lengthens their life span, therefore paediatric HIV care needs to extend beyond focusing on survival and focus more on physical and psychological wellbeing. Living with HIV also affects the psychological wellbeing of those living with HIV and their families, leading to mental health problems and developmental challenges; requiring interventions (Amzel et al., 2015) Task shifting is an effective strategy to address the shortage of human resources in HIV treatment and care. It offers treatment and care

which is cost effective and of high quality. This strategy requires knowledge of treatment and care of PLWHIV, therefore registered professional nurses are expected to treat and care for PLWHIV to cover the shortage of doctors (Callaghan et al., 2010).

HIV treatment therapy reduces mortality (Harding, 2018:e524). Students were asked a question that examined their knowledge of HIV treatment (drugs). Just over three quarters (77.7%) of respondents know that the first-line regimen includes tenofovir, emtricitabine and efavirenz. These results are consistent with the overall score in the management of HIV in a study done on nurses in the Western Cape, who displayed moderate levels of knowledge with regard to HIV management, as their mean score was 72.7% (Solomons et al., 2019). The University of California tested the developed HIV primary curriculum on university students about to graduate: their level of knowledge of basic HIV treatment was 29% and improved to 61% after the implementation of the curriculum (Warren et al., 2018).

It is also noted that 80.6% of respondents are willing to treat opportunistic diseases, and only 68% also indicated that they are confident; and less than half (41.2%) know that Rifafour® is not used to treat meningitis; that leaves more than half (58.8%) of respondents unaware that Rifafour® does not treat meningitis, but is used to treat tuberculosis. The level of knowledge with regard to opportunistic disease treatment is low. Similar results were indicated in a study done among nurses in Ghana: only 44.6% knew that TB can be prevented in PLWHIV by using TB preventive therapy (Serwaa, 2018:90). The only difference is that they were already working in health facilities, whereas this study was done on final-year nursing students who had already completed the HIV content of the syllabus.

5.4 Summary of the chapter

Continuous data collection about the baseline knowledge of HIV and impact of training among nurses and nursing students is needed to evaluate the need to modify the training programme (Goel et al., 2010:56). Hence the importance of determining the level of readiness for provision of HIV care among final-year nursing students in a nursing training institution in the Western Cape. This chapter covered the demographics and students' readiness to provide HIV care in all four aspects of HIV. The research obtained an 81.7%

response rate; 126 students were recruited but only 103 questionnaires were returned completed. The majority of respondents were female, with a few male respondents (10.7%). Of the respondents, majority were below the age of 35 years and 10.4% above 35 years.

The majority of students did not have previous healthcare experience prior to the course, as only 15.5% had worked in healthcare as caregivers and technicians. Almost half had a family member or co-worker living with HIV; however, 59.2% did not. The study could establish the level of readiness with regard to HIV care among final-year nursing students as moderate, scoring 73.9%.

The study focused on four HIV care aspects which student nurses are expected to be familiar with by the end of their studies: prevention of HIV, promotion of health, monitoring of health status of PLWHIV, and HIV management. Levels of readiness in all four aspects fall within the moderate category, the highest being promotion of health of PLWHIV, with a score of 79.5%. Respondents' scores vary in all level of readiness: they are highly willing and moderately confident, but with low levels of knowledge with regard to HIV care.

Chapter 6 – Conclusion and recommendations

6.1 Introduction

This chapter gives an overview of the entire study to ascertain if the readiness of nursing students with regard to HIV care was established. It also highlights how the study was conducted and the data analysed. The results of the study are revisited as well as the results and their implications for the healthcare system, nursing students and nursing education institution, and what can be done to improve the readiness of nursing students.

6.2 Conclusions of the study

The study's aim was to determine the readiness of final-year nursing students in the provision of HIV care at a Western Cape nursing institution. Readiness is the state of being willing and prepared to do something (*Concise Oxford English Dictionary*, 1990:1221). In this study, readiness implied being willing and confident to provide HIV care as well as having accurate and updated HIV care-related knowledge.

The study determined students' levels of readiness in the four main aspects; these were guided by the framework used in the study: HIV prevention, evaluation of the health status of PLWHIV, promotion of health of PLWHIV, and provision of HIV management among final-year nursing students at one university in the Western Cape. The overall level of readiness of final-year nursing students at the specific Western Cape nursing institution is moderate, at 73.9%.

This study was guided by the post-positivist paradigm, whereby the evidence has one truth but cannot be fully observed (Frambach et al., 2013:552). The results of this study were calculated based on willingness, confidence, and knowledge in all four HIV care aspects; however, this does not guarantee that the students are indeed willing or confident, as confirmation or observation of students' displaying willingness and confidence in a clinical area was not done. The knowledge questions, however, gave a true reflection of what they know and what they do not know about HIV care aspects (Frambach et al., 2013:552).

A quantitative approach was used, as the study measured the level of readiness in the provision of HIV care among final-year students at a nursing institution in the Western Cape. It neither explored the reasons for the outcome, nor did it evaluate perceptions and feelings on the readiness of respondents in HIV care, as a qualitative approach would have done. Quantifiable data were collected, and statistical and computational techniques were used to gather and analyse the data in this approach.

This study was conducted at a nursing training institution in the Western Cape, which is a public institution. The institution has four campuses, and the study was done at one of the urban campuses, as the other two rural campuses had a very small number of final-year nursing students. The final-year students registered for the nursing qualification (R425) were used as a target group, as they are expected to be knowledgeable and skilled in caring for PLWHIV.

A total of 30 students were used as part of the pre-testing process of the instrument and did not form part of the sample, leaving an available sample size of 126 final-year nursing students. Of these, only 103 students agreed to participate in the study. Data was collected over a period of six months owing to unforeseen circumstances such as strikes and students not being on block at the same time.

On the day of data collection, the researcher obtained permission from the lecturer to have about 15 to 20 minutes before the end of the class to be able to inform the students about the study and invite them to participate. The students who agreed to participate signed consent, and then completed the questionnaires at the prepared station. The coding of the questionnaires allowed omission of any identifying data that could link the questionnaire to an individual respondent, ensuring that anonymity was maintained.

Using IBM® SPSS® Statistics Version 24 software, the collected data was captured and statistically analysed with the assistance of a statistician. Data was coded and recoded to facilitate analysis. The pre-test was done on 30 students from the same nursing training institution. The final reliability scores for each aspect of HIV care as assessed in this study were established, and there was evidence of reliability, as the internal consistency scores were above 0.8 for each aspect as illustrated in Table 3-2. Throughout the study, ethical

principles were considered, focusing on the integrity of the researcher who adhered to all professional standards and principles of ethics.

For each of the four aspects investigated in this study, the readiness level was found to be moderate, with the health promotion for PLWHIV aspect scoring the highest in readiness at 79.5%, followed by HIV prevention at 73.2%. The aspects of evaluation of health status of PLWHIV and HIV management had similar scores of 71.8% and 71.6% respectively. In all the HIV care aspects investigated, readiness was evaluated as comprising willingness, confidence, and knowledge. The study results revealed that final-year nursing students were highly willing, with a score of 84.2%; moderately confident, with a score of 78.6%; and had a low level of knowledge, with a score of 59% with regard to HIV management. The results highlight that final-year nursing students appear to be very willing and reasonably confident; however, they may not have adequate knowledge to support their practice.

Overall findings of the study indicate that the level of the readiness in provision of HIV is moderate, with respondents having an average score of 73.9%. Nurses can gain from up-to-date HIV information, training, and coaching, as well as from group discussions, while experienced nurses can assist in counselling by guiding less experienced nurses, as well as providing psychological support (Mulaudzi et al, 2011:30).

HIV care aspects were divided into four: prevention of HIV, health promotion for PLWHIV, evaluation of health status for PLWHIV, and HIV management. In all four aspects, the respondents' level of readiness is moderate (73.9%). The respondents showed that they are very willing to prevent HIV, as this had the highest score of 88.3%, but less willing to manage HIV, as this scored 77.1%. They are also highly confident in respect of HIV prevention (84.3%), but least confident in HIV management (69.6%).

Although the overall level of knowledge in all aspects is low, respondents displayed better knowledge in promotion of health of PLWHIV, as they scored 69.9%, but least knowledge in HIV prevention, as they scored 47.1%.

6.3 Recommendations

The results indicated a moderate level of readiness; this requires some intervention to mitigate the situation in order to improve the readiness of nursing students, and thus improve nursing health institutions in the healthcare system. The most concerning issue in this study is the low level of knowledge with regard to HIV care, scoring 59%, among final-year nursing students at one nursing training institution in the Western Cape. Improving knowledge with regard to HIV care is the most crucial issue.

6.3.1 Recommendations for nursing education institution

The nursing training institution should ensure that the curriculum covers HIV intensively, because it is still endemic in South Africa.

When the nursing training institution allocates practical sessions, it should consider giving more hours in Primary Health Care settings where PLWHIV are often initiated with ART, as this will provide students with more exposure to HIV care.

The institution should provide students with guidelines and short exercises to be completed during practical sessions in facilities where PLWHIV are located. This exercise will stimulate students to think, to relate and to be more independent in managing HIV. Random one-on-one sessions with students to discuss their experiences and the exercises, and a portfolio to identify problems and progress, could facilitate learning and improve knowledge and confidence, thus improving willingness.

Mentors from the nursing institution should follow up students in experiential training to continuously monitor and evaluate their progress in HIV care. This will make students more committed to care and learn more, knowing that they are under the supervision of a lecturer or mentor.

Methods of evaluating students' willingness, confidence and knowledge should not be solely through theory; the institution should strive to use actual practice to evaluate performance, especially of final-year nursing students, as they are being evaluated to go out into the world and convert theory into practice.

The responsibility for educating nursing students is shared among educational institutions, NGOs, healthcare facilities, research institutions, and healthcare professional developers. Clear communication between these institutions is required to communicate the gaps which need to be filled by other institutions and to facilitate further training.

Training institutions can arrange workshops for nursing students at surrounding NGOs and other institutions interested in investing in student pre-employment readiness. These institutions can assist in preparing students for the world of work. This exposure could improve students' knowledge with regard to HIV care. Such endeavours could include sessions with PLWHIV and experts, and these have been documented to improve competencies of nurses in HIV care (Frain, 2017).

The Department of Health does offer information pamphlets; nursing institutions should emphasise optimal use of the provided information. The research findings should also be communicated to the students to enlighten them and for them to address the identified gaps and other areas of concern.

Nursing educational institutions can use nursing students to raise awareness among their peers who are doing other courses at the same institution; in that way they will learn to give health education about HIV, and they will learn more about counselling and testing. When they reach their final year, they will be ready to face employment independently.

6.3.2 Recommendations for healthcare institutions

The current study has indicated considerable gaps in HIV knowledge. This implies that employers will be required to provide extra short courses for newly qualified nurses to care for and manage PLWHIV.

Health facilities should provide students with policies, guidelines and protocols to facilitate their learning. These materials should be up to date, so that the students can use them, practise the latest care, and improve their knowledge while completing their work-integrated learning.

Health facilities should continuously evaluate students in their use of provided protocols in prevention, screening, and treating. Structured competency will assist students to focus on what is expected of them.

Health facilities should allocate mentors (senior nurses) to follow up and guide students during practical periods. The mentors already know how the facilities function and their HIV care provision; thus, they will be able to guide students on specific aspects of HIV care, while actually caring for PLWHIV. This has the potential of empowering students and increasing their readiness, especially in the aspect of knowledge.

Health facilities should identify gaps in HIV care when monitoring students and communicate these to the nursing training institution, so that the institution can emphasise and address the aspects identified during the practical sessions.

Health facilities should take into consideration that students are at the health facilities to learn and achieve outcomes, not to address staff shortage issues. Students should have more time to focus on learning objectives as specified by the training institution, including taking care of PLWHIV.

6.3.3 Recommendations for nursing students

A high level of commitment from students is recommended. They should study the material provided by the training institution, health facilities and all other sources, to ensure their knowledge is both correct and current.

Students should use the practical sessions to learn and ensure they learn as much as possible during their clinical placement. Learning should be a priority, and they should question senior staff about any issues identified and be actively involved in patient care. In this way they will broaden their knowledge.

6.3.4 Recommendation for further research

Further research could be done to evaluate the HIV content covered in the curriculum of nursing students training to become registered professional nurses. Such research would explore any gaps and provide an overview of what needs review and adjustment in the curriculum.

An observational study of students' practice in an actual health facility with actual patients would provide accurate findings to determine their level of readiness, as it would be

observed whether they are confident and if they are able to apply their knowledge in practice.

A qualitative study to investigate final-year students' provision of HIV care would provide in-depth data on their level of readiness, as there would be the opportunity to explore this in that kind of study.

A needs assessment could be done to establish what students would like included in the syllabus to improve their readiness and practice. Their views thus would be considered when a new curriculum is drafted.

A qualitative study could investigate lecturers with regard to HIV care and how they deliver training. This could identify their competence and knowledge in respect of the latest HIV care, as these qualities influence the calibre student teachers produce.

6.4 Summary of the chapter

This chapter highlighted the overall readiness of nursing students with regard to HIV care. The results were dissected and meanings established. The impact of the results was also highlighted to furnish recommendations to mitigate the impact of gaps. Recommendations were divided according to various areas that the study touched upon. Recommendations are in the sequence below.

Recommendations for nursing education institutions which cover all aspects that provide advice to improve the nursing education system, which is responsible for training nursing students in preparation for healthcare services.

Recommendations for nursing students on how they can improve their readiness during their studies and when they join healthcare facilities as employees in the near future.

Recommendations for healthcare facilities on how they can assist in improving the readiness of nursing students during their training when they are placed in health facilities for experiential training, or after completion of their studies when they join the healthcare workforce.

References

Abolfotouh, M., Alabdrabalnabi, A.A., Albacker, R.B., Al-Jughaiman, U.A. & Hassan, S.N. 2013. Knowledge, attitude and practice of infertility among Saudi couples. *International Journal of General Medicine*, 6:563-573. https://doi.org/10.2147/IJGM.S46884

Achappa, B., Mahalingam, S., Multani, P., Pranathi, M., Madi, D., Unnikrishnan, B., Ramapuram, J.T. & Rao, S. 2012. Knowledge, risk perceptions and attitude of nurses towards HIV in a tertiary care hospital in Mangalore, India. *Journal of Clinical and Diagnostic Research*, 6(6):982-986.

Adams, S., Luo, W., Wesolowski, L., Cohen, S.E., Peters, P.J., Owen, S.M. & Masciotra, S. 2017. Performance evaluation of the point-of-care INSTI™ HIV -1/2 antibody test in early and established HIV infections. *Journal of Clinical Virology*, 91:90-94. https://doi.org/10.1016/j.jcv.2017.03.012

Adeniyi, O.V., Ajayi. A.I., Ter Goon D., Owolabi, E.O., Eboh, A. & Lambert, J. 2018. Factors affecting adherence to antiretroviral therapy among pregnant women in the Eastern Cape, South Africa. *BMC Infectious Diseases*, 18(1), Article175. https://doi.org/10.1186/s12879-018-3087-8

Aghamolaei, T., Tavafian, S.S., Hasani, L., & Zare, S. 2009. Attitudes of healthcare providers towards patients with HIV /AIDS in Bandar Abbas. *Achieves of Iranian Medicine*, 12(3):298-301.

Ahmed, S., Autrey, J., Katz, I.T., Fox, M.P., Rosen, S., Onoya, D., Bärnighausen, T., Mayer, K.H. & Bor J. 2018. Why do people living with HIV not initiate treatment? A systematic review of qualitative evidence from low- and middle-income countries. *Social Science & Medicine*, 213:72-84. https://doi.org/10.1016/j.socscimed.2018.05.048

Alemayehu, M., Yisehak, Y., Alaro, W. & Alemayehu, B. 2017. Opportunistic Infections among HIV/AIDS Patients. Taking Anti-retroviral Therapy at a Tertiary Care Hospital in Wolaita Zone, Southern Ethiopia. *Journal of AIDS & Clinical* Research, 8(2), Article 1000665.

Althoff, K.N., Chandran, A., Zhang, J., Arevalo, W.M., Gange, S.J., Sterling, T.R., Gill, M.J., Justice, A.C., Palella Jr, F.J., Rebeiro, P.F., Silverberg, M.J., Mayor, A.M., Horberg, M.A., Thorne, J.E., Rabkin, C.S., Mathews, W.C., Klein, M.B., Humes, E., Lee, J., Hogg, R., Moore, R.D. & North American AIDS cohort collaboration on research and design of leDEA. 2019. Life expectancy disparities among adults with HIV in the United State and Canada: the impact of a reduction in drug- and alcohol- related death using the Lives Saved Simulation. *American Journal of Epidemiology.* 188(12):2097-2109. https://doi.org/10.1093/aje/kwz232

Amico, K.R. & Bekker, L.G. 2019. Global PrEP roll-out: recommendations for programmatic success. *The Lancet HIV*, 6(2):e137-e140. https://doi.org/10.1016/S2352-3018(19)30002-5

Amzel, A., Toska, E., Lovich, R., Widyono, M., Patel, T., Foti, C., Dziuban, E.J., Phelps, B.R., Sugandhi, N., Mark, D., Altschuler, J. & the Child Survival Working Group of the Interagency Task Team on the Prevention and Treatment of HIV Infection in Pregnant Women, Mothers and Children.2013. Promoting a combination approach to paediatric HIV psychosocial support. *AIDS*, 27(Suppl. 2):S147-S157.

Andersson, G.Z., Reinius, M., Eriksson, L.E., Svedhem, V., Esfahani, F.M., Deuba, K., Rao, D., Lyatuu, G.W., Giovenco, D. & Ekström, A.M. 2019. Stigma reduction interventions in people living with HIV to improve health-related quality of life. *The Lancet HIV*, 7(2):e129-e140. https://doi.org/10.1016/S2352-3018(19)30343-1

Aregay, A.D., Kidane, K.M., Aregay, A.B., Fenta, K.A. Woldegebriel, A.G., Godefay, H. & Woldearegay, T.W. 2020. Prediction of CD4 T-lymphocyte count using WHO clinical staging among ART-naïve HIV-related adolescents and adults in Northern Ethopia: a retrospective study. *AIDS Research and Treatment*, 2020, Article 2163486, 8 pp. https://doi.org/10.1155/2020/2163486

Avert. 2018. Taking care of yourself when living with HIV. https://www.Avert.org/living-with-HIV/health-wellbeing/taking-care-of-yourself [21 November 2020].

Azia, I.N., Mukumbang, F.C. & Van Wyk, B. 2016. Barriers to adherence to antiretroviral treatment in a regional hospial in Vredenburg in Western Cape, South Africa. *Southern African Journal of HIV Medicine*, 17(1), a476. https://doi.org/10.4102/sajhivmed.v17i1.476

Bam, N.E. & Naidoo, J.R. 2014. Nurses' experiences in palliative care of terminally-ill HIV patients in a level 1 district hospital. *Curationis*, 37(1), Article 1238, 9 pp. https://doi.org/10.4102/curationis.v37i1.1238

Barouch, D.H. & Deeks, S.G. 2014. Immunologic strategies for HIV-1 remission and eradication. *Science Jounals,* 345(6193):169-174

Barron, P., Pillay, Y., Doherty, T., Sherman, G., Jackson, D., Bhardwaj, S., Robinson, P. & Goga, A. 2013. Eliminating mother-to-child HIV transmission in South Africa. *Bulletin of the World Health Organization,* 91:70-74.

Bateganya, M., Amanyeiwe, U., Roxo, U. & Dong, M. 2015. Impact of support groups for people living with HIV on clinical outcomes: a systematic review of the literature. *Journal of Acquired Immune Deficiency Syndrome*, 68(3):S368-S374.

Bektaş, H.A. & Kulakaç, Ö. 2007. Knowledge and attitudes of nursing students toward patients living with HIV/AIDS (PLHIV): a Turkish perspective. *AIDS Care*, 19(7):888-894. https://doi.org/10.1080/09540120701203352

Ben Natan, M., Dubov, D. & Raychlin M. 2015. Nursing students' willingness to care for human immunodeficiency virus-infected patients in the future. *Nurse Educator*, 40(6):E1-E5.

Bergman, E., De Feijter, J., Frambach, J., Godefrooij, M., Slootweg, I., Stalmeijer, R. & Van Der Zwet, J. 2012. A guide to research paradigms relevant to medical education. *Academic Medicine*, 87(4):545.

Bless C., Higson-Smith, C. & Kagee, A. 2006. *Fundamentals of social research methods: An African perspective.* 4th ed. Cape Town: Juta.

Bonato, M., Turrini, F., Vitobello, C., Giordani, A., Passeri, L., Meloni, A., Galli, L., La Torre, A., Merati, G., Pavei, G. & Cinque, P. 2018. The use of a mobile application to support physical activity and lifestyle changes in persons living with HIV: the smartapp study. In Murphy, M., Boreham, C., De Vito, G. & Tsolakidis, E. (eds). *Book of Abstracts of the 23rd Annual Congress of the European College of Sport Science, Dublin, Ireland, 4–7 July*. Cologne: SporTools: 528.

Brattström-Stolt, L. Funk, T., Sié, A., Ndiaye, C. & Alfvén, T. 2019. Noma–knowledge and practice competence among primary health care workers: a cross-sectional study in Burkina Faso. *International Health*, 11(4):290-296. https://doi.org/10.1093/inthealth/ihy088

Brink, H., Van der Walt, C. & Van Rensburg, G. 2012. *Fundamentals of research methodology for healthcare professionals.* 3rd ed. Cape Town: Juta.

Browne, S.H, Barford, K., Ramela, T. & Dowse, R. 2019. The impact of illustrated side effect information on understanding and sustained retention of antiretroviral side effect knowledge. *Research in Social & Administrative Pharmacy*, 15(4):469-473.

Brynard, P.A. & Hanekom, S.X. 2006. *Introduction to research in management- related fields.* 2nd ed. Pretoria*:* Van Schaik.

Callaghan, M., Ford, N. & Schneider, H. 2010. A systematic review of task-shifting for HIV treatment and care in Africa. *Human Resources for Health*, 8, Article 8. https://doi.org/10.1186/1478-4491-8-8

Chang, L.W., Serwadda, D., Quinn, T.C., Wawer, M.J., Gray, R.H. & Reynolds, S.J. 2013. Combination implementation for HIV prevention: moving from clinical trial evidence to population-level effects. *The Lancet Infectious Diseases*, 13(1):65-76. https://doi.org/10.1016/S1473-3099(12)70273-6

Cheung, P.S. & Rana S. 2019. Nursing students' knowledge of HIV AIDS: literature review. Unpublished Bachelor's thesis (Social Services, Health and Sport), JAMK University of Applied Sciences, Jyväskylä, Finland.

Chimoyi, L., Tshuma, N., Muloongo, K., Setswe, G., Sarfo, B. & Nyasulu, P.S. 2015. HIV-related knowledge, perceptions, attitudes, and utilisation of HIV counselling and testing: a venue-based intercept commuter population survey in the inner city of Johannesburg, South Africa. *Global Health Action*, 8(1), Article 26950, 9 pp. http://dx.doi.org/10.3402/gha.v8.26950

Clemenzi-Allen, A.A., Hickey, M., Conte, M., Das, D., Geng, E., Riley, E., Havlir, D., Gandhi, M. & Imbert, E. 2020. Improving care outcomes for PLWHIV experiencing homelessness and unstable housing: a synthetic review of clinic-based strategies. *Current HIV/AIDS Reports*,17(3):259-267. https://doi.org/10.1007/s11904-020-00488-0

Clouse, K., Pettifor, A.E., Maskew, M., Bassett, J., Van Rie, A., Behets, F., Gay, C., Sanne, I. & Fox, M.P. 2013. Patient retention from HIV diagnosis through one year on antiretroviral therapy at a primary healthcare clinic in Johannesburg, South Africa. *Journal of Acquired Immune Deficiency Syndrome,* 62(2):e39-346.

Coetzee, B., Kagee A. & Bland, R. 2015. Barriers and facilitators to paediatric adherence to antiretroviral therapy in rural South Africa: a multi-stakeholder perspective. *AIDS Care*, 27(3):315-321. https://doi.org/10.1080/09540121.2014.967658

Colvin C.J., Fairall, L., Lewin S., Georgeu, D., Zwarenstein, M., Bachmann, M.O, Uebel, K.E. & Bateman, E.D. 2010. Expanding access to ART in South Africa: the role of nurse-initiated treatment. *South African Medical Journal,* 100(4):210-212.

Concise Oxford English dictionary. 8th ed. 1990. Oxford: Oxford University Press.

Crock, E.A., Miller, C., McKenzie, R., Burk, N., Frecker, J., Hall, J.E. & Ramirez, O.M. 2017. Emerging needs of people living with HIV receiving community-based nursing in an Australian setting. *Journal of the Association of Nurses in AIDS Care*, 28(4):644-658.

De Lima, I.C.V., Galvão, M.T.G., De Oliveira Alexandre, H., Lima, F.E.T. & De Araújo, T.L. 2016. Information and communication technologies for adherence to antiretroviral treatment in adults with HIV /Aids. *International Journal of Medical Informatics,* 92:54-61. https://doi.org/10.1016/j.ijmedinf.2016.04.013

De Munnik, S., Den Daas, C., Ameerlaan, H.S.M., Kok, G., Raethke, M.S. & Vervoort, S.C.J.M. 2017. Let's talk about sex: a qualitative study exploring the experiences of HIV nurses when discussing sexual risk behaviours with HIV-positive men who are having sex with men. *International Journal of Nursing Studies*, 76:55-61. https://doi.org/10.1016/j.ijnurstu.2017.09.002

Dehne, K.L., Dallabetta, G., Wilson, D., Garnett, G.P., Laga, M., Benomar, E., Fakoya, A., Baggaley, R.C., Nelson, L.J., Kasedde, S., Bermejo, A., Warren, M., Benedikt, C. & Global Prevention Focal Point Group. 2016. HIV prevention 2020: a framework for delivery and a call for action. *The Lancet HIV.* 3(7):e323-e332. https://doi.org/10.1016/S2352-3018(16)30035-2

DeKoekkoek, T., Given, B., Given C.W., Ridenour K., Schueller, M. & Spoelstra, S.L. 2015. mHealth SMS text messaging interventions and to promote medication adherence: an integrative review. *Journal of Clinical Nursing,* 24(19-20): 2722-2735. https://doi.org/10.1111/jocn.12918

Department of Health. 2003. National Health Act, No. 61 of 2003. Pretoria. Department of Health.

Department of Health. 2013. Nursing Act, No. 33 of 2005: Regulations regarding the scope of practice of nurses and midwives. *Government Gazette*, 36835, 15 October: 1-18.

Department of Health. 2016a. Implementation of the Universal Test and Treat strategy for HIV positive patients and differentiated care for stable patents. Pretoria: Department of Health.

Department of Health. 2016b. National HIV testing services: policy 2016. Pretoria. Department of Health.

Department of Health. 2018. Standard treatment guidelines and essential medicines list for South Africa. 6th ed. Pretoria: Department of Health.

Department of statistics. 2020. Press statement: Mid-year population estimates. Pretoria: Department of statistics.

Dharmalingam, M., Poreddi, V., Gandhi, S. & Chandra, R. 2015. Undergraduate nursing students' knowledge and attitude towards people living with human immunodeficiency virus/acquired immunodeficiency syndrome. *International Journal of Advanced Medical and Health Research*, 2(1):22-27.

Du Plooy-Cilliers, F., Davids, C. & Bezuidenhout, R.M. (eds). 2014. *Research matters.* Cape Town: Juta.

Edanto, Agung Waluyo & Sri Yona. 2019. Correlation of family acceptance and peer support group toward sexual behavior risk on MSM with HIV /AIDS in Medan, Indonesia. *Efermería Clínica*, 29(Suppl. 2):189-193. https://doi.org/10.1016/j.enfcli.2019.04.052

Fairall, L., Bachmann, M.O., Lombard, C., Timmerman, V., Uebel, K., Zwarenstein, M., Boulle, A., Georgeu, D., Colvin, C.J., Lewin, S., Faris, G., Cornick, R., Draper, B., Tshabalala, M., Kotze, E., Van Vuuren, C., Steyn, D., Chapman, R. & Bateman, E. 2012. Task shifting of antiretroviral treatment from doctors to primary-care nurses in South Africa (STRETCH): a pragmatic, parallel, cluster-randomised trial. *The Lancet,* 380(9845):889-898. https://doi.org/10.1016/S0140-6736(12)60730-2

Fincham, J.E. 2008. Response rates and responsiveness for surveys, standards, and the *Journal*. *American Journal of Pharmaceutical Education*, 72(2):43. https://doi.org/10.5688/aj720243

Ford, N., Meintjes, G., Vitoria, M., Greene, G. & Chiller, T. 2017. The evolving of CD4 cell counts in HIV. *Current Opinion in HIV and AIDS*, 12(2):123-128.

Foundation for Professional Development. 2014. Management of HIV in the work place. Pretoria: FPD.

Foundation for Professional Development. 2017. The integrated management of TB, HIV and STIs in the primary health setting for healthcare professionals. Pretoria: FPD.

Frain J.A. 2017. Preparing every nurse to become an HIV nurse*. Nurse Education Today*, 48:129-133. https://doi.org/10.1016/j.nedt.2016.10.005

Frambach, J.M., Van der Vleuten, C.P.M. & Durning, S.J. 2013. Quality criteria in qualitative and quantitative research. *Academic Medicine*, 88(4):552.

Galagan, S., Jed, S., Sumitani, J., Gilvydis, J.M. Bakor, A., Cooke, R., Naidoo, E., Winters, D. & Weaver, M.R. 2017. Improving tuberculosis (TB) and human immunodeficiency virus (HIV) treatment monitoring in South Africa: evaluation of an advanced TB/HIV course for healthcare workers. *Open Forum Infectious Diseases*, 4(1), Article ofw248. https://doi.org/10.1093/ofid/ofw248

Gebresillassie, B.M., Gebeyehum, M.B., Abegaz, T.M., Erku, D.A., Mekuria, A.B. & Tadesse, Y.D. 2016. Evaluation of cotrimoxazole use as a preventive therapy among patients living with HIV/AIDS in Gondar University Referral Hospital, Northwestern Ethiopia: a retrospective, cross-sectional study. *HIV/AIDS – Research and Palliative Care,* 8:125-133*.* https://doi.org/10.2147/HIV.S103081

Genberg, B.L., Shangani, S., Sabatino, K., Rachlis, B., Wachira, J., Braitstein, P. & Operario, D. 2017. Improving engagement in the HIV care cascade: a systematic review of intervention involving people living with HIV/AIDS as peers. *AIDS and Behavior*, 20(10):2452-2463*.* https://doi.org/10.1007/s10461-016-1307-z

Geremew, D., Melku, M., Endalamaw, A., Woldu, B., Fasil, A., Negash, M., Baynes, H.W., Geremew, H., Teklu, T., Deressa, T., Tessema, B. & Sack U. 2020. Tuberculosis and its association with $CD4^+$ T cell count among adult HIV positive patients in Ethiopian settings: a systematic review and meta-analysis. *BMC Infectious Diseases*, 20, Article 325, 10 pp. https://doi.org/10.1186/s12879-020-05040-4

Gerrish, K. & Lacey, A. 2010. *The research process in nursing.* 6th ed. Oxford: Wiley-Blackwell.

Gezahegn, M. & Upadhyay, M. 2014. The effect of HIV/AIDS on economic growth of southern African countries. *Asian Economic and Financial Review,* 4(9):1146-1157.

Goel, N.K., Bansal, R., Pathak, R., Sharma, H.K., Aggarwal, M. & Luthra, S.C. 2010. Knowledge and awareness of nursing students about HIV/AIDS. *Journal of Health and Population: Perspectives and Issues*, 33(1):55-60.

Gray, R.H. 2019. Male circumcision for HIV and STI prevention: a reflection. *Clinical Chemistry*, 65(1):15-18. https://doi.org/10.1373/clinchem.2018.286542

Green, A., De Azevedo, V., Patten, G., Davies, M., Ibeto, M. & Cox, V. 2014. Clinical mentorship of nurse initiated antiretroviral therapy in Khayelitsha, South Africa: a quality of care assessment. *PloS One*, 9(6):e98389. https://doi.org/10.1371/journal.pone.0098389

Griffin, D.O. 2018. The diagnosis of symptomatic acute antiretroviral syndrome during the window period with antigen/antibody testing and HIV viral load. *IDCases*, 12:157-160. https://doi.org/10.1016/j.idcr.2018.05.011

Guillon M. 2018. Success factors for universal access to antiretroviral treatments in South Africa. *International Journal of Health Planning and Management*, 33(4): e1160-e1178. https://doi.org/10.1002/hpm.2602

Gunn, L.H., Janson, B., Lorjuste, I., Summers, L., Burns, P. & Bryant, T. 2019. Healthcare providers' knowledge, readiness, prescribing behaviors, and perceived barriers regarding routine HIV testing and pre-exposure prophylaxis in DeLand, Florida. *SAGE Open Medicine*, 7, Article 2050312119836030, 12 pp. https://doi.org/10.1177/2050312119836030

Gwokyalya, V., Beyeza-Kashesya, J., Bwanika, J.B., Matovu, J.K.B., Mugerwa, S., Arinaitwe, J., Kasozi, D., Bukenya, J., Kindyomunda, R., Wagner, G.J., Makumbi, F.E. & Wanyenze, R.K. 2019. Knowledge and correlates of use of safer conception methods among HIV infected women attending HIV care in Uganda. *Reproductive Health*, 16(Suppl. 1):64.

Hansen, T.T., Herselman, M., Du Plessis, L., Daniels, L., Bezuidenhout, T., Van Niekerk, C., Truter, L. & Iversen, P.O. 2015. Evaluation of selected aspects of the nutrition therapeutic programme offered to HIV-positive women of child bearing age in Western Cape province, South Africa. *Southern African Journal of HIV Medicine,* 16(1), Article 388, 5 pp. http://dx.doi.org/10.4102/sajhivmed.v16i1.338

Harding, R. 2018. Palliative care as an essential component of the HIV care continuum. *The Lancet HIV*, 5(9):e524-e530. https://doi.org/10.1016/s2352-3018(18)30110-3

Haroun, D., El Saleh, O., Wood, L., Mechli, R., Al Marzouqi, N. & Anouti, S. 2016. Assessment knowledge of, and attitude to, HIV/Aids among university students in the United Arab Emirates. *PloS One*, 11(2):e0149920. https://doi.org/10.1371/journal.pone.0149920

Haskins, J.L.M., Phakathi, S., Grant, M. & Horwood, C.M. 2014. Attitudes of nurses towards patient care at a rural district hospital in the KwaZulu-Natal province of South

Africa. *Africa Journal of Nursing and Midwifery*, 16(1):32-44. https://doi.org/10.25159/2520-5293/1485

Heale, R. & Twycross, A. 2015. Validity and reliability in quantitative studies. *Evidence-Based Nursing*, 18(3):66-67. http://dx.doi.org/10.1136/eb-2015-102129

Hu, S., Neff, C.P., Kumar, D.M., Habu, Y., Akkina, S.R., Seki, T. & Akkina, R. 2017. A humanized mouse model for HIV-2 infection and efficacy testing of a single-pill triple-drug combination anti-retroviral therapy. *Virology*, 501:115-118. https://doi.org/10.1016/j.virol.2016.11.013

Human Sciences Research Council (HSRC). 2018. The fifth South African national HIV prevalence, incidence, behaviour and communication survey, 2017. HIV impact assessment summary, July. http://www.hsrc.ac.za/uploads/pageContent/9234/SABSSMV_Impact_Assessment_Summary_ZA_ADS_cleared_PDFA4.pdf [13 November 2020].

Hunter R.F., Gough, A., O'Kane, N., McKeown, G., Fitzpatrick, A., Walker T., McKinley, M., Lee, M. & Fee, K. 2018. Ethical issues in social media research for public health. *American Journal of Public Health*, 108(3):343-348. https://doi.org/10.2105/AJPH.2017.304249

Ibeneme, S.C., Irem, F.O., Iloanusi, N.I., Ezuma, A.D., Ezenwankwo, F.E., Okere, P.C., Nnamani, A.O. Ezeafor, S.N., Dim, N.R. & Fortwengel, G. 2019. Impact of physical exercises on immune function, bone mineral density, and quality of life in people living with HIV/AIDS: a systematic review with meta-analysis. *BMC Infectious Diseases*, 19(1), Article 340. https://doi.org/10.1186/s12879-019-3916-4

Ignacio, R.A.B., Chu, J., Power, M.C., Douaiher, J., Lane, J.D., Collins, J.P. & Stone, V.E. 2014. Influence of the provider and nurse on completion of non-targeted HIV screening in an urgent care setting. *Aids Research and Therapy*, 11(1):24.

Iwelunmor, J., Sofolahan-Oladeinde, Y. & Airhihenbuwa, C.O. 2015. Social cultural factors influencing HIV disclosure among men in South Africa. *American Journal of Men's Health*, 9(3):193-200. https://doi.org/10.1177/1557988314535235

Iwoi, D.M.W., Nde, P.F., Yuh, E., Kwenti, E.T., Tshimwanga, E.K., Achiri, D.T. & Djunda, K.E. 2017. Assessment of the level of knowledge, attitude, and practice with regard to care of people living with HIV/AIDS among nursing midwifery students in Fako, Cameroon. *World Journal of AIDS*, 7(1):1-15.

Jafari, H., Khatony A., Abdi, A. & Jafari, F. 2019. Nursing and midwifery students' attitude towards principles of medical ethics in Kermanshah, Iran. *BMC Medical Ethics*, 20(1), Article 26. https://doi.org/10.1186/s12910-019-0364-z

Jaiantilal, P., Gutin, S.A., Cummings, B., Mbofana, F. & Rose, C.D. 2015. Acceptability, feasibility and challenges of implementing an HIV prevention intervention for people living with HIVAIDS among healthcare providers in Mozambique: results of a qualitative study. *SAHARA-J: Journal of Social Aspects of HIV/AIDS*, 12(1):2-9. https://doi.org/10.1080/17290376.2015.1016999

Johanson, G.A. & Brooks, G.P. 2010. Initial scale development: sample size for pilot studies. *Educational and Psychological Measurement*, 70(3):394-400. https://doi.org/10.1177/0013164409355692

Jose, H., Madi, D., Chowta, N., Ramapuram, J., Bhaskaran, U., Achappa, B. & Chandran, V. 2016. Fertility desires and intentions among people living with HIV/AIDS (PLWHA) in Southern India. *Journal of Clinical and Diagnostic Research*, 10(6):OC19-OC22.

Kassa, H., Murugan, R., Zewdu, F., Hailu, M. & Woldeyohannes, D. 2014. Assessment of knowledge, attitude and practice and associated factors towards palliative care among nurses working in selected hospitals, Addis Ababa, Ethiopia. *BMC Palliative Care*,13(1), Article 6. https://doi.org/10.1186/1472-684X-13-6

Kaushik, V. & Walsh, C.A. 2019. Pragmatism as a research paradigm and its implications for social work research. *Social Sciences*, 8(9), Article 255. https://doi.org/10.3390/socsci8090255

Kave, S., Khuzwayo, N.F., Hatcher, A. & Sikweyiya, Y. 2019. The role of support groups in linking and retaining newly diagnosed clients in HIV care in a peri-urban location in South Africa. *African Journal of AIDS Research*, 18(1):9-17. https://doi.org/10.2989/16085906.2018.1551233

Kelly, M., Dowling, M. & Millar, M. 2018. The search for understanding: the role of paradigms. *Nurse Researcher*, 25(4):9-13.

Kharsany, A.B.M. & Karim, Q.C. 2016. HIV infection and AIDS in sub-Saharan Africa: current status, challenges and opportunities. *Open Aids Journal*, 10:34-48.

Khidir, H., Psaros, C., Greener, L., O'Neil, K., Mathenjwa, M., Mosery, F.N., Moore, L., Harrison, A., Bangsberg, D.R., Smit, J.A. & Safren, S.A. 2018. Developing a safer

conception intervention for men living with HIV in South Africa. *AIDS and Behavior*, 22(6):1725-1735. https://doi.org/10.1007/s10461-017-1719-4

Kigozi, G., Musoke, R., Watya, S., Kighoma, N., Nkale, J., Nakafeero, M., Namuguzi, D., Serwada, D., Nalugoda, F., Sewankambo, N., Wawer, M.J. & Gray, R.H. 2014. The safety and acceptance of the PrePex device for non-surgical adult male circumcision in Rakai, Uganda: a non-randomized observational study. *PloS One*, 9(8):e100008.

Kivunja, C. & Kuyini, A.B. 2017. Understanding and applying research paradigms in educational contexts. *International Journal of Higher Education*, 6(5):26-41. https://doi.org/10.5430/ijhe.v6n5p26

Knebel, E., Puttkammer, N., Demes, A., Devirois, R. & Prismy, M. 2008. Developing a competency-based curriculum in HIV for nursing schools in Haiti. *Human Resources for Health*, 6(1), Article 17. https://doi.org/10.1186/1478-4491-6-17

Kok, G., Guvenc, G. & Kaplan, Z. 2018. Nursing students' knowledge, attitudes and willingness to care toward people with HIV/AIDS. *International Journal of Caring Sciences,* 11(3):1697-1706.

Land, H. 2016. Special issue on living with HIV/AIDS: prospects and challenges. *Journal of HIV/Aids & Social Services*, 15(2):127-129. https://doi.org/10.1080/15381501.2016.1169836

Laurence, C., Wispelwey, E., Flickinger T.E., Grabowski, M., Waldman A.L., Plews-Ogan, E., Debolt, C., Reynolds, G., Cohn, W., Ingersoll, K. & Dillingham, R. 2019. Development of positive links: a mobile phone app to promote linkage and retention in care for people with HIV. *JMIR Formative Research,* 3(1):e11578.

Lawler, M. & Naby, F. 2020. Opportunistic infection. In Bobat, R. (ed.). *HIV infection in children and adolescents*. Cham: Springer Nature: 165-179.

Leon, N., Lewin, S. & Matthews, C. 2013. Implementing a provider-initiated testing and counselling (PITC) intervention in Cape Town, South Africa: a process evaluation using the normalisation process model. *Implementation Science*, 8, Article 97, 17 pp. https://doi.org/10.1186/1748-5908-8-97

Lin, D., Wooley, I. & Post J. 2019. Respiratory tract infections in patients with HIV infection. https://hivmanagement.ashm.org.au/respiratory-tract-infections-in-patients-with-hiv-infection/ [22 November 2020].

Lin, X., Garg, S., Mattson, C.L., Luo, Q. & Skarbinski, J. 2016. Prescription of *pneumocystis Jiroveci* pneumonia prophylaxis in HIV-infected patients. *Journal of the International Association of Providers of AIDS Care*, 15(6):455-458. https://doi.org/10.1177/2325957416667486

Long, L.C., Fox, M.P., Sauls, C,. Evans, D,. Sanne, I. & Rosen, S.B. 2016. The high cost of HIV-positive inpatient care at an urban hospital in Johannesburg, South Africa. *PloS One*, 11(2):e0148546.

Lui, P.S.C., Sarangapany, J., Begley, K., Coote, K. & Kishore, K. 2014. Medical and nursing students' perceived knowledge, attitudes, and practices concerning human immunodeficiecy virus. *International Scholarly Research Notices,* 2014, Article 975875, 9 pp. https://doi.org/10.1155/2014/975875

Lundgren, J.D., Borges, A.H. & Neaton, J.D. 2018. Serious non-AIDS conditions in HIV: benefits of early ART. *Current HIV Aids Reports*,15(2):162-171. https://doi.org/10.1007/s11904-018-0387-y
Luzuriaga, K. & Mofenson, L.M. 2016. Challenges in elimination of pediatric HIV-1 infection. *New England Journal of Medicine*, 374(8):761-770.

Magasana, V., Zembe, W., Tabana, H., Naik, R., Jackson, D., Swanevelder, S. & Doherty, T. 2016. An assessment of quality of home-based HIV counseling and testing perfomed by lay counselors in a rural sub-district of KwaZulu-Natal, South Africa. *SAHARA-J: Journal of Social Aspects of HIV/AIDS,* 13(1):188-196. https://doi.org/10.1080/17290376.2016.1248477

Maggini, S., Pierre, A. & Calder, P.C. 2018. Immune function and micronutrient requirements change over the life course. *Nutrients*,10(10), Article 1531. https://doi.org/10.3390/nu10101531

Maluccio, J.A., Palermo, T., Kadiyala, S. & Rawat, R. 2015. Improving health-related quality of life among PLWH: results from an impact evaluation of a food assistance program in Uganda. *PloS One*, 10(8):e0135879. https://doi.org/10.1371/journal.pone.0135879

Mangi, N.G., Ter Goon, D. & Yako, E.M. 2019. Self-efficiency and clinical performance of nurses initiated and management of antiretroviral therapy: narrative review. *The Open Public Health Journal*, 12:86-93.

Marcus, J.L., Leyden, W.A., Alexeeff, S.E., Anderson, A.N., Hechter, R.C., Hu, H., Lam, J.O., Towner, W.J., Yuan, Q., Horberg, M.A. & Silverberg, M.J. 2020. Comparison of

overall and comorbidity-free life expectancy between insured adults with and without HIV infection, 2000–2016. *JAMA Network Open*, 3(6): e207954.

Marie Modeste, R.R. & Adejumo, O. 2015a. An investigation into the new graduate nurses' care and management of patients with HIV and AIDS in two provinces of South Africa: teaching and learning in healthcare professions. *African Journal for Physical Health Education, Recreation and Dance*, Suppl. 1:336-350.

Marie Modeste, R.R., & Adejumo, O. 2015b. Validation of the Integration of HIV and AIDS related nursing competencies into the undergraduate nursing curriculum in South Africa. *Curationis*, 38(2), Article 1521, 11 pp. http://dx.doi.org/10.4102/curationis.v38i2.1521

Marsh, K., Eaton, J.W., Mahy, M., Sabin, K., Autenrieth, C.S., Wanyeki, I., Daher, J. & Ghys, P.D. 2019. Global, regional and country-level 90–90–90 estimates for 2018: assessing progress towards the 2020 target. *AIDS*, 33(Suppl. 3):S213–S226.

Martin S.R. & Bryant R.V. 2019. Opportunistic infections. In Sturm, A. & White, L. (eds). *Inflammatory bowel disease nursing manual*. Cham: Springer: 189-204. https://doi.org/10.1007/978-3-319-75022-4_21

Maughan-Brown, B., Kuo, C., Galárraga, O., Smith P., Lurie, M.N., Bekker, L.G. & Harrison, A. 2018. Stumbling blocks at the clinic: experiences of seeking HIV treatment and care in South Africa. *AIDS and Behavior*, 22(3):765-773.

Mavhandu-Mudzusi, A.H., Sandy, P.T. & Hettema, A. 2017. Registered nurses' perceptions regarding nurse-led antiretroviral therapy initiation in Hhohho region, Swaziland. *International Nursing Review*, 64(4):552-560. https://doi.org/10.1111/inr.12375

McDonald, R.P. & Ho, M.H.R. 2002. Principles and practice in reporting structural equation analyses. *Psychological Methods*, 7(1):64-82. https://doi.org/10.1037/1082-989X.7.1.64

McDermott-Levy, R., Leffers, J. & Mayaka J. 2018. Ethical principles and guidelines of global health nursing practice. *Nursing Outlook*, 66(5):473-481. https://doi.org/10.1016/j.outlook.2018.06.013

McKay, V.R., Dolcini, M.M. & Catania, J.A. 2017. Impact of human resources on implementing an evidence-based HIV prevention intervention. *AIDS and Behavior*, 21(5):1394-1406. https://doi.org/10.1007/s10461-016-1425-7

Meehan, S.A., Leon, N., Naidoo, P., Jennings, K., Burger, R. & Buyers, N. 2015. Availability and acceptability of HIV counselling and testing service. A qualitative study comparing clients' experiences of accessing HIV testing at public sector primary health care facilities or non-governmental mobile services in Cape Town, South Africa. *BMC Public Health*, 15, Article 845, 10 pp. https://doi.org/10.1186/s12889-015-2173-8

Mekonnen, G.B. & Addis, S.A. 2020. Factors affecting adherence to co-trimoxazole preventive therapy in HIV/AIDS patients attending an antiretroviral therapy clinic in Ethiopia University Hospital: a cross-sectional study. *Patient Preference and Adherence*, 14:881-890. https://doi.org/10.2147/PPA.S252805

Mensana, M.P., Ernawati, D.S., Nugraha, A.P. Soebadi, B., Triyono, E.A., Husada, D., Prasetyo, R.A., Utami, S.B. & Sufiawati, I. 2018. Oral candidiasis profile of the Indonesian HIV infected pediatric patients at UPIPI Dr Soetomo General Hospital, Surabaya, Indonesia. *HIV & AIDS Review*, 17(4):272-277. https://doi.org/10.5114/hivar.2018.80259

Mohammed, E.Y.F., Kever, R.T., Martins, S.D., Afolabi, O. & Bulama, K.U. 2016. Knowledge, attitudes and practices of nurses on prevention of mother-to-child transmission (PMTCT) of human immune-deficiency virus (HIV) in State Specialist Hospital, Maiduguri, Borno State. *International Journal of Nursing and Midwifery*, 8(2):12-17. https://doi.org/10.5897/IJNM2015.0156

Mohammed, M.B. Impact of HIV/AIDS on labour productivity in Nigeria. *African Journal of Health Economics*, 9(1):33-45. https://doi.org.10.35202/AJHE.2020.913345

Monyatsi, G., Mullan, P.C., Phelps, B.R., Tolle, M.A., Machine, E.M., Gennari, F.F., Makosky, J. & Anabwani, G.M. 2012. HIV management by nurse prescribers compared with doctors at a paediatric centre in Gaborone, Botswana. *South African Medical* Journal,102(1):34-36.

Motsomi, K., Makanjee, C., Basera, T. & Nyasulu, P. 2016. Factors affecting effective communication about sexual and reproductive health issues between parents and adolescents in Zandspruit informal settlement, Johannesburg, South Africa. *Pan African Medical Journal*, 25, Article 120.

Mulaudzi, M.V., Pengpid, S. & Peltzer, K. 2011. Nurses' knowledge, attitudes, and coping related to HIV/AIDS in a rural hospital in South Africa. *Studies on Ethno-Medicine*, 5(1):25-32. https://doi.org/10.1080/09735070.2011.11886388

Mulenga, C. & Naidoo, J.R. 2017. Nurses' knowledge, attitudes and practices regarding evidence-based practice in the prevention of mother-to-child transmission of HIV

programme in Malawi. *Curationis*, 40(1), Article 1656, 8 pp. https://dx.doi.org/10.4102/curationis.v40i1.1656

Mutabazi, V., Kaplan, S.A., Rwamasirabo, E., Bitega, J.P., Ngeruka, M.L., Savio, D., Karema, C. & Binagwaho, A. 2013. One-arm, open-label, prospective, cohort field study to assess the safety and efficacy of the PrePex device for scale-up of nonsurgical circumcision when performed by nurses in resource-limited settings for HIV prevention. *Journal of Acquired Immune Deficiency Syndromes*, 63(3):315-322.

Naidoo, P.V., Dawood, F., Driver, C., Narainsamy, M., Ndlovu, S. & Ndlovu, V. 2012. Knowledge, attitudes and perceptions of pharmacy and nursing students towards male circumcision and HIV in a KwaZulu-Natal university, South Africa. *African Journal of Primary Health Care & Family Medicine*, 4(1), Article 327. http://dx.doi.org/10.4102/phcfm.v4i1.327

National Institute for Communicable Diseases. 2015. Prevention of mother to child transmission: a South African success story. *Communicable Disease Communiqué*, 14(12):5-6.

Neves, L.A de S., Castrghini, C. de C., Reis, R.K., Canini, S.R.M. da S. & Gir, E. 2018. Social support and quality of life of people with tuberculosis/HIV. *Enfermería Global*, 17(2)*:*21-29. https://doi.org/10.6018/eglobal.17.2.276351

Ngaihte, P.C., Santella, A.J., Ngaihte, E., Watt, R.G., Raj, S.S., Vatsyayan, V. & Ngaihte, G. 2017. Indian dentists' knowledge, attitudes, and willingness to conduct HIV testing: a qualitative study. *JBR Journal of Interdisciplinary Medicine and Dental Science*, 5(4), Article 4.

Ngcobo, S., Wolvaardt, J.E., Bac, M. & Webb, E. 2018. The quality of voluntary medical male circumstances done by mid-level workers in Tshwane District, South Africa: a retrospective analysis. *PloS One*,13(1):e0190795.

Ngcobo, S.J. & Mchunu G.G. 2019. Bachelor of Nursing Students' HIV and AIDS knowledge in Kwazulu-Natal province: an evaluation study. *Curationis,* 42(1), Article 1928, 11 pp. https://doi.org/10.4102/curationis.v42i1.1928

Nyamathi, A.M., Carpenter, C.L., Ekstrand, M.L., Yadav, K., Garfin, D.R., Muniz, L.C., Kelley, M. & Sinha, S. 2018. Randomized controlled trial of a community-based intervention on HIV and nutritional outcomes at 6 months among women living with HIV/AIDS in rural India. *AIDS*, 32(18):2727-2737.

O'Byrne, P., MacPherson, P., Orser, L., Jacob, J.D. & Holmes, D. 2019. PrEp-RN: clinical considerations and protocols for nurse-led PrEP. *Journal of the Association of Nurses in AIDS Care*, 30(3):301-311.

O'Connell, M.B., Jensen, P.S., Andersen, S.L., Fernbrant, C., Nørholm, V. & Petersen, H.V. 2017. Stuck in tradition – A qualitative study on barriers for implementation of evidence based nutritional care perceived by nursing staff. *Journal of Clinical Nursing*, 27(3-4):705-714. https//doi.org/10.1111/jocn.14020

Odwee, A., Kasozi, K.I., Acup, C.A., Kyamanywa, P., Ssebuufu, R., Obura, R., Agaba, J.B., Makeri, D., Kirimuhuzya, C., Sasirabo, O. & Bamaiyi, P.H. 2020. Malnutrition amongst HIV adult patients in selected hospitals of Bushenyi district in southwestern Uganda. *African Health Sciences*, 20(1):122-131.

Ogbonna, K., Govender, I. & Tumbo, J. 2016. Knowledge and practice of the prevention of mother-to-child transmission of HIV guidelines amongst doctors and nurses at Odi Hospital, Tshwane District. *South African Family Practice*, 58(5):167-171. https://doi.org/10.1080/20786190.2016.1228561

Ong-Flaherty, C., Banks, A., Doyle, M. & Sharifi, C.O. 2016. The meaning of evidence and nonmaleficence: cases from nursing. *Online Journal of Health Ethics*, 12(2), Article 2, 10 pp. http//dx.doi.org/10.18785/ojhe.1202.02

Osuji, A., Pharr, J.R., Nwokoro, U, Ike, A., Ali, C. Ejiro, O., Osuyali, J., Obiefune, M. Fiscella, K. & Ezeanolue, E.E. 2015. Impact of HIV testing and counseling (HTC) knowledge on HIV prevention practices among traditional birth attendants in Nigeria. *International Journal of Environmental Research and Public Health*, 12(2):1969-1982. https://doi.org/10.3390/ijerph120201969

Pal, S., Chattopadhyay, S., Mandal, M. & Biswas, A. 2016. Knowledge and practice regarding prevention and control of HIV/AIDS prevailing: a study among the selected nurses in two rural hospitals in West Bengal. *Indian Medical Gazette*, 150:123-131.

Parameshwaran, V., Cockbain, B.C., Hillyard, M. & Price, J.R. 2017. Is the lack of specific lesbian, gay, transgender and queer/questioning (LGBTQ) health care education in medical school a cause for concern? Evidence from a survey of knowledge and practice among UK medical students. *Journal of Homosexuality*, 64(3):367-381. https://doi.org/10.1080/00918369.2016.1190218

Passos, S.M.K. & Souza, L.D. de M. 2015. An evaluation of quality of life and its determinants among people living with HIV/AIDS from Southern Brazil. *Cadernos de Saúde Pública*, 31(4):800-814. https://doi.org/10.1590/0102-311X00000514

Petkova, M.S., Elabor, Z.B., Djarova-Daniels, T., Pavlova, E.G. & Omole, O.B. 2018. Nurses' knowledge of and willingness to promote female condom use in Johannesburg Health District. *South African Journal of Science*, 114(7-8), Article 0174, 7 pp.

Piercy, H., Bell, G., Hughes, C., Naylor, S. & Bowman, C. 2018. A workforce in jeopardy: identifying the challenges of ensuring a sustainable advanced HIV nursing workforce. *Journal of Research in Nursing*, 23(8):646-656. https://doi.org/10.1177/1744987118780913

Pillay, K., Gardner, M., Gould A., Otiti, S., Mullineux, J., Bärnighausen, T. & Matthews, P.M. 2018. Long-term effect of primary health care training on HIV testing: a quasi-experimental evaluation of the Sexual Health in Practice (SHIP) intervention. *PloS One*,13(8):e0199891. https://doi.org/10.1371/journal.pone.0199891

Polit, D.F & Beck, C.T. 2008. *nursing research: generating and assessing evidence for nursing practice*. 8th ed. Philadelphia, PA: Lippincott Williams & Wilkins.

Price, S. & Reichert, C. 2017. The Importance of continuous professional development to career satisfaction and patient care: meeting the need of novice to mid- to late-career nurses throughout their career span. *Administrative Sciences*, 7(2), Article 17, 13 pp. https://doi.org/10.3390/admsci7020017

Rabkin, M., De Pinho, H., Michaels-Strasser, S., Naitore, D., Rawat, A. & Topp, S.M. 2018. Strengthening the health workforce to support integration of HIV and non-communicable disease services in sub-Saharan Africa. *AIDS*, 32(Suppl.1):S47–S54.

Rabkin, M., Lamb, M., Osakwe, Z.T., Mwangi, P.R., El-Sadr, W.M. & Michaels-Strasser S. 2017. Nurse-led HIV services and quality of care at health facilities in Kenya, 2014–2016. *Bulletin of the World Health Organization*, 95(5):353-361. http://dx.doi.org/10.2471/BLT.16.180646

Relf, M.V., Mekwa, J., Chasokela, C., Nhlengethwa, W., Letsie, E., Mtengezo, J., Ramantele, K., Diesel, T., Booth, C., Deng, L., Mallinson, R.K., Powell, D., Webb, A., Liddle, A., Yu-Shears, J., Hall, C., Aranda-Naranjo, B. & Hopson, D.P. 2011. Essential nursing competency related to HIV and AIDS. *Journal of the Association of Nurses in AIDS Care*, 22(Suppl.1):e5-e40. https://doi.org/10.1016/j.jana.2010.07.007

Rogers, B.G., Lee, J.S., Bainter, S.A., Bedoya, C.A., Pinkston, M. & Safren, S.A. 2020. A multilevel examination of sleep, depression, and quality of life in people living with HIV/AIDS. *Journal of Health Psychology*, 25(10-11):1556-1566. https://doi.org/10.1177/1359105318765632 [This article has a delayed release (embargo) and will be available in PMC on September 1, 2021.]

Rosen, S., Maskew, M., Fox, M.P., Nyoni, C., Mongwenyana, C., Malete, G., Sanne, I., Bokaba, D., Souls, C., Rohr, J. & Long L. 2016. Correction: Initiating antiretroviral therapy for HIV at a patient's first clinic visit: the rapIT randomized controlled trial. *PLoS Medicine*, 13(5):e1002050. https://doi.org/10.1371/journal.pmed.1002050

Rossouw, M.E., Cornell, M., Cotton, M.F. & Esser, M.M. 2016. Feeding practices and nutritional status of HIV-exposed and HIV-unexposed Infants in the Western Cape. *Southern African Journal of HIV Medicine*,17(1), Article 398. http://dx.doi.org/10.4102/sajhivmed.v17i1.398

Rouleau, G., Richard, L., Côté, J., Gagnon, M.P. & Pelletier, J. 2019. Nursing practice to support people living with HIV with antiretroviral therapy adherence: a qualitative study. *Journal of the Association of Nurses in AIDS Care*, 30(4):e20-e37.

Roura, M., Watson-Jones, D., Kahawita, T.M., Ferguson, L. & Ross, D.A. 2013. Provider-initiated testing and counselling programmes in sub-Saharan Africa: a systematic review of their operational implementation. *AIDS,* 27(4):617-626.

Ruud, K.W., Srinivas S.C. & Toverud, E.L. 2014. Knowledge of HIV and its treatment among health care providers in South Africa. *International Journal of Clinical Pharmacy*, 36(2):352-359. https://doi.org/10.1007/s11096-013-9902-9

Sambah, F., Hormenu, T., Ahinkorah, B.O., Hagan, J.E. & Schack, T. 2018. Nurses/midwifery trainees' knowledge, attitudes and utilisation of HIV testing /counselling service in the central region of Ghana. *Journal of Health Science*, 6:449-460. https://doi.org/10.17265/2328-7136/2018.06.009

Santella, A.J., Conway, D.I. & Watt, R.G. 2016. The potential role of dentists in HIV screening. *British Dental Journal*, 220(5):229-233. https://doi.org/10.1038/sj.bdj.2016.172

Sari, N.P.W.P. & Parut, A.A. 2017. The effect of HIV-related knowledge on the willingness to participate in voluntary counseling and testing (VCT) among nursing students. *Advances in Health Sciences Research*, 3:189-202. https://doi.org/10.2991/inc-17.2017.2

Sari, N.P.W.P. & Parut, A.A. 2018. HIV/AIDS-related knowledge and willingness to participate in voluntary counselling and testing among health science university students. *Jurnal Ners*, 13(2):162-170.

Schmidt, H.M.A., McIver, R., Houghton, R., Selvey, C., Mc Nulty, A., Varma, R., Grulich, A.E. & Holden, J. 2018. Nurse-led pre-exposure prophylaxis: a non-traditional model to

provide HIV prevention in a resources-constrained, pragmatic clinical trial. *Sexual Health*, 15(6):595-597. https://doi.org/10.1071/SH18076

Sehume, O., Zungu, L. & Hoque, M. 2012. Attitude and willingness of nursing students towards caring for patients infected with HIV in South Africa. *IFE Psychologia*, 20(2):12-20.

Sepahvand, F., Shoorideh, F.A., Parvizy, S. & Tafreshi, M.Z. 2019. Factors affecting nurses' perceived organizational commitment: a qualitative study. *Bangladesh Journal of Medical Science*, 18(2):303-311. https://doi.org/10.3329/bjms.v18i2.40701

Serwaa, B.D. 2018. Nurses' knowledge, attitudes and practice towards patients with HIV and AIDS, Kumasi, Ghana. Unpublished MA (Nursing Science) dissertation, University of South Africa, Pretoria.

Sharma, M., Chris, A., Chan, A., Knox, D.C., Wilton, J., McEwen, O., Mishra, S., Grace, D., Rogers, T., Bayoumi, A.M., Maxwell, J., Shahin, R., Bogoch, I., Gilbert, M. & Tan, D.H.S. 2018. Decentralizing the delivery of HIV pre-exposure prophylaxis (PrEP) through family physicians and sexual health clinic nurses: a dissemination and implementation study protocol. *BMC Health Services Research*, 18(1), Article 513.

Shoko, C. & Chikobvu, D. 2019. A superiority of viral load over CD4 cell count when predicting mortality in HIV patients on therapy. *BMC Infectious Diseases*, 19(1), Article169. https://doi.org/10.1186/s12879-019-3781-1

Shrestha, R., Lim, S.H. Altice, F.L., Copenhaver, M., Wickersham, J.A., Saifi, R., Halim, A., Naning, H. & Kamarulzaman, A. 2020. Use of smartphone to seek sexual health information online among Malaysian men who have sex with men (MSM): implications for mHealth intervention to increase HIV testing and reduce HIV risks. *Journal of Community Health*, 45(1):10-19.

Silverman, J.G. 2011. Adolescent female sex workers: invisibility, violence and HIV. *Archives of Disease in Childhood*, 96(5):478-481. http://dx.doi.org/10.1136/adc.2009.178715

Smit, J.A., Church, K., Milford, C., Harrison, A.D. & Beksinska, M.E. 2012. Key informant perspectives on policy- and service-level challenges and opportunities for delivering integrated sexual and reproductive health and HIV care in South Africa. *BMC Health Sevices Research*, 12(1), Article 48. https://doi.org/10.1186/1472-6963-12-48

Smith, J., Odera, D.N., Chege, D., Muigai, E.N., Patnaik, P., Michaels-Strasser, S., Howard, A.A., Yu-Shears, J. & Dohrn, J. 2016. Identifying the gaps: an assessment of nurses' training, competency, and practice in HIV care and treatment in Kenya. *Journal of the Association of Nurses in Aids Care*, 27(3):322-330. http://dx.doi.org/10.1016/j.jana.2016.01.005

Solomons D.J, Van der Merwe A.S., Esterhuizen, T.M. & Crowley, T. 2019. Factors influencing the confidence and knowledge of nurses prescribing antiretroviral treatment in a rural and urban district in the Western Cape province. *Southern African Journal of HIV Medicine*, 20(1), 7 pp.

Som, P., Bhattacherjee, S., Guha, R., Basu, M. & Datta, S. 2015. A study of knowledge and practice among nurses regarding care of human immunodeficiency virus positive patients in medical college and hospitals of Kolkata, India. *Annals of Nigerian Medicine*, 9(1):15-19.

South African Nursing Council (SANC). 2005. Nursing education and training standards, in terms of the Nursing Act (Act No. 33 of 2005, as amended). Pretoria: SANC.

South African Nursing Council (SANC). 2005. Nursing education and training standards, in terms of the Nursing Act (Act No. 33 of 2005, as amended): Bachelor degree in nursing and midwifery qualification framework. Pretoria: SANC.

South African Nursing Council (SANC). 2016. Registration of student nurses and student midwives/accoucheurs – calendar year 2015. Pretoria: SANC.

South African Nursing Council (SANC). 2017. Annual statistics. Age analysis of persons on the register, 2017. Pretoria: SANC.

South African Nursing Council (SANC). 2019. Annual statistics. Age analysis of persons on the register, 2019. Pretoria: SANC.

Souza, A.C. de, Alexandre, N.M.C. & Guirardello, E. de B. 2017. Psychometric properties in instruments evaluation of reliability and validity. *Epidemiologia e Serviços de Saúde*, 26(3):649-659. http://dx.doi.org/10.5123/s1679-49742017000300022

Soweto Trust for Nurse Clinical Training (STNCT). 2017. *Primary clinical care manual*. 9th ed. Johannesburg: Jacana Media.

Stime, K.J., Garrett, N., Sookrajh, Y., Dorward, J., Dlamini, N., Olowolagba, A., Sharma, M., Barnabas, R.V. & Drain, P.K. 2018. Clinic flow for STI, HIV, and TB patients in an urban infectious disease clinic offering point-of-care testing services in Durban, South

Africa. *BMC Health Services Research,* 18(1), Article 363, 9 pp. https://doi.org/10.1186/s12913-018-3154-2

Strauss, M., George, G.L. & Rhodes, B.D. 2018. Determining preferences related to HIV counselling and testing services among high school learners in KwaZulu-Natal: a discreet choice experiment. *AIDS and Behavior*, 22(1):64-76. https://doi.org/10.1007/s10461-016-1602-8

Suryana, K., Suharsono, H. & Joenputri, N. 2020. The association between WHO clinical and other risk factors with pulmonary tuberculosis among people living with HIV/AIDS: a cross-sectional study. *International Journal of Pharmacy and Pharmaceutical Sciences*, 12(7):18-22. https://doi.org/10.22159/ijpps.2020v12i7.37982

Susilowati, T., Sutaryono, T.N.K. & Sofro, M.A.U. 2019. Loss of follow-up predisposition factors in HIV and AIDS patients with ARV therapy. In Setiyo, M. et al. (eds). *Proceedings of the 1st Borobudur International Symposium on Humanities, Economics and Social Sciences (BIS-HESS 2019), Indonesia.* Paris: Atlantis Press: 580-583. https://doi.org/10.2991/assehr.k.200529.122

Suthar, A.B., Vitoria, M.A., Nagata, J.M., Anglaret, X. Mbori-Ngacha, D., Sued, O., Kaplan, J.E. & Doherty, M.C. 2015. Co-trimoxazole prophylaxis in adults, including pregnant women, with HIV: a systematic review and meta-analysis. *The Lancet HIV*, 2(4):e137-e150. https://doi.org/10.1016/S2352-3018(15)00005-3

Swart, A.M., Chisholm, B.S., Cohen, K., Workman, L.J., Cameron, D. & Blockman, M. 2013. Analysis of queries from nurses to the South African National HIV & TB Health Care Worker Hotline*. Southern African Journal of HIV Medicine*,14(4):179-182. https://doi.org/10.4102/sajhivmed.v14i4.54

Tesfaw, A., Jara, D. & Temesgen, H. 2017. Dietary diversity and associated factors among HIV positive adult patients attending public health facilities in Motta Town, East Gojjam Zone, Northwest Ethiopia, 2017. *Advances in Public Health*, 2018, Article 6135482, 8 pp. https://doi.org/10.1155/2018/6135482

Teeraananchai, S., Kerr S.J., Ruxrungtham, K., Avihingsanon, A., Chaivooth, S., Teeraratkul, A., Bhakeecheep, S., Ongwandee, S., Thanprasertsuk, S. & Law, M.G. 2018. Loss to follow-up and associated factors of patients in the National AIDS Program in Thailand. *Antiviral Therapy*, 23(6):529-538.

Tinaro, P., Zewotir, T. & North, D. 2020. Trends and adaptive optimal set points of $CD4^+$ count clinical covariates at each phase of the HIV disease progression. *AIDS Research and Treatment*, 2020, Article 1379676, 14 pp. https://doi.org/10.1155/2020/1379676

Tshering, K., Wangchuk, K. & Letho, Z. 2020. Assessment of knowledge, attitude and practice of post exposure prophylaxis for HIV among nurses at Jigme Dorji Wanghuck National Referral Hospital, Bhutan. *PloS One*, 15(8):e0238069. https://doi.org/10.1371/journal.pone.0238069

Tshingani, K., Donnen, P., Mukumnbi, H., Duez, P. & Dramaix-Wilmet, M. 2017. Impact of *Moringa Oleifera* lam. Leaf powder supplementation versus nutritional counseling on the body mass index and immune response of HIV patients on antiretroviral therapy: a single-blind randomized control trial. *BMC Complementary Medicine and Therapies,*17(1), Article 420. https://doi.org/10.1186/s12906-017-1920-z

Uebel, K., Guise, A., Georgeu, D., Colvin, C. & Lewin, S. 2013. Integrated HIV care into nurse-led primary health care service in South Africa: a synthesis of three linked qualitative studies. *BMC Health Services Research*, 13(1), Article 171, 11 pp. https://doi.org/10.1186/1472-6963-13-171

UNAIDS. 2016a. Press release: South Africa takes bold step to provide HIV treatment for all. Geneva: UNAIDS.

UNAIDS. 2016b. Update: The importance of HIV care and support services. Geneva: UNAIDS.

UNAIDS. 2018. UNAIDS data 2018. Geneva: UNAIDS. https://www.unaids.org/sites/default/files/media_asset/unaids-data-2018_en.pdf [4 June 2019].

UNAIDS. 2019. UNAIDS data 2019. Geneva: UNAIDS. https://www.unaids.org/sites/default/files/media_asset/2019-UNAIDS-data_en.pdf [3 June 2020].

UNAIDS. 2020a. Global AIDS update 2020. Seizing the moment: tackling entrenched inequalities to end epidemics. Geneva: UNAIDS. https://www.unaids.org/sites/default/files/media_asset/2020_global-aids-report_en.pdf [15 October 2020].

UNAIDS. 2020b. Global HIV & AIDS statistics — 2020 fact sheet. Geneva: UNAIDS. https://www.unaids.org/en/resources/fact-sheet [13 November 2020].

Van Dyk, A.C. 2013. *HIV and AIDS: education, care and counselling: a multidisciplinary approach*. 5th ed. Cape Town: Pearson Education.

Venter, W.D.F., Fischer, A., Lalla-Edward, S.T., Coleman, J., Lau Chan, V., Shubber, Z., Phatsoane, M., Gorgens, M., Stewart-Isherwood, L., Carmona, S. & Fraser-Hurt, N. 2019. Improving linkage to and retention in care in newly diagnosed HIV-positive patients using smartphones in South Africa: randomized controlled trial. *JMIR mHealth and uHhealth*, 7(4):e12652.

Vermund, S.H. & Hayes, R.J. 2013. Combination prevention: new hope for stopping the epidemic. *Current HIV/AIDS Reports*, 10(2):169-186. https://doi.org/10.1007/s11904-013-0155-y

Vermund, S.H., Fidler, S.J., Ayles, H., Beyers, N., Hayes, R.J. & HPTN 071 Study Team. 2013. Can combination prevention strategies reduce HIV transmission in generalized epidemic settings in Africa? The HPTN 071 (PopART) study plan in South Africa and Zambia. *Journal of Acquired Immune Deficiency Syndromes*, 63(2): S221-S227.

Vieira, L., Mahumane, A.M., Napua, M., Chale, F., Manuel, J.L., Cowan, J.G., Sherr, K., Chapman, R.R. & Pfeiffer, J.T. 2020. HIV exposed infant follow-up in Mozambique: formative research findings for the design of a cluster randomized controlled trial to improve testing and ART initiation. *BMC Health Services* Research, 20(1), Article 226, 10 pp.

Waldura, J.F., Neff, S., Dehlendorf, C. & Goldschmidt, R.H. 2013. Teleconsultation improves primary care clinicians' confidence about caring for HIV. *Journal of General Internal Medicine*, 28(6):793-800. https://doi.org/10.1007/s11606-013-2332-5

Warren-Jeanpiere, L., Dillaway, H., Hamilton, P., Young, M., & Goparaju, L. 2017. Life begins at 60: identifying the social support needs of African American women aging with HIV. *Journal of Health Care for the Poor and Underserved*, 28(1):389-405.

Warren, N., Portillo, C.J., Dawson-Rose, C., Monasterio, E., Fox, C.B., Freeborn, K., Morris, P. & Stringari-Murray S. 2018. HIV primary care curriculum improves HIV knowledge, confidence, and attitudes. *Journal for Nurse Practitioners,*14(6):e113-e120. https://doi.org/10.1016/j.nurpra.2018.03.008

Weldegebreal, F., Digaffe, T., Mesfin, F. & Mitiku, H. 2018. Dietary diversity and associated factors among HIV positive adults attending antiretroviral therapy clinics at Hiwot Fana and Dilchora Hospitals, eastern Ethiopia. *HIV/AIDS*, 10:63-72. https://doi.org/10.2147/HIV.S138638

World Health Organization (WHO). 2016. Guideline: updates on HIV and infant feeding. The duration of breast feeding and support from health services to improve feeding

practices among mothers living with HIV. Geneva: WHO. https://apps.who.int/iris/bitstream/handle/10665/246260/9789241549707-eng.pdf?sequence=1

World Health Organization (WHO). 2018. Guideline: HIV diagnosis and ART use in HIV-exposed infants: a programmatic update. *WHO Technical Report*, July.

World Health Organization (WHO). 2020. Surveillance of antiretroviral toxicity: global HIV, hepatitis and STIs programme. What's new in person-centred HIV antiretroviral drug toxicity monitoring. *WHO Technical Brief*, June.

Yordy, B.M., Roberts, S. & Taggart, H.M. 2017. Quality Improvement in clinical nutrition: screening and mealtime protection for the hospitalized patient. *Clinical Nurse Specialist,* 31(3):149-156.

Young, M.E. & Ryan, A. 2020. Postpositivism in health professions education scholarship. *Academic Medicine*, 95(5):695-699.

Zuber, A., McCarthy, C.F., Verani, A.R., Msidi, E. & Johnson, C. 2014. A survey of nurse-initiated and -managed antiretroviral therapy (NIMART) in practice, education, policy, and regulation in east, central, and southern Africa. *Journal of the Association of Nurses in AIDS Care*, 25(6):520-531.

Zuo, L., Peng, K. , Hu, Y. & Xu, Q. 2019. Genotypic methods for HIV drug resistance monitoring: the opportunities and challenges faced by China. *Current HIV Research*, 17(4):225-239. https//doi.org/10.2174/1570162x17666190927154110

Appendices

Appendix A – Research information

Principal investigator: Pfarelo Mandiwana

Co-investigator: **Dr R.R. Marie Modeste**

Address: **Faculty of Health and Wellness Sciences**
Cape Peninsula University of Technology (CPUT)
Bellville Campus
Symphony Way
Cape Town, 7535

Contact Numbers: **Pfarelo Mandiwana 0824390379**

Dr R.R. Marie Modeste

Title of the project: Readiness for provision of HIV care among final-year nursing students from one university in the Western Cape

Dear Participant

You are invited to take part in a research project undertaken by Pfarelo Mandiwana with the aim to establish the readiness of final-year nursing students for the provision of care to people living with HIV in one of the nursing training institutions in the Western Cape. The study intends to ascertain final-year nursing students' readiness with regard to the

four aspects of HIV care. Kindly spend a few minutes reading the information presented, which will explain the details of this project. Should you have any questions about this project that you do not fully understand, please feel free to contact us personally. It is very important that you are fully satisfied and that you clearly understand what this research entails and how you could be involved. Furthermore, 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 initially agree to take part.

What is this research study all about?

The study aims to determine the readiness of final-year nursing students for the provision of care to people living with HIV in one of the nursing training institutions in the Western Cape. The study intends to determine the level of readiness of final-year nursing students regarding HIV prevention, management, promotion of health of PLWHIV, and evaluating health status for PLWHIV in one nursing training institution in the Western Cape.

Why have you been invited to participate?

The HIV epidemic requires every healthcare worker to have up-to-date knowledge and the confidence to manage people living with HIV, and to be willing to take care of people living with HIV for the country to accomplish the 2030 HIV reduction goals. As a final- year student, you are being prepared to be part of the healthcare workforce, hence you have the necessary information about your own readiness with regard to the provision of HIV care.

What will your responsibilities be?

You will also be asked to complete a questionnaire as honestly as possible which will take no longer than 20 minutes of your time.

Will you benefit from taking part in this research?

Although there is no personal benefit from participating in the study, the responses from respondents will greatly add value to the research field and can be utilised for further research and the higher education syllabus review. This in turn will have the potential to improve the provision of care for society as a whole, and for nursing education programmes.

Are there any risks involved in my taking part in this research?

There is no anticipated risk related to participation in the study. However, the researcher will make effort to avoid any harm or stress to all respondents, as your name, contact details and identity will be kept confidential. Should you experience any stress or discomfort, please feel free to report to the researcher, who will in turn refer you to the support services provide by the institution, tel. 021 959 6513.

Should you need further information, please feel free to contact:

Researcher: P. Mandiwana
Supervisor: R.R Marie Modeste
Telephone: 021 959 6183

Appendix B – Consent form: Declaration by participant

I declare that:

- I have read or had read to me this information and consent form and that 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 withdraw from the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished if the researcher feels it is in my best interests, or if I do not follow the study plan as agreed to.

I also consent that my information may be:

- **Used and kept for future research studies** ☐

- **Used and discarded** ☐

Signed at (*place*) .....…..……..…….. On (*date*) …..……..…..…..……. 2017

Signature of participant----------Signature of witness----------

DECLARATION BY THE INVESTIGATOR

I, Pfarelo Mandiwana, declare that I explained the information in this document to (*Name of Participant*) **……**

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

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

Signed at (*place*) .....…..……..…..…. On (*date*) …..……..…..…..…….. 2017

Signature of investigator---------- Signature of witness----------

Appendix C – Self-administered questionnaire

Department of Nursing

Faculty of Health and Wellness Sciences

Private Bag X 124 BELLVILLE 7530 South Africa

Telephone: (021) 959 6183 cell phone: 082 439 0379

Title: Readiness for provision of HIV care among final-year nursing students from one university in the Western Cape.

Part I: Demographic Data

	Please tick ☑ the appropriate answer				
1	Age (at your last birthday)	…….			
2	Gender	Male			
		Female			
3	Marital status	Single			
		Married			
		Divorced			
		Widower/Widow			
		Other – Specify ……			
4	Do you have previous healthcare work-related experience obtained before this course?	Yes		No	
5	If you answered 'yes' to Question 4, specify the type of previous healthcare-related experience (tick the appropriate box)	Caregiver	Auxiliary nursing assistant	Enrolled nursing	Other: …….

6	Do you have a family member, close friend or co-worker living with HIV?	Yes	No
7	Have you ever nursed a person living with HIV?	Yes	No

Part II: Readiness to provide HIV care

Please indicate the level at which you agree with the following statements related to your readiness for the provision of HIV care. **Please tick ☑ appropriate answers.**

Aspects of the framework	HIV care Aspects	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
HIV prevention	1. I am willing to conduct HIV pre-test counselling	1	2	3	4	5
	2. I am willing to conduct HIV testing	1	2	3	4	5
	3. I am willing to perform post-HIV counselling	1	2	3	4	5
	4. I am confident to perform HIV pre-test counselling	1	2	3	4	5
	5. I am confident to conduct HIV testing	1	2	3	4	5
	6. I am confident to performing HIV post-test counselling	1	2	3	4	5
	7. If a client tests HIV negative with a rapid test and she/he is sexually active, I will repeat the test after 3 months	1	2	3	4	5
	8. HIV rapid test detects the presence of HIV in the blood	5	4	3	2	1
	9. For breastfeeding infants, if the PCR (Polymerase Chain Reaction) test is negative, I will stop ART	5	4	3	2	1
Health promotion for PLWH	10.I am willing to conduct a nutritional programme for people living with HIV (PLWH)	1	2	3	4	5
	11.I am willing to conduct counselling for positive and healthy living to PLWH	1	2	3	4	5
	12.I am willing to provide health education on how to	1	2	3	4	5

Aspects of the framework	HIV care Aspects	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
	prevent opportunistic diseases to PLWHIV					
	13.I am confident in conducting a nutritional programme for PLWH	1	2	3	4	5
	14.I am confident in conducting counselling for positive and healthy living for PLWH	1	2	3	4	5
	15.I am confident in preventing opportunistic diseases for PLWH	1	2	3	4	5
	16.Nutritional supplements are given to all PLWHIV, not just the poor who cannot afford nutritious food	5	4	3	2	1
	17.Clients should be encouraged to use protection even if the partner is HIV positive	1	2	3	4	5
	18.Co-trimoxazole is given to prevent opportunistic diseases from HIV Stage 2 to Stage 4	1	2	3	4	5
Health status evaluation for PLWH	19.I am willing to assess clinical stages of HIV infection in all PLWHIV who come to consult.	1	2	3	4	5
	20.I am willing to assess opportunistic diseases during each follow-up of PLWHIV.	1	2	3	4	5
	21.I am willing to draw bloods to monitor the progression of HIV infection in the body	1	2	3	4	5
	22.I am confident in identifying clinical stages of HIV infection in all PLWHIV who come to consult.	1	2	3	4	5
	23.I am confident in assessing opportunistic diseases	1	2	3	4	5
	24.I am confident in drawing bloods for biological monitoring of PLWHIV.	1	2	3	4	5

Aspects of the framework	HIV care Aspects	Strongly disagree	Disagree	Uncertain	Agree	Strongly agree
	25.Kaposi's sarcoma is one of the symptoms of clinical Stage 4 HIV infection	1	2	3	4	5
	26.Cryptococcal meningitis, heart attack, diarrhoea are all common opportunistic diseases	5	4	3	2	1
	27.Some of biological monitoring of PLWHIV on antiretroviral therapy (ART) includes viral load, CD4, renal & liver function and haemoglobin differentiation	1	2	3	4	5
HIV management	28.I am willing to initiate ART	1	2	3	4	5
	29.I am willing to treat opportunistic diseases	1	2	3	4	5
	30.I am willing to provide HIV palliative care	1	2	3	4	5
	31.I am confident in choosing the correct ART regimen for PLWH	1	2	3	4	5
	32.I am confident in treating the opportunistic diseases for PLWHIV	1	2	3	4	5
	33.I am confident in caring for PLWHIV during palliative stage	1	2	3	4	5
	34.Tenofovir, emtricitabine and efavirenz are all first-line regimens of ART in South Africa	1	2	3	4	5
	35.Rifafour® is a treatment given to prevent meningitis for PLWH	5	4	3	2	1
	36.Making PLWHIV comfortable, oxygenation, keeping patient pain free and providing basic nursing care is all part of palliative care.	1	2	3	4	5

Appendix D - Letter of support from Student Counselling Department

Date: 6 March 2017

Letter of support

Dear Madam

I hereby acknowledge your request for support from Student Counselling Department, CPUT. The Student Counselling Department hereby agrees to provide a counselling service to students who may feel emotional discomfort during the process of the research project: "**Western Cape final-year nursing students' readiness for the provision of HIV care**" - Researcher Pfarelo Mandiwana – Student number: 213191946.

For any further requests, contact Student Counselling at ext. 6513

Kind regards

Dr Charlene Petersen

Student Counselling

Appendix E – Arrangements to access the campus

Western Cape Government
Health

Directorate WCCN
Date: 2017/03/02
Enquiries: Dr T M Bock
Head of Campus WCCN: Metro East Campus
021 684 1535

Mme M Pfarelo

CPUT Department of Nursing

RE: APPLICATION TO CONDUCT RESEARCH AT WCCN

Your proposal titled: "Western Cape final year nursing students' readiness for the provision of HIV care," refers.

In line with the CPUT research application policy the WCCN supports your research and will grant you access to its sites kindly note the following:

1) When you collect data at the WCCN, please furbish the Internal research ethics committee with proof of ethical clearance from CPUT HREC
2) You will be assisted by the committee to make contact with the relevant Heads of Campus to allow you the necessary access to the site to make all the necessary arrangements.

We wish you success with this endeavour

Sincerely

Dr T M Bock

Acting Chair of the WCCN Research Ethics committee

Head of Campus Metro East: Western Cape College of Nursing

Appendix F – Ethics clearance certificates

Cape Peninsula University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
Email: sethn@cput.ac.za

24 April 2017
REC Approval Reference No:
CPUT/HW-REC 2017/H7

Faculty of Health and Wellness Sciences – Nursing Sciences

Dear Ms Pfarelo

Re: APPLICATION TO THE HW-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC on 30 March 2017 to Ms Mandiwana Pfarelo – 213191946 for ethical clearance. This approval is for research activities related to student research in the Department of Nursing Science at this Institution.

TITLE: Western Cape final year nursing students' readiness for the provision of HIV care.

Supervisor: Dr R Modeste

Comment:

Data collection permission is required and has been obtained.

Approval will not extend beyond 25 April 2018. An extension should be applied for 6 weeks before this expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Mr. Navindhra Naidoo
Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

Cape Peninsula
University of Technology

HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)
Registration Number NHREC: REC- 230408-014

P.O. Box 1906 • Bellville 7535 South Africa
Symphony Road Bellville 7535
Tel: +27 21 959 6917
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13 May 2020
REC Approval Reference No:
CPUT/HW-REC 2020/H10

Faculty of Health and Wellness Sciences

Dear Ms P Mandiwana

Re: APPLICATION TO THE HW-REC FOR ETHICS CLEARANCE

Approval was granted by the Health and Wellness Sciences-REC to **Ms P Mandiwana** for ethical clearance. This approval is for research activities related to research for **Ms P Mandiwana** at Cape Peninsula University of Technology.

TITLE: **Readiness for provision of HIV care among final year nursing students from one university in the Western Cape**

Supervisor: Dr R Modeste

Comment:

Approval will not extend beyond 14 May 2021. An extension should be applied for 6 weeks before this1 expiry date should data collection and use/analysis of data, information and/or samples for this study continue beyond this date.

The investigator(s) should understand the ethical conditions under which they are authorized to carry out this study and they should be compliant to these conditions. It is required that the investigator(s) complete an **annual progress report** that should be submitted to the HWS-REC in December of that particular year, for the HWS-REC to be kept informed of the progress and of any problems you may have encountered.

Kind Regards

Dr *Navindhra Naidoo*
Chairperson – Research Ethics Committee
Faculty of Health and Wellness Sciences

Appendix G – Declaration from the editor

ELIZABETH S VAN ASWEGEN
BA (Bibl), BA Hons (English language & literature), MA (English), DLitt (English), FSAILIS

Language and technical editing | bibliographic citation

DECLARATION OF EDITING

11 Rosebank Place
Oranjezicht
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082 883 5763
lizvanas@mweb.co.za

The Master of Nursing thesis by candidate **Mandiwana Pfarelo**, titled 'Readiness for provision of HIV care among final-year nursing students from one university in the Western Cape' has been edited, the references have been checked for correctness and conformance with CPUT Harvard bibliographic style requirements, all in-text citations have been checked against the references, and all items in the reference list have been checked for citation in the text. The candidate has been advised to make the recommended changes.

Dr ES van Aswegen
29 November 2020